2020 年长安大学 SCI 论文统计

长安大学学科服务工作组

2021 年 6 月

前言

为分析我校学科发展情况，为学院和相关部门提供数据参考，图书馆学科服务工作组工作人员编制了本报告。

基于一套严格的选刊程序以及客观的计量方法，Web of Science 数据库中收录了各个学科领域中最具权威性和影响力的学术期刊。同时还收录了每一篇论文中所引用的参考文献并按照被引作者、出处和出版年代编制成索引，建成世界上影响力最大、最权威的引文索引数据库。

科学引文索引（Science Citation Index-Expanded，SCIE，科学引文索引扩展版），是 Web of Science 的一个子库，是全球最权威的自然科学引文数据库，也是文献计量学和科学计量学的重要工具。目前收录自然科学 9600 余种国际性、高影响力的学术期刊，数据最早可以回溯到 1900 年。通过引文检索功能可查找相关研究课题早期、当时和最近的学术文献，同时获取论文摘要；可以看到所引用参考文献的记录、被引用情况及相关文献的记录。

本报告统计了 2020 年长安大学各学院及单位在 SCIE 数据库中的论文收录和被引情况，并从多个方面分析了论文的学科贡献度。报告揭示了各学院在 SCIE 上的学术产出、影响力和发展趋势和对学科的贡献情况，供学院和相关部门参考。

由于学术水平和分析能力有限，本报告不足之处请批评指正，也希望各位提出宝贵建议。

长安大学图书馆学科服务工作组

2021 年 6 月

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第一章　数据来源与简介

本报告的数据来源于 SCIE 数据库，检索时间范围：2020 年 1 月——2020 年 12 月；报告检索及筛选条件：第一作者单位署名为长安大学的论文；报告中论文的检索及被引频次采集日期：2021 年 4 月 30 日。

1.1　SCIE 简介

科学引文索引（Science Citation Index-Expanded，SCIE，科学引文索引扩展版），是 Web of Science 的一个子库，是全球最权威的自然科学引文数据库，目前收录自然科学 9400 余种国际性、高影响力的学术期刊，数据最早可以回溯到 1900 年。其内容涵盖了数学、物理学、化学与化工、地球科学、交通运输、光学、信息与通信、计算机科学、控制科学、环境科学与工程、机电工程、土木工程、机械工程及自动化、材料科学与工程、冶金工程等 150 多个学科领域。

1.2　JCR 简介

依据来自 Web of Science（Science Citation Index Expanded 和 Social Science Citation Index）中的引文数据，Journal Citation Reports 提供可靠的统计分析方法，对全球学术期刊进行客观、系统的评估，对包含 SCI 收录的 3800 种核心期刊在内的 9000 多种期刊的影响因子（Impact Factor）等指数加以统计。帮助用户以定量的方式了解全球的学术期刊，并且通过这些分析数据可以了解某学术期刊在相应研究领域中的影响力。

1.3　关于中国科学院文献情报中心期刊分区法的说明

中国科学院文献情报中心期刊分区法是中科院文献情报中心制定的分区（简称中科院分区），该分区法首先将 SCI 期刊分为数学、物理、化学、生物、地学、天文、工程技术、医学、环境科学、农林科学、社会科学、管理科学及综合性期刊 13 大类，2020 年中科院文献情报中心发布了期刊分区表升级版。升级版将 13 个大类学科扩展至包括自然科学和社会科学在内的 18 个大类学科。小类分区表是将期刊按照 JCR 提供的 177 个比较细的学科类目所做的分区。

该分区法选择学术影响力作为划分方式，将各大类和各小类分各自为 4 个等级，即 4 个区。把每个学科的所有期刊按照学术影响力（3 年平均 IF）由高到底降序排列，依次划分为 4 个区，使得每个分区期刊影响力总和相同。由于学科内期刊的 3 年 IF 的偏态分布，这使得 1 区期刊数量极少。为了保证期刊 1 区期刊

数量，1 区期刊取整个学科数量总数的 5%，即 3 年平均 IF 最高的 5%的期刊为 1 区期刊。2~4 区期刊使用 3 年平均 IF 总和相同的方式划分。按照该方法，前 5%为该类 1 区、6%~20%为 2 区、21%~50%为 3 区，其余的为 4 区。

第二章　2020 年长安大学 SCIE 论文产出状况

2.1　SCIE 论文统计及学院分布概括

2.1.1　SCIE 论文统计及学院分布概括

2020 年，长安大学师生的科研论文被 SCIE 收录的“Article”类型论文有 2091 篇，以长安大学为第一作者单位发表的 SCIE 论文有 1427 篇，主要分布在 18 个学院（部）。各学院（部）发表的论文以及与 2016 年、2017 年、2018 年、2019 年发文情况比较详见表 1。

表 1　2016-2020 年长安大学各学院 SCIE 论文发表情况

序号	单位名称	2020 年 SCIE 论文数量	2019 年 SCIE 论文数量	2018 年 SCIE 论文数量	2017 年 SCIE 论文数量	2016 年 SCIE 论文数量
1	公路学院	**400**	318	180	111	80
2	水利与环境学院	**153**	131	86	68	81
3	地质工程与测绘学院	**128**	117	76	30	20
4	材料科学与工程学院	**109**	117	60	66	44
5	建筑工程学院	**103**	72	47	30	22
6	汽车学院	**101**	73	31	24	20
7	信息工程学院	**69**	69	41	27	28
8	电子与控制工程学院	**67**	38	45	24	10
9	地球科学与资源学院	**64**	59	96	43	22
10	工程机械学院	**59**	50	34	22	15
11	运输工程学院	**52**	2	-	-	-
12	经济与管理学院	**47**	54	34	16	1
13	理学院	**47**	34	35	17	13
14	建筑学院	**17**	21	12	4	2
15	土地工程学院	**5**	3	-	-	-
16	体育部	**3**	1	1	3	-

17	人文学院	**2**	1	-	-	-
18	外国语学院	**1**	4	1	1	-
合计		**1427**	1164	779	486	358

注：上表中的数据统计的均为第一作者单位为“长安大学”的 SCIE“Article”类型论文

从表 1 可以看出，近五年来，我校 SCIE 收录论文的总数呈逐年上升趋势，而且公路学院、地质工程与测绘学院、汽车学院、建筑工程学院、工程机械学院、等 5 所学院近五年 SCIE 发文数量也呈逐年上升趋势。公路学院、汽车学院、建筑工程学院、电子与控制工程学院、运输工程学院 2020 年 SCIE 论文数量实现突增（图 2）。而且，公路学院、水利与环境学院连续四年 SCIE 发文量在 18 所学院（部）中名列前三。

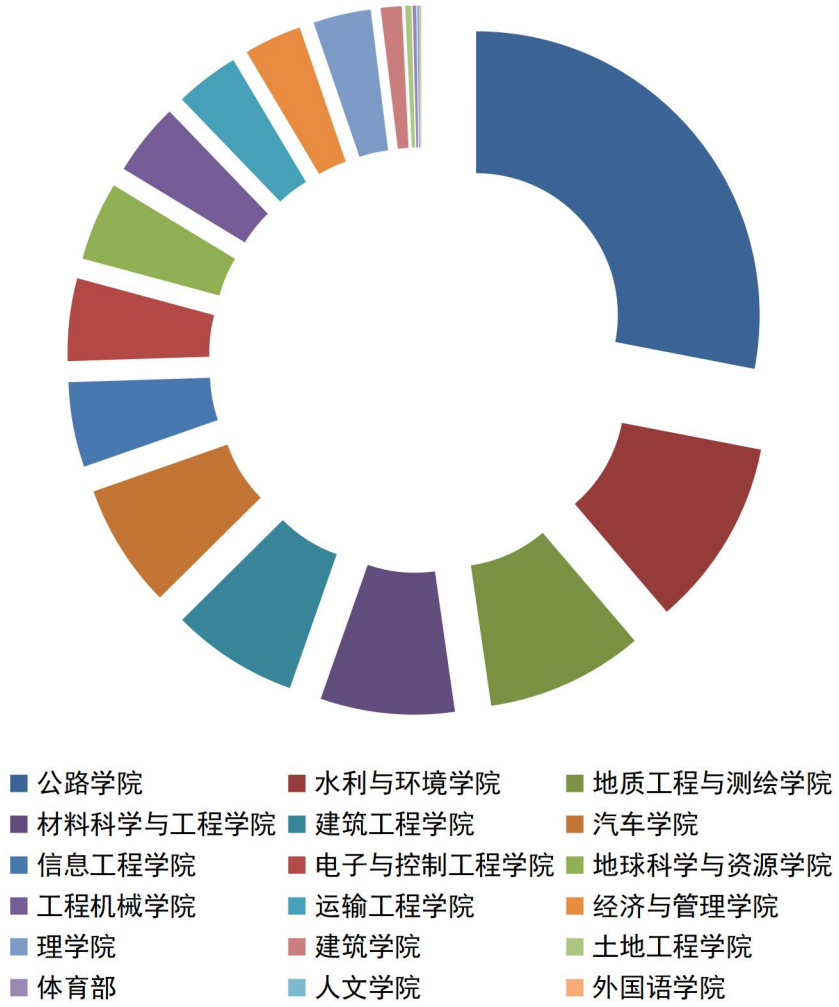

图 1　2020 年长安大学各单位 SCIE 论文发表情况图

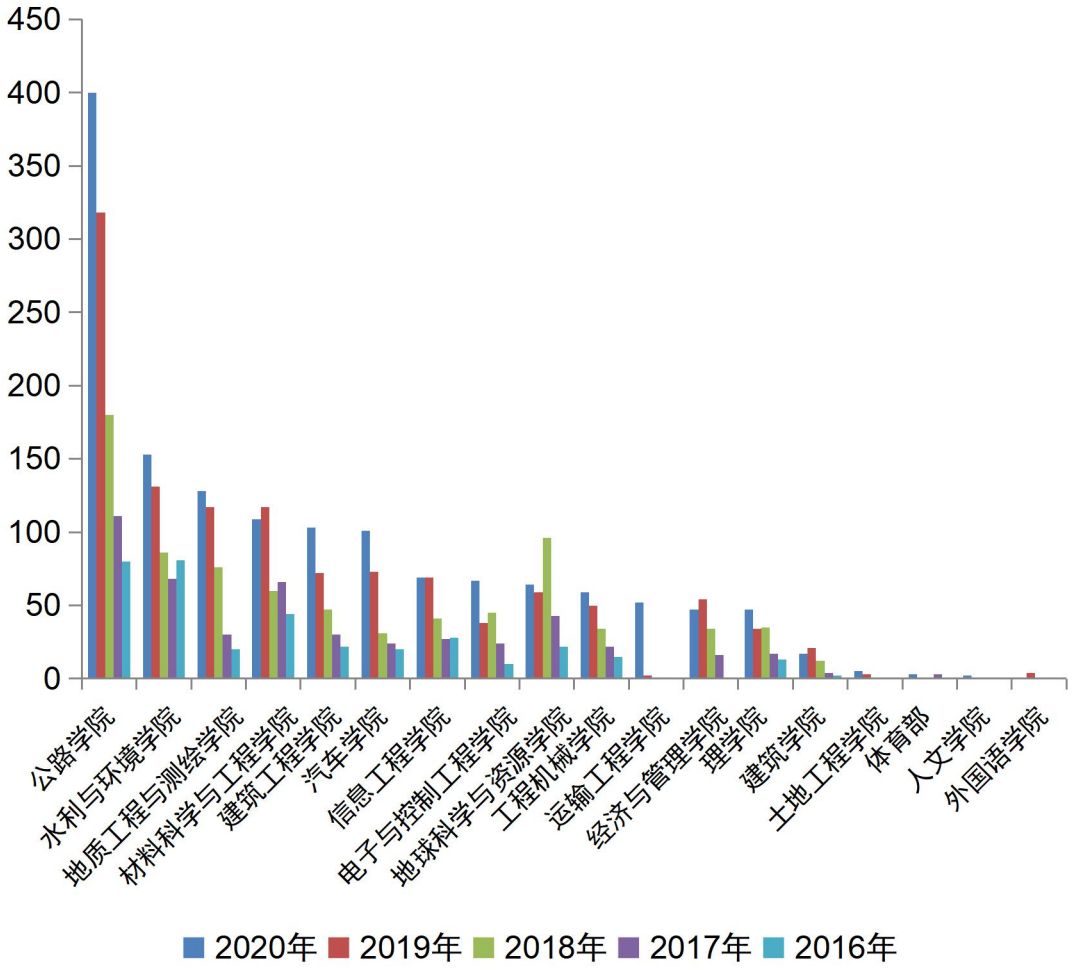

图 2　长安大学各单位 2016-2020 年 SCIE 论文发表情况图

2.1.2　2020 年各单位发表的 SCIE 论文详细情况（见附录 I）

18 个学院（部）SCIE 发文的详细记录见附录 I。

2.2　SCIE 论文被引频次分布情况

2020 年，我校师生以第一作者身份发表的 1427 篇 SCIE 论文，在 Web of Science 中共计被引 3069 次，篇均被引 2.15 次。其中，最高被引频次为 48 次，该论文为水利与环境学院在期刊《EXPOSURE AND HEALTH》上发表的论文《Finding High-Quality Groundwater Resources to Reduce the Hydatidosis Incidence in the Shiqu County of Sichuan Province, China: Analysis, Assessment, and Management》。各学院（部处）SCIE 论文被引频次分布情况详见表 2。

表 2　2020 年我校各学院（部）SCIE 论文被引频次分布情况

学院	SCI 论文总数（A）	总被引频次（B）	最高被引频次	篇均被引频次（B/A）
公路学院	400	928	41	2.32
水利与环境学院	153	869	48	5.67
地质工程与测绘学院	128	145	9	1.13
材料科学与工程学院	109	189	20	1.73
建筑工程学院	103	136	17	1.32
汽车学院	101	265	34	2.62
信息工程学院	69	99	15	1.43
电子与控制工程学院	67	79	13	1.17
地球科学与资源学院	64	87	10	1.35
工程机械学院	59	80	16	1.35
运输工程学院	52	24	4	0.46
经济与管理学院	47	76	14	1.61
理学院	47	64	13	1.36
建筑学院	17	22	6	1.29
土地工程学院	5	4	2	0.80
体育部	3	0	0	0.00
人文学院	2	2	2	1.00
外国语学院	1	0	0	0.00
合计	1427	3069	——	2.15

表 3 列出了 1427 篇 SCIE 论文在 Web of Science 合集中被引频次排名前 10 的论文，可以看出，水利与环境学院有 7 篇论文、汽车学院有 2 篇论文、公路学院有 1 篇论文已进入被引频次排名前 10。

表 3 Web of Science 合集中被引频次前 10 的论文

序号	篇名	第一作者	学院	来源期刊	Web of Science 合集中被引频次
1	Finding High-Quality Groundwater Resources to Reduce the Hydatidosis Incidence in the Shiqu County of Sichuan Province, China: Analysis, Assessment, and Management	Wang, Dan	水利与环境学院	EXPOSURE AND HEALTH	48
2	Surface Water Pollution in the Middle Chinese Loess Plateau with Special Focus on Hexavalent Chromium (Cr6+): Occurrence, Sources and Health Risks	He, Song	水利与环境学院	EXPOSURE AND HEALTH	45
3	Spatial Distribution, Exposure, And Potential Health Risk Assessment From Nitrate In Drinking Water From Semi-Arid Region Of South India	Adimalla, Narsimha	水利与环境学院	HUMAN AND ECOLOGICAL RISK ASSESSMENT	41
4	Continuum Analysis Of The Structurally Controlled Displacements For Large-Scale Underground Caverns In Bedded Rock Masses	Li, Ang	公路学院	TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY	41
5	Construction Of Electric Vehicle Driving Cycle For Studying Electric Vehicle Energy Consumption And Equivalent Emissions	Zhao, Xuan	汽车学院	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	34

6	Comparative Study On Metal/Cfrp Hybrid Structures Under Static And Dynamic Loading	Zhu, Guohua	汽车学院	INTERNATIONAL JOURNAL OF IMPACT ENGINEERING	34
7	Poor Groundwater Quality And High Potential Health Risks In The Datong Basin, Northern China: Research From Published Data	He, Xiaodong	水利与环境学院	ENVIRONMENTAL GEOCHEMISTRY AND HEALTH	33
8	Preparation Of Heterometallic Coni-Mofs-Modified Bivo4: A Steady Photoanode For Improved Performance In Photoelectrochemical Water Splitting	Zhou, Shiqian	水利与环境学院	APPLIED CATALYSIS B-ENVIRONMENTAL	32
9	Groundwater Chemistry And Groundwater Quality Index Incorporating Health Risk Weighting In Dingbian County, Ordos Basin Of Northwest China	Wu, Jianhua	水利与环境学院	GEOCHEMISTRY	32
10	The Precursor-Guided Hydrothermal Synthesis Of Cubi2O4/Wo3 Heterostructure With Enhanced Photoactivity Under Simulated Solar Light Irradiation And Mechanism Insight	Wang, Liping	水利与环境学院	JOURNAL OF HAZARDOUS MATERIALS	29

2.3 2020 年 SCIE 论文的发文作者及所属单位分布

2020 年以我校为第一作者单位发表的 1427 篇论文中，发文量在 3 篇以上的作者有 90 人，其中公路学院 29 人、建筑工程学院 11 人、材料科学与工程学院 8 人、汽车学院 8 人、水利与环境学院 6 人、经济管理学院 6 人、地质工程与测绘学院 5 人、地球科学与资源学院 4 人、信息工程学院 4 人、工程机械学院 4 人、电子与控制学院 3 人、理学院 3 人，详见表 4。

表 4 2020 年长安大学以第一作者身份发表 SCIE 论文数量 3 篇以上的作者及所属单位分布

序号	作　者	发文数量	所属单位
1	Adimalla, Narsimha	13	水利与环境学院
2	Jiang, Yingjun	11	公路学院
3	Ji, Xiaoping	8	公路学院
4	Wang, Chaohui	7	公路学院
5	Zhang, Jingxiao	7	经济与管理学院
6	Liu, Weiyu	6	电子与控制工程学院
7	Li, Gang	6	电子与控制工程学院
8	Luo, Yanbin	6	公路学院
9	Zhou, Liang	5	材料科学与工程学院
10	Tian, Yaogang	5	材料科学与工程学院
11	Xu, Yiku	5	材料科学与工程学院
12	Lv, Jing	5	建筑工程学院
13	Huang, Hua	5	建筑工程学院
14	Li, Si-Wen	5	水利与环境学院
15	Ma, Fei	5	经济与管理学院
16	Bao, Han	5	公路学院
17	Bao, Xiongxiong	5	理学院
18	Zhao, Xiangmo	4	信息工程学院
19	Luan, Lijun	4	材料科学与工程学院
20	Wang, Zuopeng	4	地球科学与资源学院
21	Cui, Fuqing	4	地质工程与测绘学院

22	Li, Datao	4	工程机械学院
23	Zhao, Gaowen	4	公路学院
24	Su, Jinfei	4	公路学院
25	Liu, Feife	4	公路学院
26	Gao, Guangzhong	4	公路学院
27	Chen, Jianxun	4	公路学院
28	Bi, Yanqiu	4	公路学院
29	Wei, Hui	4	建筑工程学院
30	Liu, Xi	4	建筑工程学院
31	Kong, Dequan	4	建筑工程学院
32	He, Jiaojie	4	建筑工程学院
33	Liu, Dan	4	经济与管理学院
34	Du, Qiang	4	经济与管理学院
35	Xie, Shaobo	4	汽车学院
36	Li, Yaohua	4	汽车学院
37	Wang, Chang	4	汽车学院
38	Liu, Yongtao	4	汽车学院
39	Huo, Aidi	4	水利与环境学院
40	Chen, Zhanming	3	汽车学院
41	He, Rui	3	材料科学与工程学院
42	Wang, Zhenjun	3	材料科学与工程学院
43	Zhang, W. X	3	材料科学与工程学院
44	Zheng, Jiahong	3	材料科学与工程学院
45	Gao, Feng	3	地球科学与资源学院
46	Guo, Junfeng	3	地球科学与资源学院
47	Shao, T. Q	3	地球科学与资源学院
48	Deng, Longsheng	3	地质工程与测绘学院
49	Wang, Jin	3	地质工程与测绘学院

50	Zhu, Wu	3	地质工程与测绘学院
51	Hui, Meng	3	电子与控制工程学院
52	Wang, Binhua	3	工程机械学院
53	Zhang, Han	3	工程机械学院
54	Zhao, Ruiying	3	工程机械学院
55	Cui, Shengchao	3	公路学院
56	Gao, Xuhe	3	公路学院
57	Guo, Fucheng	3	公路学院
58	Han, Sen	3	公路学院
59	Chen, Qian	3	公路学院
60	Li, Youyun	3	公路学院
61	Liu, Jiang	3	公路学院
62	Liu, Weiwei	3	公路学院
63	Lu, Zhen	3	公路学院
64	Lyu, Zhenghua	3	公路学院
65	Ma, Biao	3	公路学院
66	Qiu, Junling	3	公路学院
67	Wang, Xiaoming	3	公路学院
68	Wang, Xuancang	3	公路学院
69	Xue, Hengxiao	3	公路学院
70	Ye, Fei	3	公路学院
71	Zhai Ruixin	3	公路学院
72	Zhang, Shasha	3	公路学院
73	Gao, Fangfang	3	建筑工程学院
74	Li, Chao;	3	建筑工程学院
75	Nie, Shaofeng	3	建筑工程学院
76	Wang, Bo	3	建筑工程学院
77	Wu, Hanheng	3	建筑工程学院

78	Shi, Jinzhao	3	经济与管理学院
79	Wang, Chao	3	经济与管理学院
80	Duan, Jinwei	3	理学院
81	Heng, Ziling	3	理学院
82	Fu, Rui	3	汽车学院
83	Yan, Liming	3	汽车学院
84	Zhu, Guohua	3	汽车学院
85	Ding, Zhan	3	水利与环境学院
86	Zhang, Liyuan	3	水利与环境学院
87	Zhang, Qiying	3	水利与环境学院
88	Li, Tenglong	3	信息工程学院
89	Liu, Lidong	3	信息工程学院
90	Shan, Bowei	3	信息工程学院

对各学院（部处）SCIE 论文第一作者发文统计如下（表 5~表 22，按作者姓氏拼音排序）：

表 5 公路学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Bai, Hua	1	115	Liu, Zhuangzhuang	1
2	Bao, Han	5	116	Long, Xueqin	1
3	Bao, Weixing	1	117	Lu, Zhen	3
4	Bi, Yanqiu	4	118	Luo, Lei	1
5	Cao, Xudong	2	119	Luo, Yanbin	6
6	Cao, Yangsen	1	120	Lyu, Lei	1
7	Chen, Hao	1	121	Lyu, Zhenghua	3
8	Chen, Jianxun	4	122	Ma, B	1
9	Chen, Lijun	1	123	Ma, Biao	3
10	Chen, Ming	1	124	Ma, Feng	1

11	Chen, Peishuai	1	125	Ma, Jianqin	1
12	Chen, Qian	3	126	Ma, Shuhong	1
13	Chen, Rui	1	127	Mei, Kuihua	1
14	Chen, Shi-Zhi	2	128	Mi, Zhengxiang	1
15	Chen, Xiao	1	129	Mu, Yan	1
16	Chen, Yu	2	130	Niu, Yanwei	1
17	Chen, Yuxian	1	131	Peng, Bo	2
18	Chen, Zixuan	1	132	Peng, J	1
19	Cheng, Xiaoyun	1	133	Peng, Yu-hua	1
20	Chu, L	2	134	Qiu, Junling	3
21	Chu, Longjia	1	135	Qu, Guangzhen	2
22	Cong, Peiliang	1	136	Qu, Hao	1
23	Cui, Shengchao	3	137	Ren, Leping	1
24	Deng, Changqing	2	138	Sha, Aimin	2
25	Deng, Ya-Juan	1	139	Shao, Yang	1
26	Ding, LongTing	1	140	Shen, Aiqin	1
27	Dong, Chenhao	1	141	Shen, Chenchen	1
28	Dong, Shi	1	142	Shen, Chuandong	1
29	Dong, Wenhao	1	143	Sheng, Yanping	1
30	Dong, Yaping	2	144	Shi, Xiaoli	1
31	Dong, Yunxiu	1	145	Si, Wei	1
32	Duan, Lan	2	146	Song Yifan	1
33	Fang, Ying	1	147	Song, Chaojie	1
34	Feng, Ponan	2	148	Song, Fei	1
35	Feng, Xiao	1	149	Song, Jia-Ling	1
36	Gang, Luo	1	150	Su, Jinfei	4
37	Gao, Chao	1	151	Sun, Guoqing	1
38	Gao, Guangzhong	4	152	Sun, Min	1
39	Gao, Jiang-ping	1	153	Sun, Shengfei	1

40	Gao, Junfeng	2	154	Sun, Shengjiang	1
41	Gao, Qidong	1	155	Sun, Yingwei	1
42	Gao, Wen-bo	1	156	Sun, Yufeng	1
43	Gao, Xuhe	3	157	Tan, Xiaoyong	2
44	Guo, Fucheng	3	158	Tang, Ke	2
45	Guo, Jukun	1	159	Tian, Yanjuan	1
46	Guo, Yinchuan	1	160	Tian, Zhongnan	1
47	Han, S	1	161	Wan, Qi	1
48	Han, Sen	4	162	Wang, Bin	1
49	Han, Xingbo	1	163	Wang, Chaohui	7
50	Hao, Jianming	1	164	Wang, Chonghui	1
51	He, L.	1	165	Wang, Feng	2
52	He, Yuan	1	166	Wang, Hainian	1
53	Hu, Liqun	1	167	Wang, Han	1
54	Huang, Jianyou	2	168	Wang, Hanian	1
55	Huang, Pingming	1	169	Wang, Jiajia	1
56	Huang, Wu	1	170	Wang, Jiarong	1
57	Huang, Zhe	1	171	Wang, Lusheng	1
58	Ji, Xiaoping	8	172	Wang, Miaomiao	1
59	Jiang, Hua	1	173	Wang, Qingsong	1
60	Jiang, Lei	1	174	Wang, Shuai	2
61	Jiang, Wei	2	175	Wang, Tengda	1
62	Jiang, Xuemeng	1	176	Wang, Wentong	1
63	Jiang, Yingjun	11	177	Wang, Wenzhen	1
64	Jiao, Shuaiyang	2	178	Wang, Xiaoming	3
65	Jiao, Wenxiu	2	179	Wang, Xiuling	2
66	Jin, Hui	1	180	Wang, Xuancang	3
67	Lai, Hongpeng	1	181	Wang, Yaqiong	1
68	Lai, Jinxing	1	182	Wang, Ya-Qiong	2

69	Lau, Stephen L. H	1	183	Wang, Zhi-Feng	2
70	Lei, Junan	1	184	Wang, Zhixiang	2
71	Lei, Lei	1	185	Weng, Xiaolin	2
72	Lei, Ping	1	186	Wu Gangrou	1
73	Lei, Yong	1	187	Wu, Fangwen	1
74	Li Yang	1	188	Wu, Hao	1
75	Li, Ang	1	189	Wu, Xirong	1
76	Li, Cheng	1	190	Xiao, Lili	1
77	Li, Duo	2	191	Xie, Qing	1
78	Li, Guangling	1	192	Xing, Xiangyang	2
79	Li, Hao	1	193	Xu, Cheng	1
80	Li, Heng	1	194	Xu, Gui	1
81	Li, Hui	2	195	Xu, Hanzheng	1
82	Li, Jiange	1	196	Xu, Jiangbo	2
83	Li, Jiawu	1	197	Xu, Jing	2
84	Li, Ning	1	198	Xu, Jinliang	2
85	Li, Peilong	1	199	Xu, Ouming	1
86	Li, Penglin	1	200	Xu, Tianyu	1
87	Li, Shaohui	1	201	Xu, Yinshan	1
88	Li, Wei	1	202	Xue, Bin	1
89	Li, Yang	1	203	Xue, Hengxiao	3
90	Li, Yao	2	204	Xue, Zhi-Jia	1
91	Li, Youyun	3	205	Yang, Guolin	1
92	Li, Yu	1	206	Yang, Hong-zhi	2
93	Li, Yue	2	207	Yang, Jianhua	1
94	Li, Zhe	2	208	Yang, Kai	1
95	Li, Zhennan	1	209	Yang, Qingchao	1
96	Li, Zhiqiang;	1	210	Yang, Xiaohua	1
97	Liang, Xing	1	211	Yang, Xiaolong	2

98	Liu Hongying	1	212	Yang, Xu	1
99	Liu, Bin	1	213	Ye, Fei	3
100	Liu, Binqing	1	214	Ye, Wanli	1
101	Liu, Fabao	1	215	Yin, Peijie	1
102	Liu, Feifei	4	216	You, Qinglong	1
103	Liu, Fuqiang	2	217	Yu, Jin-Yang	1
104	Liu, Jiang	3	218	Yu, Xiaoguang	1
105	Liu, Jingwei	1	219	Yuan, Gaoang;	2
106	Liu, Shiwei	1	220	Yuan, Haoyun	2
107	Liu, Tao	1	221	Yuan, Shuai	2
108	Liu, Weiwei	3	222	Yun, Di;	2
109	Liu, Xiang	2	223	Zhai Ruixin	3
110	Liu, Xingliang	1	224	Zhang Jiu-peng	1
111	Liu, Yang	1	225	Zhang, Bowen	1
112	Liu, Yu	2	226	Zhang, Chenyu	1
113	Liu, ZhanLiang	1	227	Zhang, Chi	2
114	Liu, Zhizhen	1	228	Zhang, Gang	2

表 6 水利与环境学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Adimalla, Narsimha	13	55	Ma, Xuedong	1
2	Bai, Bo	1	56	Mu, Dengrui;	1
3	Cai, Zizhao	1	57	Mu, Feifei	1
4	Chai, Lihong	1	58	Ndong	2
5	Chen Siming	1	59	Qi, Yuzhen	1
6	Chen Yao	2	60	Qian, Hui	1
7	Chen, Jie	1	61	Qiao, Xiao-ying	1
8	Chen, Yuyun	1	62	Qu, Yan hui	1

9	Cheng, Dawei	1	63	Ren, Xiaofei	1
10	Ding, Fei	2	64	Shi, Wenhai	2
11	Ding, Zhan	3	65	Su, Zhenmin	1
12	Dou, Yan	1	66	Sun, Ya-qiao	1
13	Duan, Lei	1	67	Sun, Yukun	1
14	Feng, Wenwen	2	68	Wang, Beibei	1
15	Gao, Yanyan	2	69	Wang, Dan	1
16	Gao, Ziqian	1	70	Wang, Haike	2
17	Gong, Chengcheng	1	71	Wang, Jucui	1
18	Gong, Xinghui	2	72	Wang, Lei	1
19	Gui, Jiawei	1	73	Wang, Liping	1
20	Guo, Jifeng	2	74	Wang, Sha	1
21	Han, Fengshuang	1	75	Wang, Tong	1
22	He, Song	1	76	Wang, Wei	1
23	He, Xiaodong	2	77	Wang, Xiao	1
24	He, Xiaole	1	78	Wang, Xueli	2
25	Hou, Kai	2	79	Wang, Zhenhong	1
26	Huang, Lihui	1	80	Wei, Xiao	1
27	Huo, Aidi	4	81	Wei, Xiaowei	1
28	Ji, Yujie	1	82	Wei, Xingchen	1
29	Jia, Hui	2	83	Wei, Zhengwen	1
30	Jia, Xia	2	84	Wu, Jianhua	1
31	Jia, Yuefa	1	85	Xing, Jianyu	2
32	Jia, Zhifeng	1	86	Xu, Panpan	2
33	Jiang, Ling	1	87	Xu, Shuai	1
34	Kamara, Saidu	1	88	Yang, Mingyan	1
35	Li Qian	1	89	Yang, Yijie	2
36	Li, Aowen	1	90	Zhang, Dan	1
37	Li, Ci	1	91	Zhang, Linjiang	1

38	Li, Huanhuan	1	92	Zhang, Liyuan;	3
39	Li, Jinlong	1	93	Zhang, Qiying	3
40	Li, Peiyue	1	94	Zhang, Xiaoling	1
41	Li, Si-Wen	5	95	Zhang, Yaoyao	1
42	Li, Wanxin	1	96	Zhang, Yuan	1
43	Li, Yingzhi	1	97	Zhang, Zaiyong	2
44	Li, Yu	1	98	Zhang, Zhongjie	1
45	Li, ZhiLiang	1	99	Zhao, Hanghang	1
46	Liu, Shan	1	100	Zhao, Ming	1
47	Liu, Xiuhua	1	101	Zhao, Shuangfeng	1
48	Liu, Yuanyuan	1	102	Zhao, Zhiqiang	1
49	Liu, Zhao	1	103	Zheng, Ce	2
50	Lu, Xiang-fei	1	104	Zheng, Dan	1
51	Luo, Mengya	1	105	Zheng, Xuemei	1
52	Luo, Pingping	1	106	Zhou, Shiqian	1
53	Ma, Lianjing	1	107	Zhu, Qi	1
54	Ma, Xiong	1	108	Zou, Xiaotong	2

表 7 地质工程与测绘学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Cao, Hongye	2	47	Peng, Mimi	1
2	Cao, Yanbo	2	48	Qi YanFu	1
3	Cao, Ziyang	1	49	Qi, Zhipeng	2
4	Chang, Jiang	1	50	Qu Yong-long	1
5	Chen, Liquan	1	51	Qu, Wei	1
6	Cong, Ming	2	52	Ren, Chaofeng	2
7	Cui, Fuqing	4	53	Shao, Guang-zhou	1
8	Deng, Longsheng	3	54	Song, Sha	1

9	Du, Yuan	1	55	Song, Yanhui	1
10	Fan, Wen	1	56	Sui, Lichun	2
11	Feng, Bing	1	57	Tian, Zhen	1
12	Feyissa, Muleta Ebissa	1	58	Wang Fei	2
13	Fu, Yukai	1	59	Wang, Baohang	1
14	Gao, Meiling	1	60	Wang, Feiyong	2
15	Guo, Jian	1	61	Wang, Jin	3
16	Guo, Y	1	62	Wang, Li	1
17	Hong, Bo	2	63	Wang, Sijia	1
18	Hou, Xiaokun	1	64	Wang, Zhiqi	1
19	Jia, Zhijie	1	65	Wei, Xinsheng	2
20	Jiao, Jiashuang	1	66	Wei, Ya-ni	2
21	Kang, Junmei	1	67	Wu, Tianjun	2
22	Li, He	2	68	Wu, Tingting	1
23	Li, Hua	2	69	Wu, Yinting	2
24	Li, Lan	1	70	Xi, Jiangbo	1
25	Li, Liangzhi	1	71	Xu, Qiang	1
26	Li, Lincui	2	72	Xu, Shigang	1
27	Li, Nan	1	73	Yan, Rui-xin	1
28	Li, Ping	2	74	Yan, Zuofei	1
29	Li, Xi'an	2	75	Yang, Chengsheng	1
30	Li, Xing-Wang	2	76	Yang, Liye	1
31	Li, Xunchang	1	77	Yang, Longwei	1
32	Li, Yan	1	78	Yang, Wei	1
33	Lian, Baoqin	2	79	Ye, Junhua	1
34	Ling, Qing	1	80	Yu, B	1
35	Liu, Kui	2	81	Yue, Chongwang	1
36	Liu, Xiaojie	2	82	Zhang JiFeng	2
37	Liu, Xin	2	83	Zhang YiMi	1

38	Liu, Zhiheng	1	84	Zhang, Kainan	1
39	Liu, Zhi-Yun	1	85	Zhong, Mianqing	2
40	Lu BaoLiang	1	86	Zhou Yang	1
41	Lu, Quanzhong	1	87	Zhou, Jianmei	1
42	Luo, Silong	1	88	Zhou, Ze-Hua	1
43	Ma, Fei	1	89	Zhu, Wu	3
44	Ni, Wan-kui	1	90	Zhu, Xinghua	2
45	Niu, Yufen	1	91	Zhuang, Jianqi	2
46	Peng, Jianbing	2			

表 8 材料科学与工程学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Ai, Cheng	2	35	Wang Nan	1
2	Chang, Mingfeng	2	36	Wang, Hong-Bo	2
3	Chen, Mingyuan	1	37	Wang, Xin-Gang	1
4	Cong, Peiliang	2	38	Wang, Zhenjun	3
5	Deng, Juanli	2	39	Wang, Zhu	2
6	Du, Xiaoming	1	40	Wu, Jiayu	1
7	Fan Xiaoyong	2	41	Wu, Yajuan	1
8	Fan, Ji-Bin	1	42	Xia, Huiyun	1
9	Gou, Lei	1	43	Xing, Ya-Zhe	1
10	Guan, Bowen	1	44	Xiong, Rui	1
11	Guo, Haoyan	1	45	Xu, Ouming	1
12	He, Rui	3	46	Xu, Peijun	1
13	Jia, Yifan	1	47	Xu, Xiqing	2
14	Jiang, Chaoping	1	48	Xu, Yiku	5
15	Kong, Xiang-Ze	1	49	Yan, Luke	2
16	Li, Yao	2	50	Yan, Ni	1

17	Li, Zuzhong	2	51	Yan, Xin	1
18	Liu, Guanyu	1	52	Yang Zehui	1
19	Liu, Jingyi;	2	53	Yu, Pengfei	2
20	Liu, Jun	1	54	Yuan, Zhanwei	1
21	Liu, Shenglin	1	55	Zhang, Ben	1
22	Liu, Zhuoran	1	56	Zhang, Fengying	2
23	Lou, Baowen	2	57	Zhang, Gui	1
24	Lu, Dong	1	58	Zhang, Hanxiao	1
25	Luan, Lijun	4	59	Zhang, Long	1
26	Luo, Weihua	1	60	Zhang, Ru	1
27	Mu, Yan	1	61	Zhang, W. X	3
28	Ren Xuqiang	1	62	Zhang, Wei-Wei	1
29	Shen, Qiuyan	1	63	Zhang, Yong	1
30	Sheng, Yanping	1	64	Zhang, Zhihui	1
31	Sun, Zhiping	2	65	Zhao Qinyang	2
32	Tian, Yaogang	5	66	Zhao, Dong	1
33	Tian, Yefei	1	67	Zheng, Jiahong	3
34	Tong, Zheng	1	68	Zhou, Liang	5

表 9 建筑工程学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Bai, Liang	1	34	Liu, Xi	4
2	Bu, Yonghong	1	35	Liu, Yan	1
3	Chai, Gaoda	1	36	Liu, Yuyang	1
4	Chai, Shaobo	2	37	Lv, Jing	5
5	Chang, Zhao Qun	1	38	Ma, Yudong	1
6	Chen, Xu	1	39	Meng, Qinglong	1
7	Dang, Huixue	1	40	Nie, Shaofeng	3

8	Dong, Jing	1	41	Qin, Chaogang	1
9	Gao, Fang-fang	3	42	Quan, Dengzhou	1
10	Gu Yaxiu	1	43	Su, Jizhi	1
11	Guan, Yu	1	44	Sui, Xuemin	1
12	He, Jiaojie	4	45	Tan, Zijing	1
13	He, Jun	2	46	Tian, Wei	2
14	Hu, Bo	1	47	Wang, Bo	3
15	Hu, Yi	1	48	Wang, Bu	1
16	Hu, Zhiping	1	49	Wang, Tong	1
17	Huang, Hua	5	50	Wei, Hui	4
18	Jing, Yanlin	1	51	Wu, Hanheng	3
19	Kong, Dequan	4	52	Wu, Pei	1
20	Lan, Guanqi	1	53	Wu, Tao	1
21	Li, Chao	3	54	Xing, Guohua	2
22	Li, Fangtao	1	55	Xiong, Ergang	1
23	Li, Gen	1	56	Yan, Qing	1
24	Li, Liang	1	57	Yao, Xinmei	1
25	Li, Xiaoguang	2	58	Ye, Yanxia	1
26	Li, Yan-chun	1	59	Yuan, Chunbo	1
27	Li, Zi-Ai	1	60	Zhang, Changguang	1
28	Liang, Kun	2	61	Zhang, Dan	2
29	Liang, Wenbiao	2	62	Zhang, Xun	1
30	Liao, Fangfang	1	63	Zhao, Xiaohong	1
31	Liu, Boquan	1	64	Zhou, Tianhua	1
32	Liu, Hongping	1	65	Zhu, Q	1
33	Liu, Qin	1			

表 10 汽车学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Cai, Jing	1	35	Wang, Feng-Hui	1
2	Chen, Gang	1	36	Wang, Hui	2
3	Chen, Hao	1	37	Wang, Junxiang	1
4	Chen, Yunxing	1	38	Wang, Ning	2
5	Chen, Zhanming	3	39	Wang, Shu	2
6	Deng, Mingyang	1	40	Wei, Lulu	1
7	Fenghui, Wang	1	41	Wu, Fuwei	1
8	Fu, Rui	3	42	Xie, Pei	1
9	Gao, Yang	1	43	Xie, Shaobo	4
10	Geng, Limin	1	44	Xiong, Yanfeng	1
11	Guo, Yingshi	1	45	Xu, Yu	1
12	Han, Fei	1	46	Yan, Liming	3
13	He, Yilin	1	47	Yan, Shengyu	1
14	Jing, Zheng	1	48	Yan, Xingpei	1
15	Li Yaohua	4	49	Yan, Ying	1
16	Li, Bin	1	50	Yang, Wei	2
17	Li, HuiFang	1	51	Yang, Yang	1
18	Li, Wen	1	52	Yao, Jingxuan	1
19	Li, Xuebo	1	53	Yin, Peng	2
20	Li, Zhen	2	54	Zhang, Dawei	1
21	Liu, Jing	1	55	Zhang, Hailun	1
22	Liu, Pan	1	56	Zhang, Hongjia	2
23	Liu, Tong	1	57	Zhang, Kaichao	1
24	Liu, Xiaodong	1	58	Zhang, Peng	2
25	Liu, Yili	1	59	Zhang, Shuo	2
26	Liu, Yongtao	4	60	Zhang, Zhi	2

27	Niu, Shifeng	1	61	Zhao, Chen	1
28	Qi, Donghui	1	62	Zhao, Xuan	2
29	Qiao, Jie	2	63	Zhao, Zhi-Hong	1
30	Qiu, Zhaowen	1	64	Zhi, Huinan	1
31	Shen, Xiaoyan	1	65	Zhou, Yang	2
32	Sun, Qinyu	2	66	Zhu, Guohua	3
33	Wang, Biyao	1	67	Zhu, Tong	1
34	Wang, Chang	4			

表 11 信息工程学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Chen, Li	1	25	Ming, Yang	2
2	Chen, Peng	1	26	Pei, Lili	1
3	Chen, Zhe	1	27	Ren, Shuai	2
4	Cheng, Xin	1	28	Shan, Bowei	3
5	Dai, Zhe	1	29	Shen, Chao	1
6	Fan, Na	1	30	Shi, Xin	1
7	Fang, Shan	1	31	Song, Qingsong	2
8	Fang, Yong	1	32	Sun, Zhaoyun	1
9	Fang, Yukun	1	33	Sun, Zhu	2
10	Feng, Xiaoran	1	34	Tang, Lei	2
11	Feng, Xing-le	1	35	Tang, Xinyao	1
12	Gao, Tao	2	36	Tao, Gao	1
13	Gao, Rong	1	37	Tong, Xing	1
14	Guo, Chen	1	38	Wang Weixing	2
15	Hou, Jun	2	39	Wang, Jing	1
16	Jia, Shuo	1	40	Wang, Qinglong	1
17	Li, Tenglong	3	41	Wang, Wei	1

18	Liang, Haoxiang	1	42	Wang, Wenwei	1
19	Liu, Lidong	3	43	Wang, Zhen	2
20	Liu, Hanye	1	44	Wu, Jinzhong	1
21	Liu, Xinyi	1	45	Yang, Yun	1
22	Luo, Xianglong	1	46	Zhang, Zhaoyang	1
23	Meng, Qiao	1	47	Zhao, Xiangmo	4
24	Min, Haigen	1	48	Zhao, Yi	1

表 12 电子与控制工程学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Chen, Junshuo	2	23	Si, Liyun	1
2	Guan, Limin	1	24	Song, Jia-cheng	2
3	Hu, Xiao-Chuan	1	25	Song, Yongchao	1
4	Hu, Yansu	1	26	Wang, Guiping	1
5	Hui, Meng	3	27	Wang, Hui-Feng	2
6	Kang, Hongbo	1	28	Xiao, Jian	1
7	Ke, Ji	1	29	Xu, Gui-Min	1
8	Lei, Xu	2	30	Xu, Xian-Feng	1
9	Li, Gang	6	31	Xu, Xiaobo	1
10	Li, Jie	1	32	Xue, Chao	2
11	Li, Longjie	1	33	Yan, Maode	1
12	Li, Shuguang	2	34	Yang, Zhaohui	1
13	Li, Xiaohui	2	35	Yao, Rui	1
14	Liang, Dandan	1	36	Ye, Zhen	1
15	Liang, Huagang	1	37	Zhang, Yipu	1
16	Lin, Zhang	1	38	Zhang, Zan	2
17	Liu, Weiyu	6	39	Zhao, Yi	1
18	Meng, Yun	2	40	Zhou Jingmei	2

19	Peng, Peng	1	41	Zhu, Liya	1
20	Quan, Enmao	1	42	Zhu, Rixing	1
21	Quan, Siwen	2	43	Zhu, Wei	1
22	Saad, Muhammad	1	44	Zuo, Lei	1

表 13 地球科学与资源学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Fan, Shuanghu	2	24	Lin, Xin	2
2	Fan, Yu-Hai	1	25	Liu, Junfeng	1
3	Feng, Yonggang	1	26	Liu, Xiaobo	1
4	Gao, Feng	3	27	Shao, T. Q	3
5	Guo, Junfeng	3	28	Sun, Xiao-Hui	1
6	Han, Ke	1	29	Tan, X	1
7	Han, Yixiao	1	30	Tan, Xijuan	1
8	He, Hujun	2	31	Wang Xiaofeng	1
9	He, Xiaoyuan	1	32	Wang, Mengxi	1
10	Huang Xin	1	33	Wang, Yan	1
11	Huang, Hexin	2	34	Wang, Yang	1
12	Huang, Yu	1	35	Wang, Zuopeng	4
13	Kang Ming	1	36	Wei Ran	1
14	Lei, Ru-Xiong	2	37	Xiao, Zhouxuan	1
15	Li, Hai	2	38	Xiong, Kun	1
16	Li YongJun	1	39	Zhang, Guishan	1
17	Li, Hui	1	40	Zhang, Haidong	2
18	Li, Junjun	2	41	Zhao, Bangsheng	1
19	Li, Ruibao	1	42	Zhao, Liandang	1
20	Li, Xiang-Chuan	1	43	Zhao, Shao-Wei	1

21	Li, Zhen	1	44	Zhi, Qian	1
22	Li, Zhihang	1	45	Zhou, Wei	1
23	Liang, Ji-Wei	2			

表 14 工程机械学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Cao, Wei	1	22	Meng, Fanwei	1
2	Cao, Xuepeng	1	23	Shen, Jianjun	1
3	Chen, Shibin	2	24	Wang, Binhua	3
4	Chen, Yixin	1	25	Wang, Haiying	2
5	Chen, Zhengcang	1	26	Wei, Meng	1
6	Ding Kai	1	27	Wu, Linlin	1
7	Dou, Jianming	2	28	Xiang, Qingyi	1
8	Feng, Shuo	1	29	Xu, Xinxin	1
9	Gao, Yongchang	1	30	Yang, Shuangge	2
10	Guo, Wanjin	1	31	Yang, Yikun	1
11	Jia, Feng	1	32	Yao, Zechen	1
12	Jia, Jie	1	33	Zhang, Fuqiang	1
13	Jin, Qichao	1	34	Zhang, Han	3
14	Li, Datao	4	35	Zhang, Jun	2
15	Li, Jia	1	36	Zhang, Liping	1
16	Li, Jiabo	2	37	Zhang, XiaoLi	1
17	Li, Yao	1	38	Zhang, Zeyu	1
18	Liu, Xiaohui	1	39	Zhao, Lingying	1
19	Lou, Gaoxiang	1	40	Zhao, Ruiying	3
20	Lv, Jingxiang	2	41	Zhao, Xiaoyun	1
21	Ma, Deng-cheng	1	42	Zuo, Hao	1

表 15 运输工程学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Bai, Qiang	1	25	Long, Xueqin	2
2	Cai, Jing	1	26	Lu, Wenbo	1
3	Cao, Ningbo	1	27	Ma, Zhuanglin	2
4	Chen, Gang	1	28	Peng, Zhipeng	1
5	Chen, Hengrui	1	29	Shao, Hai-peng	2
6	Chen, Hong	1	30	Sun, Qian	1
7	Cheng, Xiaoyun	1	31	Sun, Xiaoke	1
8	Cheng, Yanqiu	1	32	Tian, Zhun	1
9	Deng, Yajuan	2	33	Wang, Jianwei	1
10	Ding, Ling	1	34	Wang, Lu	1
11	Dong, Shi	1	35	Wang, Ning	1
12	Dong, Zhi	1	36	Wang, Qiuling	1
13	Fu, Xin	1	37	Wu, Zhouhao	1
14	Gao, Yanan	1	38	Xiao, Mei	1
15	Gui, Jiawei	1	39	Xu, Jinqiang	1
16	Han, Xueyan	1	40	Xu, Ting	1
17	Huang, Xin	1	41	Yang, Fan	1
18	Huang, Yan	1	42	Yu, Lijie	1
19	Jin, Yuming	1	43	Yuan, Changwei	1
20	Li, Di	1	44	Zhang, Qi	1
21	Li, Qiong	1	45	Zhao, Dan	1
22	Liu, Lina	1	46	Zhou, Bei	1
23	Liu, Yufeng	1	47	Zhu, Wenying	1
24	Liu, Zhizhen	2			

表 16 经济管理学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Bai, Libiao	2	12	Shi, Jinzhao	3
2	Du, Qiang	4	13	Shoaib, Muhammad	1
3	Jia, Siqi	1	14	Sun, Qipeng	1
4	Li, Jinfeng	1	15	Wang, Chao	3
5	Li, Min	1	16	Wang, Yongjie	1
6	Li, Qian	1	17	Xu, Haicheng	1
7	Li, Xiuping	1	18	Zhang, Yu	2
8	Liu, Dan	4	19	Zhang, Jingxiao	7
9	Ma, Fei	2	20	Zhang, Kaiqi	1
10	Mao, Xinhua	2	21	Zhang, Shengzhong	2
11	Peng, Zhimin	2	22	Zhao, Miyun	1

表 17 理学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Bao, Xiongxiong	5	17	Wang, Changpeng	1
2	Cheng, Xiaohan	1	18	Wang, Fenglong	1
3	Cui, Lin	1	19	Wang, Juan	1
4	Duan, Jinwei	3	20	Wang, Xuezhi	2
5	Gao, Puyang	1	21	Wang, Yinghui	2
6	He, An	1	22	Wang, Zhen	1
7	Heng, Ziling	3	23	Xiao, Yuzhu	1
8	Hou, Zhaoyang	1	24	Xu, Shiqiang	2
9	Jin, Ming-Zhu	1	25	Yan, Qinling	1
10	Li, Hao	1	26	Yao, Ru-Yang	2
11	Li, Qunhui	1	27	Yu, Weibo	1

12	Liu, Fenjin	1	28	Zhang, Bo	2
13	Liu, Jia	2	29	Zhang, Meng	1
14	Liu, Min	1	30	Zhang, Tailei	2
15	Liu, Shunyi	1	31	Zhao Xiao-Gang	1
16	Ma, Jianmin	1	32	Zhou, Yuan	1

表 18 建筑学院

序号	姓名	发文数量	序号	姓名	发文数量
1	Ding, Hua	1	8	Ma, Xuan	1
2	Duan, Ya-Qiong	2	9	Shen, Tong	1
3	Fan, Yujiang	1	10	Xu, Juan	1
4	Han, Li	1	11	Yu, Xiaohui	1
5	Hou, Quanhua	2	12	Zhang, Wenting	1
6	Liu, Qibo	1	13	Zhang, Yue	1
7	Ma, Kai-Ze	1	14	Zhu, Jizhou	1

表 19 土地工程学院

序号	姓名	发文数量
1	Han, Lei	1
2	Norbu, Namkha	1
3	Shao, Yajing	1
4	Wang, Xiaofeng	1
5	Zhang, Yan	1

表 20 体育部

序号	姓名	发文数量
1	Gang, Ren	1

2	He, Le	1
3	Xu, Zhiwen	1

表 21 人文学院

序号	姓名	发文数量
1	Li, Xiaoping	1
2	Liu, Yan	1

表 22 外国语学院

序号	姓名	发文数量
1	Lin, Zhong	1

2.4 SCIE 论文来源期刊的分布概况

2020 年以我校为第一作者单位发表的 1427 篇论文，分布在 452 个期刊中，与 2019 年相比，期刊种类增加了 49 种（2019 年为 403 种来源期刊）。

2.4.1 2020 年长安大学发表 SCIE 论文 JCR 影响因子前 10 位的期刊

2020 年以长安大学为第一作者单位发表的 1427 篇论文，共分布在 452 个期刊。其中，我校发表论文影响因子最高的期刊是《APPLIED CATALYSIS B-ENVIRONMENTAL》（见表 23），其 2019 年影响因子为 16.683，2020 年我校在该期刊上发表了 3 篇论文，分别是：水利与环境学院的 Chen, Kaiyi; Bai, Bo; Wang, Qizhao，论文题目为《Preparation Of Heterometallic Coni-Mofs-Modified Bivo4: A Steady Photoanode For Improved Performance In Photoelectrochemical Water Splitting》；水利与环境学院的 Chen, Kaiyi; Bai, Bo; Wang, Qizhao 论文题目为《Aminated Flower-Like ZnIn2S4 Coupled With Benzoic Acid Modified g-C3N4 Nanosheets Via Covalent Bonds For Ameliorated Photocatalytic Hydrogen Generation》；水利与环境学院的 Li, Si-Wen，论文题目为《Highly Effective Oxidative Desulfurization With Magnetic Mof Supported W-Moo3 Catalyst Under

Oxygen As Oxidant》。

表 23 2020 年长安大学发表 SCIE 论文影响因子前 10 位的期刊

序号	期刊名称	论文数量	2019 年影响因子
1	APPLIED CATALYSIS B-ENVIRONMENTAL	3	16.683
2	NANO ENERGY	1	16.602
3	CHEMICAL ENGINEERING JOURNAL	5	10.652
4	IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS	1	9.112
5	JOURNAL OF HAZARDOUS MATERIALS	2	9.038
6	APPLIED ENERGY	2	8.848
7	ACS APPLIED MATERIALS & INTERFACES	1	8.758
8	COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING	4	8.552
9	JOURNAL OF POWER SOURCES	1	8.247
10	ENERGY CONVERSION AND MANAGEMENT	2	8.208

注：影响因子 (Impact Factor，IF) 是美国 ISI（科学信息研究所）的 JCR（期刊引证报告）中的一项数据。即某期刊前两年发表的论文在这两年中被引用总次数除以该期刊在这两年内发表的论文总数。这是一个国际上通行的期刊评价指标。

2.4.2 2020 年长安大学发表 SCIE 论文数量前 10 位的期刊

2020 年我校发表 SCIE 论文数量最多的期刊是《CONSTRUCTION AND BUILDING MATERIALS》，共计 93 篇，其 2019 年影响因子为 4.419（见表 24）。

表 24 2020 年长安大学发表 SCIE 论文数量前 10 位的期刊

序号	期刊名称	论文数量	2019 年影响因子	5 年影响因子
1	CONSTRUCTION AND BUILDING MATERIALS	93	4.419	5.036
2	IEEE ACCESS	80	3.745	4.076
3	ADVANCES IN CIVIL ENGINEERING	59	1.176	N/A
4	MATERIALS	37	3.057	3.424

5	JOURNAL OF ADVANCED TRANSPORTATION	36	1.670	1.752
6	SUSTAINABILITY	28	2.576	2.798
7	ADVANCES IN MATERIALS SCIENCE AND ENGINEERING	26	1.271	1.554
8	INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING	25	2.646	2.574
9	MATHEMATICAL PROBLEMS IN ENGINEERING	23	1.009	0.986
10	SENSORS	22	3.275	3.427

注：ADVANCES IN CIVIL ENGINEERING 被 SCIE 收录未满 5 年，因此没有 5 年影响因子。

结合表 23 和表 24 可以看出，我校目前在影响因子较高的国际期刊上发表了一些 SCIE 论文，但论文发表数量较高的期刊影响因子并不是很高。

2.4.3 2020 年长安大学发表 SCIE 论文的 452 种来源期刊

2020 年我校为第一作者单位发表的 SCIE 论文的种来源期刊的发文数量、JCR 影响因子和中国科学院文献情报中心期刊分区情况详见表 25。

表 25 452 种来源期刊的 JCR 影响因子及中国科学院文献情报中心期刊分区情况（按发文量排序）

序号	期刊名称	发文数量	影响因子	5 年影响因子	中国科学院文献情报中心期刊分区			
					大类		小类	
					学科	分区	学科	分区
1	CONSTRUCTION AND BUILDING MATERIALS	93	4.419	5.036	工程技术	1	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	1
							ENGINEERING, CIVIL 工程：土木	1
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
2	IEEE ACCESS	80	3.745	4.076	计算机科学	3	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
							TELECOMMUNICATIONS 电信学	3
3	ADVANCES IN CIVIL ENGINEERING	59	1.176	N/A	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4

							ENGINEERING, CIVIL 工程：土木	4
4	MATERIALS	37	3.057	3.424	材料科学	3	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
5	JOURNAL OF ADVANCED TRANSPORTATION	36	1.670	1.752	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
6	SUSTAINABILITY	28	2.576	2.798	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
							ENVIRONMENTAL STUDIES 环境研究	4
							GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY 绿色可持续发展技术	4
7	ADVANCES IN MATERIALS SCIENCE AND ENGINEERING	26	1.271	1.554	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
8	INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING	25	2.646	2.574	工程技术	3	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	2
							CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3

							ENGINEERING, CIVIL 工程：土木	3
9	MATHEMATICAL PROBLEMS IN ENGINEERING	23	1.009	0.986	工程技术	4	ENGINEERING, MULTIDISCIPLINARY 工程：综合	4
							MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
10	SENSORS	22	3.275	3.427	工程技术	3	CHEMISTRY, ANALYTICAL 分析化学	3
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	3
11	APPLIED SCIENCES-BASEL	21	2.474	2.458	工程技术	3	CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
							ENGINEERING, MULTIDISCIPLINARY 工程：综合	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							PHYSICS, APPLIED 物理：应用	3

12	JOURNAL OF MATERIALS IN CIVIL ENGINEERING	20	2.169	2.506	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
13	JOURNAL OF CLEANER PRODUCTION	18	7.246	7.491	环境科学与生态学	1	ENGINEERING, ENVIRONMENTAL 工程：环境	1
							ENVIRONMENTAL SCIENCES 环境科学	1
							GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY 绿色可持续发展技术	1
14	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	16	2.849	3.127	医学	3	ENVIRONMENTAL SCIENCES 环境科学	3
							PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH 公共卫生、环境卫生与职业卫生	3
15	ROAD MATERIALS AND PAVEMENT DESIGN	16	2.582	2.631	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3

							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
16	ENVIRONMENTAL EARTH SCIENCES	14	2.180	2.253	环境科学与生态学	4	WATER RESOURCES 水资源	3
							ENVIRONMENTAL SCIENCES 环境科学	4
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
17	COATINGS	13	2.436	2.718	材料科学	3	MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	3
18	PLOS ONE	12	2.740	3.227	综合性期刊	3	MULTIDISCIPLINARY SCIENCES 综合性期刊	3
19	ENGINEERING GEOLOGY	11	4.779	5.122	地球科学	1	ENGINEERING, GEOLOGICAL 工程：地质	1
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
20	REMOTE SENSING	11	4.509	5.001	工程技术	2	REMOTE SENSING 遥感	2
21	SCIENTIFIC REPORTS	11	3.998	4.576	综合性期刊	3	MULTIDISCIPLINARY SCIENCES 综合性期刊	3
22	BULLETIN OF ENGINEERING	11	3.041	3.257	工程技术	3	ENGINEERING, ENVIRONMENTAL 工程：环	3

	GEOLOGY AND THE ENVIRONMENT						境	
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							ENGINEERING, GEOLOGICAL 工程：地质	4
23	WATER	11	2.544	2.709	环境科学与生态学	4	WATER RESOURCES 水资源	4
24	COMPLEXITY	10	2.462	2.474	工程技术	4	MULTIDISCIPLINARY SCIENCES 综合性期刊	3
							MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
25	GEOLOGICAL JOURNAL	10	1.595	1.855	地球科学	4	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
26	HUMAN AND ECOLOGICAL RISK ASSESSMENT	9	2.300	2.084	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
27	COMPOSITE STRUCTURES	8	5.138	5.169	工程技术	1	MECHANICS 力学	1
							MATERIALS SCIENCE, COMPOSITES 材料科学：复合	2

28	CERAMICS INTERNATIONAL	8	3.830	3.513	材料科学	2	MATERIALS SCIENCE, CERAMICS 材料科学：硅酸盐	1
29	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	8	3.056	3.306	环境科学与生态学	3	ENVIRONMENTAL SCIENCES 环境科学	3
30	JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS	8	2.220	2.078	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							PHYSICS, APPLIED 物理：应用	4
							PHYSICS, CONDENSED MATTER 物理：凝聚态物理	4
31	ARABIAN JOURNAL OF GEOSCIENCES	8	1.327	1.534	地球科学	4	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
32	JOURNAL OF HYDROLOGY	7	4.500	5.080	地球科学	1	ENGINEERING, CIVIL 工程：土木	1
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
							WATER RESOURCES 水资源	1

33	TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY	7	4.450	4.761	工程技术	1	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	1
							ENGINEERING, CIVIL 工程：土木	1
34	JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH	7	2.938	3.541	工程技术	2	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	2
							ENGINEERING, CIVIL 工程：土木	2
35	ENERGIES	7	2.702	2.822	工程技术	4	ENERGY & FUELS 能源与燃料	4
36	JOURNAL OF TESTING AND EVALUATION	7	0.877	0.871	材料科学	4	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	4
37	JOURNAL OF COASTAL RESEARCH	7	0.793	1.112	地球科学	4	ENVIRONMENTAL SCIENCES 环境科学	4
							GEOGRAPHY, PHYSICAL 自然地理	4
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
38	SCIENCE OF THE TOTAL ENVIRONMENT	6	6.551	6.419	环境科学与生态学	1	ENVIRONMENTAL SCIENCES 环境科学	1
39	SUSTAINABLE CITIES AND SOCIETY	6	5.268	5.143	工程技术	2	CONSTRUCTION & BUILDING	2

							TECHNOLOGY 结构与建筑技术	
							ENERGY & FUELS 能源与燃料	2
							GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY 绿色可持续发展技术	2
40	EXPOSURE AND HEALTH	6	4.762	6.232	环境科学与生态学	3	WATER RESOURCES 水资源	2
41	JOURNAL OF ALLOYS AND COMPOUNDS	6	4.650	4.082	材料科学	2	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	1
							CHEMISTRY, PHYSICAL 物理化学	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
42	COLD REGIONS SCIENCE AND TECHNOLOGY	6	2.739	2.674	工程技术	3	ENGINEERING, CIVIL 工程：土木	3
							ENGINEERING, ENVIRONMENTAL 工程：环境	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
43	JOURNAL OF MOUNTAIN SCIENCE	6	1.550	1.651	环境科学与	3	ENVIRONMENTAL SCIENCES 环境科学	3

					生态学			
44	KSCE JOURNAL OF CIVIL ENGINEERING	6	1.515	1.519	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
45	CHEMICAL ENGINEERING JOURNAL	5	10.652	9.430	工程技术	1	ENGINEERING, CHEMICAL 工程：化工	1
							ENGINEERING, ENVIRONMENTAL 工程：环境	1
46	APPLIED SURFACE SCIENCE	5	6.182	5.141	材料科学	2	MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	1
							CHEMISTRY, PHYSICAL 物理化学	2
							PHYSICS, APPLIED 物理：应用	2
							PHYSICS, CONDENSED MATTER 物理：凝聚态物理	2
47	CHEMOSPHERE	5	5.778	5.705	环境科学与生态学	2	ENVIRONMENTAL SCIENCES 环境科学	2
48	PRECAMBRIAN RESEARCH	5	4.427	5.088	地球科学	1	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
49	ORE GEOLOGY REVIEWS	5	3.868	4.440	地球科学	2	GEOLOGY 地质学	1

							MINING & MINERAL PROCESSING 矿业与矿物加工	1
							MINERALOGY 矿物学	2
50	ENERGY REPORTS	5	3.595	N/A	工程技术	3	ENERGY & FUELS 能源与燃料	3
51	ENGINEERING STRUCTURES	5	3.548	3.775	工程技术	1	ENGINEERING, CIVIL 工程：土木	2
52	STRUCTURES	5	1.839	N/A	工程技术	3	ENGINEERING, CIVIL 工程：土木	3
53	ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING	5	1.711	1.474	综合性期刊	3	MULTIDISCIPLINARY SCIENCES 综合性期刊	4
54	POLISH JOURNAL OF ENVIRONMENTAL STUDIES	5	1.383	1.421	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
55	SHOCK AND VIBRATION	5	1.298	1.552	工程技术	4	ACOUSTICS 声学	4
							ENGINEERING, MECHANICAL 工程：机械	4
							MECHANICS 力学	4
56	JOURNAL OF CENTRAL SOUTH UNIVERSITY	5	1.249	1.139	材料科学	3	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	3
57	TRANSPORTATION RESEARCH	5	1.029	1.216	工程技术	4	ENGINEERING, CIVIL 工程：土木	4

	RECORD						TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
58	FRESENIUS ENVIRONMENTAL BULLETIN	5	0.553	0.521	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
59	COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING	4	8.552	6.212	工程技术	1	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	1
							CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	1
							ENGINEERING, CIVIL 工程：土木	1
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	1
60	LANDSLIDES	4	4.708	5.447	地球科学	2	ENGINEERING, GEOLOGICAL 工程：地质	2
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
61	TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT	4	4.577	4.923	工程技术	2	ENVIRONMENTAL STUDIES 环境研究	2
							TRANSPORTATION 交通运输	2
							TRANSPORTATION SCIENCE &	3

							TECHNOLOGY 运输科技	
62	ENVIRONMENTAL GEOCHEMISTRY AND HEALTH	4	3.472	3.662	环境科学与生态学	3	ENGINEERING, ENVIRONMENTAL 工程：环境	3
							ENVIRONMENTAL SCIENCES 环境科学	3
							PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH 公共卫生、环境卫生与职业卫生	3
							WATER RESOURCES 水资源	3
63	PHYSICAL CHEMISTRY CHEMICAL PHYSICS	4	3.430	3.735	化学	2	PHYSICS, ATOMIC, MOLECULAR & CHEMICAL 物理：原子、分子和化学物理	2
							CHEMISTRY, PHYSICAL 物理化学	3
64	JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS	4	2.739	3.322	工程技术	2	ENGINEERING, CIVIL 工程：土木	2
							MECHANICS 力学	2
65	IET INTELLIGENT TRANSPORT SYSTEMS	4	2.480	2.343	工程技术	3	TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
66	JOURNAL OF BRIDGE ENGINEERING	4	2.196	2.449	工程技术	3	ENGINEERING, CIVIL 工程：土木	2
67	JOURNAL OF PERFORMANCE OF	4	1.648	1.631	工程技术	4	CONSTRUCTION & BUILDING	3

	CONSTRUCTED FACILITIES						TECHNOLOGY 结构与建筑技术	
							ENGINEERING, CIVIL 工程：土木	3
68	WATER SCIENCE AND TECHNOLOGY	4	1.638	1.632	环境科学与生态学	4	ENGINEERING, ENVIRONMENTAL 工程：环境	4
							ENVIRONMENTAL SCIENCES 环境科学	4
							WATER RESOURCES 水资源	4
69	JOURNAL OF SENSORS	4	1.595	1.822	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	4
70	INTERNATIONAL JOURNAL OF CRASHWORTHINESS	4	1.477	1.413	工程技术	4	ENGINEERING, MANUFACTURING 工程：制造	4
							ENGINEERING, MECHANICAL 工程：机械	4
71	INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS	4	1.151	1.236	计算机科学	4	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	4
							TELECOMMUNICATIONS 电信学	4
72	ACTA MICROSCOPICA	4	0.822	0.449	工程技术	4	MICROSCOPY 显微镜技术	4

73	CHINESE JOURNAL OF GEOPHYSICS-CHINESE EDITION	4	0.811	0.945	地球科学	3	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
74	TEHNICKI VJESNIK-TECHNICAL GAZETTE	4	0.670	0.683	工程技术	4	ENGINEERING, MULTIDISCIPLINARY 工程：综合	4
75	GEOCHEMISTRY	4	N/A	N/A	地球科学	3	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
76	APPLIED CATALYSIS B-ENVIRONMENTAL	3	16.683	14.443	化学	1	CHEMISTRY, PHYSICAL 物理化学	1
							ENGINEERING, CHEMICAL 工程：化工	1
							ENGINEERING, ENVIRONMENTAL 工程：环境	1
77	RENEWABLE ENERGY	3	6.274	5.964	工程技术	1	ENERGY & FUELS 能源与燃料	2
							GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY 绿色可持续发展技术	2
78	IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING	3	5.855	6.032	工程技术	2	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
							GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	2

							IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	2
							REMOTE SENSING 遥感	2
79	AUTOMATION IN CONSTRUCTION	3	5.669	6.121	工程技术	1	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	1
							ENGINEERING, CIVIL 工程：土木	1
80	FUEL	3	5.578	5.776	工程技术	1	ENGINEERING, CHEMICAL 工程：化工	1
							ENERGY & FUELS 能源与燃料	2
81	ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY	3	4.872	4.967	环境科学与生态学	2	TOXICOLOGY 毒理学	1
							ENVIRONMENTAL SCIENCES 环境科学	2
82	JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING	3	4.594	3.348	计算机科学	3	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	3
							COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							TELECOMMUNICATIONS 电信学	3
83	THIN-WALLED STRUCTURES	3	4.033	4.108	工程技术	2	ENGINEERING, CIVIL 工程：土木	2
							ENGINEERING, MECHANICAL 工程：机械	2

							MECHANICS 力学	2
84	COMPUTERS AND GEOTECHNICS	3	3.818	4.146	工程技术	2	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	1
							ENGINEERING, GEOLOGICAL 工程：地质	1
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
85	INTERMETALLICS	3	3.398	3.604	材料科学	2	CHEMISTRY, PHYSICAL 物理化学	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							METALLURGY & METALLURGICAL ENGINEERING 冶金工程	2
86	ELECTROPHORESIS	3	3.081	2.452	生物学	3	BIOCHEMICAL RESEARCH METHODS 生化研究方法	3
							CHEMISTRY, ANALYTICAL 分析化学	3
87	IEEE TRANSACTIONS ON INFORMATION THEORY	3	3.036	3.232	计算机科学	2	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	2
							ENGINEERING, ELECTRICAL &	2

							ELECTRONIC 工程：电子与电气	
88	MATERIALS AND STRUCTURES	3	2.901	3.293	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
89	ENGINEERING FAILURE ANALYSIS	3	2.897	2.855	工程技术	2	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	1
							ENGINEERING, MECHANICAL 工程：机械	2
90	JOURNAL OF SOLID STATE CHEMISTRY	3	2.726	2.310	化学	3	CHEMISTRY, INORGANIC & NUCLEAR 无机化学与核化学	2
							CHEMISTRY, PHYSICAL 物理化学	3
91	FRONTIERS IN EARTH SCIENCE	3	2.689	N/A	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
92	SOIL DYNAMICS AND EARTHQUAKE ENGINEERING	3	2.637	2.862	工程技术	2	ENGINEERING, GEOLOGICAL 工程：地质	2
							GEOSCIENCES, MULTIDISCIPLINARY 地球	2

							科学综合	
93	STRUCTURE AND INFRASTRUCTURE ENGINEERING	3	2.620	2.481	工程技术	3	ENGINEERING, CIVIL 工程：土木	2
							ENGINEERING, MECHANICAL 工程：机械	3
94	MICROMACHINES	3	2.524	2.554	工程技术	3	INSTRUMENTS & INSTRUMENTATION 仪器仪表	3
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	4
95	ENTROPY	3	2.494	2.530.	物理与天体物理	3	PHYSICS, MULTIDISCIPLINARY 物理：综合	3
96	ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY	3	2.400	2.714	环境科学与生态学	3	ENVIRONMENTAL SCIENCES 环境科学	3
							TOXICOLOGY 毒理学	4
97	MINERALS	3	2.380	2.572	地球科学	4	MINERALOGY 矿物学	3
							MINING & MINERAL PROCESSING 矿业与矿物加工	3
98	STRUCTURAL CONCRETE	3	2.174	2.206	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3

99	ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT	3	2.160	N/A	工程技术	3	ENGINEERING, CIVIL 工程：土木	3
							ENGINEERING, INDUSTRIAL 工程：工业	4
							MANAGEMENT 管理学	4
100	ENVIRONMENTAL MONITORING AND ASSESSMENT	3	1.903	2.273	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
101	CHINESE GEOGRAPHICAL SCIENCE	3	1.854	1.920	环境科学与生态学	3	ENVIRONMENTAL SCIENCES 环境科学	3
102	JOURNAL OF INTELLIGENT & FUZZY SYSTEMS	3	1.851	1.797	计算机科学	4	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	4
103	EUROPEAN JOURNAL OF ENVIRONMENTAL AND CIVIL ENGINEERING	3	1.832	1.894	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							ENGINEERING, GEOLOGICAL 工程：地质	4
104	JOURNAL OF GEOPHYSICS AND ENGINEERING	3	1.624	1.615	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
105	ADVANCES IN STRUCTURAL ENGINEERING	3	1.416	1.718	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4
							ENGINEERING, CIVIL 工程：土木	4

106	JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY	3	1.365	1.472	材料科学	4	ENGINEERING, CHEMICAL 工程：化工	4
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							MECHANICS 力学	4
107	JOURNAL OF APPLIED REMOTE SENSING	3	1.360	1.301	工程技术	4	ENVIRONMENTAL SCIENCES 环境科学	4
							IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	4
							REMOTE SENSING 遥感	4
108	ACTA PETROLOGICA SINICA	3	1.265	1.730	地球科学	2	GEOLOGY 地质学	2
109	RARE METAL MATERIALS AND ENGINEERING	3	0.485	0.488	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							METALLURGY & METALLURGICAL ENGINEERING 冶金工程	4
110	JOURNAL OF HAZARDOUS MATERIALS	2	9.038	8.512	环境科学与生态学	1	ENGINEERING, ENVIRONMENTAL 工程：环境	1
							ENVIRONMENTAL SCIENCES 环境科学	1
111	APPLIED ENERGY	2	8.848	9.086	工程技术	1	ENERGY & FUELS 能源与燃料	1

							ENGINEERING, CHEMICAL 工程：化工	1
112	ENERGY CONVERSION AND MANAGEMENT	2	8.208	7.447	工程技术	1	ENERGY & FUELS 能源与燃料	1
							MECHANICS 力学	1
							THERMODYNAMICS 热力学	1
113	MECHANICAL SYSTEMS AND SIGNAL PROCESSING	2	6.471	6.308	工程技术	1	ENGINEERING, MECHANICAL 工程：机械	1
114	IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS	2	6.319	6.709	工程技术	1	ENGINEERING, CIVIL 工程：土木	1
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	2
115	ENERGY	2	6.082	6.046	工程技术	1	THERMODYNAMICS 热力学	1
							ENERGY & FUELS 能源与燃料	2
116	TRANSPORTATION RESEARCH PART C-EMERGING TECHNOLOGIES	2	6.077	7.080	工程技术	1	TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	1
117	JOURNAL OF MATERIALS RESEARCH	2	5.289	5.707	材料科学	2	MATERIALS SCIENCE,	2

	AND TECHNOLOGY-JMR&T						MULTIDISCIPLINARY 材料科学：综合	
							METALLURGY & METALLURGICAL ENGINEERING 冶金工程	2
118	INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES	2	5.162	5.137	化学	2	CHEMISTRY, APPLIED 应用化学	1
							POLYMER SCIENCE 高分子科学	1
							BIOCHEMISTRY & MOLECULAR BIOLOGY 生化与分子生物学	2
119	APPLIED THERMAL ENGINEERING	2	4.725	4.514	工程技术	2	ENERGY & FUELS 能源与燃料	2
							ENGINEERING, MECHANICAL 工程：机械	2
							MECHANICS 力学	2
							THERMODYNAMICS 热力学	2
120	MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING	2	4.652	4.580	材料科学	1	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	1
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	2

121	GEOPHYSICAL RESEARCH LETTERS	2	4.497	4.952	地球科学	1	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
122	CATENA	2	4.333	4.620	农林科学	1	WATER RESOURCES 水资源	1
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
							SOIL SCIENCE 土壤科学	2
123	IEEE GEOSCIENCE AND REMOTE SENSING LETTERS	2	3.833	3.700	工程技术	2	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
							GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	3
							IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	3
							REMOTE SENSING 遥感	3
124	IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING	2	3.827	3.909	工程技术	2	IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	2
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3

							GEOGRAPHY, PHYSICAL 自然地理	3
							REMOTE SENSING 遥感	3
125	JOURNAL OF THE ELECTROCHEMICAL SOCIETY	2	3.721	3.719	工程技术	3	ELECTROCHEMISTRY 电化学	3
							MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	4
126	EARTH SURFACE PROCESSES AND LANDFORMS	2	3.694	4.103	地球科学	2	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
							GEOGRAPHY, PHYSICAL 自然地理	3
127	INTERNATIONAL GEOLOGY REVIEW	2	3.657	3.501	地球科学	3	GEOLOGY 地质学	3
128	MECHANICS OF ADVANCED MATERIALS AND STRUCTURES	2	3.517	2.748	材料科学	3	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	2
							MATERIALS SCIENCE, COMPOSITES 材料科学：复合	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							MECHANICS 力学	4

129	ENERGY & FUELS	2	3.421	3.715	工程技术	3	ENERGY & FUELS 能源与燃料	3
							ENGINEERING, CHEMICAL 工程：化工	3
130	MATERIALS CHEMISTRY AND PHYSICS	2	3.408	2.884	材料科学	3	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
131	LITHOS	2	3.390	4.511	地球科学	2	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	2
							MINERALOGY 矿物学	2
132	GEOMATICS NATURAL HAZARDS & RISK	2	3.333	3.046	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
							WATER RESOURCES 水资源	3
133	IEEE SENSORS JOURNAL	2	3.073	3.193	工程技术	2	INSTRUMENTS & INSTRUMENTATION 仪器仪表	2
							PHYSICS, APPLIED 物理：应用	2
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3

134	JOURNAL OF ASIAN EARTH SCIENCES	2	3.059	3.412	地球科学	2	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
135	ACS OMEGA	2	2.870	2.905	化学	3	CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
136	FLUID PHASE EQUILIBRIA	2	2.838	2.454	工程技术	2	ENGINEERING, CHEMICAL 工程：化工	2
							THERMODYNAMICS 热力学	2
							CHEMISTRY, PHYSICAL 物理化学	3
137	COMPUTER COMMUNICATIONS	2	2.816	2.944	计算机科学	3	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
							TELECOMMUNICATIONS 电信学	3
138	EUROPEAN JOURNAL OF REMOTE SENSING	2	2.808	2.547	地球科学	4	REMOTE SENSING 遥感	4
139	PEER-TO-PEER NETWORKING AND APPLICATIONS	2	2.793	2.100	计算机科学	3	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							TELECOMMUNICATIONS 电信学	3

140	JOURNAL OF EARTHQUAKE ENGINEERING	2	2.779	2.450	工程技术	3	ENGINEERING, CIVIL 工程：土木	3
							ENGINEERING, GEOLOGICAL 工程：地质	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
141	ACTA CHIMICA SINICA	2	2.759	1.803	化学	3	CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
142	FRONTIERS IN MATERIALS	2	2.705	N/A	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
143	SYMMETRY-BASEL	2	2.645	1.427	综合性期刊	3	MULTIDISCIPLINARY SCIENCES 综合性期刊	3
144	HYDROGEOLOGY JOURNAL	2	2.641	2.672	地球科学	3	WATER RESOURCES 水资源	2
							WATER RESOURCES 水资源	3
145	INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY	2	2.633	2.925	工程技术	3	AUTOMATION & CONTROL SYSTEMS 自动化与控制系统	3
							ENGINEERING, MANUFACTURING 工程：制造	3
146	GEOPHYSICS	2	2.609	3.100	地球科学	2	GEOCHEMISTRY & GEOPHYSICS 地球化学	2

							与地球物理	
147	COMMUNICATIONS IN COMPUTATIONAL PHYSICS	2	2.607	2.229	物理与天体物理	3	PHYSICS, MATHEMATICAL 物理：数学物理	3
148	INTERNATIONAL JOURNAL OF GEOMECHANICS	2	2.589	2.742	地球科学	3	ENGINEERING, GEOLOGICAL 工程：地质	3
149	JOURNAL OF APPLIED POLYMER SCIENCE	2	2.520	2.257	化学	3	POLYMER SCIENCE 高分子科学	3
150	JOURNAL OF STRUCTURAL ENGINEERING	2	2.454	2.870	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	2
							ENGINEERING, CIVIL 工程：土木	3
151	NATURAL HAZARDS	2	2.427	2.799	工程技术	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
							WATER RESOURCES 水资源	3
152	ELECTRONICS	2	2.412	N/A	工程技术	3	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4

153	CRYSTALS	2	2.404	2.376	材料科学	3	CRYSTALLOGRAPHY 晶体学	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
154	MULTIMEDIA TOOLS AND APPLICATIONS	2	2.313	1.994	计算机科学	4	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	4
							COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	4
							COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	4
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
155	REMOTE SENSING LETTERS	2	2.298	2.418	工程技术	4	IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	4
							REMOTE SENSING 遥感	4
156	ADVANCES IN SPACE RESEARCH	2	2.178	1.879	地球科学	3	ASTRONOMY & ASTROPHYSICS 天文与天体物理	3
							ENGINEERING, AEROSPACE 工程：宇航	3

							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
157	CHEMICAL PHYSICS LETTERS	2	2.029	1.724	化学	3	CHEMISTRY, PHYSICAL 物理化学	4
							PHYSICS, ATOMIC, MOLECULAR & CHEMICAL 物理：原子、分子和化学物理	4
158	HYDROLOGY RESEARCH	2	2.012	1.939	环境科学与生态学	4	WATER RESOURCES 水资源	3
159	ACTA MECHANICA SOLIDA SINICA	2	2.008	1.798	工程技术	3	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							MECHANICS 力学	3
160	JOURNAL OF COMPOSITE MATERIALS	2	1.972	2.045	材料科学	4	MATERIALS SCIENCE, COMPOSITES 材料科学：复合	4
161	MATCH-COMMUNICATIONS IN MATHEMATICAL AND IN COMPUTER CHEMISTRY	2	1.949	1.787	化学	2	CHEMISTRY, MULTIDISCIPLINARY 化学综合	2
							MATHEMATICS, INTERDISCIPLINARY	2

							APPLICATIONS 数学跨学科应用	
							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	3
162	WIND AND STRUCTURES	2	1.922	1.643	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4
							ENGINEERING, CIVIL 工程：土木	4
							MECHANICS 力学	4
163	WATER AIR AND SOIL POLLUTION	2	1.900	2.041	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	4
							WATER RESOURCES 水资源	4
164	MEASUREMENT SCIENCE AND TECHNOLOGY	2	1.857	1.862	工程技术	3	ENGINEERING, MULTIDISCIPLINARY 工程：综合	3
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	3
165	JOURNAL OF GEODYNAMICS	2	1.855	2.357	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4

166	WIRELESS COMMUNICATIONS & MOBILE COMPUTING	2	1.819	1.445	计算机科学	4	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	4
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							TELECOMMUNICATIONS 电信学	4
167	MULTIDIMENSIONAL SYSTEMS AND SIGNAL PROCESSING	2	1.810	1.733	工程技术	3	COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	4
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
168	MARINE GEORESOURCES & GEOTECHNOLOGY	2	1.716	1.583	工程技术	4	ENGINEERING, OCEAN 工程：大洋	3
							MINING & MINERAL PROCESSING 矿业与矿物加工	3
							ENGINEERING, GEOLOGICAL 工程：地质	4
							OCEANOGRAPHY 海洋学	4
169	JOURNAL OF PALEONTOLOGY	2	1.653	1.601	地球科学	3	PALEONTOLOGY 古生物学	3
170	JOURNAL OF CRYSTAL GROWTH	2	1.632	1.684	材料科学	3	CRYSTALLOGRAPHY 晶体学	3
							PHYSICS, APPLIED 物理：应用	3

							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
171	GEOFLUIDS	2	1.534	1.872	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
							GEOLOGY 地质学	4
172	INTERNATIONAL JOURNAL OF CIVIL ENGINEERING	2	1.446	1.377	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
173	INTERNATIONAL JOURNAL OF ENVIRONMENTAL ANALYTICAL CHEMISTRY	2	1.431	1.342	化学	4	CHEMISTRY, ANALYTICAL 分析化学	4
							ENVIRONMENTAL SCIENCES 环境科学	4
174	EURASIP JOURNAL ON WIRELESS COMMUNICATIONS AND NETWORKING	2	1.408	1.487	计算机科学	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							TELECOMMUNICATIONS 电信学	4
175	JOURNAL OF URBAN PLANNING AND DEVELOPMENT	2	1.381	1.721	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							REGIONAL & URBAN PLANNING 区域与城市规划	4
							URBAN STUDIES 城市研究	4

176	JOURNAL OF MECHANICAL SCIENCE AND TECHNOLOGY	2	1.345	1.463	工程技术	4	ENGINEERING, MECHANICAL 工程：机械	4
177	LATIN AMERICAN JOURNAL OF SOLIDS AND STRUCTURES	2	1.256	1.377	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							ENGINEERING, MECHANICAL 工程：机械	4
							MECHANICS 力学	4
178	INTERNATIONAL JOURNAL OF PARALLEL PROGRAMMING	2	1.244	1.125	计算机科学	4	COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	4
179	CHINESE PHYSICS B	2	1.223	1.038	物理与天体物理	3	PHYSICS, MULTIDISCIPLINARY 物理：综合	3
180	JOURNAL OF TRANSPORTATION ENGINEERING PART A-SYSTEMS	2	0.989	0.995	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
181	IRANIAN JOURNAL OF SCIENCE AND TECHNOLOGY-TRANSACTIONS OF CIVIL ENGINEERING	2	0.975	0.910	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
182	INTERNATIONAL JOURNAL OF STEEL STRUCTURES	2	0.878	1.167	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4

							ENGINEERING, CIVIL 工程：土木	4
183	JOURNAL OF ENVIRONMENTAL PROTECTION AND ECOLOGY	2	0.692	0.657	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
184	EARTH SCIENCES RESEARCH JOURNAL	2	0.541	0.896	地球科学	4	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
185	CHEMISTRY AND TECHNOLOGY OF FUELS AND OILS	2	0.405	0.404	工程技术	4	ENERGY & FUELS 能源与燃料	4
							ENGINEERING, CHEMICAL 工程：化工	4
							ENGINEERING, PETROLEUM 工程：石油	4
186	WATER SUPPLY	2	N/A	N/A	-	-	-	
187	NANO ENERGY	1	16.602	15.988	材料科学	1	CHEMISTRY, PHYSICAL 物理化学	1
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	1
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	1
							PHYSICS, APPLIED 物理：应用	1
188	IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS	1	9.112	9.008	计算机科学	1	AUTOMATION & CONTROL SYSTEMS 自动化与控制系统	1

							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	1
							ENGINEERING, INDUSTRIAL 工程：工业	1
189	ACS APPLIED MATERIALS & INTERFACES	1	8.758	8.901	材料科学	1	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	2
190	JOURNAL OF POWER SOURCES	1	8.247	7.250	工程技术	2	CHEMISTRY, PHYSICAL 物理化学	2
							ELECTROCHEMISTRY 电化学	2
							ENERGY & FUELS 能源与燃料	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
191	BIORESOURCE TECHNOLOGY	1	7.539	7.270	工程技术	1	AGRICULTURAL ENGINEERING 农业工程	1
							BIOTECHNOLOGY & APPLIED MICROBIOLOGY 生物工程与应用微生物	1
							ENERGY & FUELS 能源与燃料	1
192	IEEE TRANSACTIONS ON INDUSTRIAL	1	7.515	8.176	计算机科学	1	AUTOMATION & CONTROL SYSTEMS 自动	1

	ELECTRONICS						化与控制系统	
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	1
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	1
193	JOURNAL OF COLLOID AND INTERFACE SCIENCE	1	7.489	6.171	化学	1	CHEMISTRY, PHYSICAL 物理化学	2
194	JOURNAL OF MATERIALS CHEMISTRY C	1	7.059	6.404	材料科学	2	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							PHYSICS, APPLIED 物理：应用	2
195	ADDITIVE MANUFACTURING	1	7.002	N/A	工程技术	2	ENGINEERING, MANUFACTURING 工程：制造	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
196	ENVIRONMENTAL POLLUTION	1	6.793	6.939	环境科学与生态学	1	ENVIRONMENTAL SCIENCES 环境科学	1
197	JOURNAL OF PHYSICAL CHEMISTRY	1	6.710	7.811	化学	1	CHEMISTRY, PHYSICAL 物理化学	2

	LETTERS						MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	2
							PHYSICS, ATOMIC, MOLECULAR & CHEMICAL 物理：原子、分子和化学物理	2
198	IEEE TRANSACTIONS ON POWER ELECTRONICS	1	6.373	7.382	工程技术	1	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	1
199	CEMENT & CONCRETE COMPOSITES	1	6.257	7.035	工程技术	1	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	1
							MATERIALS SCIENCE, COMPOSITES 材料科学：复合	2
200	GONDWANA RESEARCH	1	6.174	7.121	地球科学	1	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
201	CHINESE JOURNAL OF CATALYSIS	1	6.146	4.424	化学	1	CHEMISTRY, APPLIED 应用化学	1
							ENGINEERING, CHEMICAL 工程：化工	1
							CHEMISTRY, PHYSICAL 物理化学	2

202	FUTURE GENERATION COMPUTER SYSTEMS-THE INTERNATIONAL JOURNAL OF ESCIENCE	1	6.125	5.387	计算机科学	2	COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	1
203	INFORMATION SCIENCES	1	5.910	5.563	计算机科学	1	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	1
204	SEPARATION AND PURIFICATION TECHNOLOGY	1	5.774	5.257	工程技术	1	ENGINEERING, CHEMICAL 工程：化工	1
205	SUSTAINABLE ENERGY & FUELS	1	5.503	5.505	材料科学	3	CHEMISTRY, PHYSICAL 物理化学	3
							ENERGY & FUELS 能源与燃料	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
206	POLYMER CHEMISTRY	1	5.342	4.671	化学	2	POLYMER SCIENCE 高分子科学	2
207	FRICTION	1	5.290	4.137	工程技术	1	ENGINEERING, MECHANICAL 工程：机械	1
208	IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS	1	5.223	4.803	工程技术	2	MATHEMATICAL & COMPUTATIONAL BIOLOGY 数学与计算生物学	1
							MEDICAL INFORMATICS 医学：信息	1

							COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	2
							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	2
209	INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	1	5.134	6.205	工程技术	1	ENGINEERING, INDUSTRIAL 工程：工业	2
							ENGINEERING, MANUFACTURING 工程：制造	2
							OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	2
210	SCRIPTA MATERIALIA	1	5.079	5.044	材料科学	1	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	1
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	2
211	ROBOTICS AND COMPUTER-INTEGRATED	1	5.057	4.851	计算机科学	1	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	1

	MANUFACTURING						ENGINEERING, MANUFACTURING 工程：制造	1
							ROBOTICS 机器人学	1
212	RELIABILITY ENGINEERING & SYSTEM SAFETY	1	5.040	5.156	工程技术	1	ENGINEERING, INDUSTRIAL 工程：工业	1
							OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	1
213	APPLIED CATALYSIS A-GENERAL	1	5.006	4.831	化学	2	CHEMISTRY, PHYSICAL 物理化学	2
							ENVIRONMENTAL SCIENCES 环境科学	2
214	FUEL PROCESSING TECHNOLOGY	1	4.982	4.733	工程技术	2	CHEMISTRY, APPLIED 应用化学	1
							ENERGY & FUELS 能源与燃料	2
							ENGINEERING, CHEMICAL 工程：化工	2
215	BUILDING AND ENVIRONMENT	1	4.971	5.459	工程技术	1	ENGINEERING, CIVIL 工程：土木	1
							CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	2
							ENGINEERING, ENVIRONMENTAL 工程：环境	2
216	STRUCTURAL HEALTH	1	4.870	4.922	工程技术	2	ENGINEERING, MULTIDISCIPLINARY 工程：	2

	MONITORING-AN INTERNATIONAL JOURNAL						综合	
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	2
217	ENERGY AND BUILDINGS	1	4.867	5.055	工程技术	2	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	2
							ENGINEERING, CIVIL 工程：土木	2
							ENERGY & FUELS 能源与燃料	3
218	NONLINEAR DYNAMICS	1	4.867	4.540	工程技术	2	ENGINEERING, MECHANICAL 工程：机械	2
							MECHANICS 力学	2
219	EARTH AND PLANETARY SCIENCE LETTERS	1	4.824	5.274	地球科学	1	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	1
220	JOURNAL OF THE ENERGY INSTITUTE	1	4.748	4.557	工程技术	2	ENERGY & FUELS 能源与燃料	3
221	IEEE JOURNAL OF EMERGING AND SELECTED TOPICS IN POWER ELECTRONICS	1	4.728	6.084	工程技术	2	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
222	ATMOSPHERIC RESEARCH	1	4.676	4.639	地球科学	2	METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	2

223	DYES AND PIGMENTS	1	4.613	3.881	材料科学	2	MATERIALS SCIENCE, TEXTILES 材料科学：纺织	1
							CHEMISTRY, APPLIED 应用化学	2
							ENGINEERING, CHEMICAL 工程：化工	2
224	INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH	1	4.577	4.145	工程技术	2	ENGINEERING, MANUFACTURING 工程：制造	2
							OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	2
							ENGINEERING, INDUSTRIAL 工程：工业	3
225	IEEE TRANSACTIONS ON ENERGY CONVERSION	1	4.501	4.917	工程技术	1	ENERGY & FUELS 能源与燃料	2
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
226	JOURNAL OF THE EUROPEAN CERAMIC SOCIETY	1	4.495	4.283	材料科学	1	MATERIALS SCIENCE, CERAMICS 材料科学：硅酸盐	1
227	PROGRESS IN ORGANIC COATINGS	1	4.469	4.061	材料科学	2	CHEMISTRY, APPLIED 应用化学	2
							MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	2

228	NEUROCOMPUTING	1	4.438	4.010	计算机科学	2	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	2
229	SIGNAL PROCESSING	1	4.384	3.882	工程技术	2	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
230	NANOMATERIALS	1	4.324	4.514	材料科学	3	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	3
231	ISA TRANSACTIONS	1	4.305	4.468	计算机科学	2	ENGINEERING, MULTIDISCIPLINARY 工程：综合	1
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	1
							AUTOMATION & CONTROL SYSTEMS 自动化与控制系统	2
232	OPTICS AND LASERS IN ENGINEERING	1	4.273	3.844	工程技术	2	OPTICS 光学	2
233	ADVANCED POWDER TECHNOLOGY	1	4.217	3.780	工程技术	2	ENGINEERING, CHEMICAL 工程：化工	2

234	GEOSCIENCE FRONTIERS	1	4.202	5.379	地球科学	1	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
235	DALTON TRANSACTIONS	1	4.174	3.812	化学	2	CHEMISTRY, INORGANIC & NUCLEAR 无机化学与核化学	2
236	INTERNATIONAL JOURNAL OF ROCK MECHANICS AND MINING SCIENCES	1	4.151	4.856	工程技术	2	MINING & MINERAL PROCESSING 矿业与矿物加工	1
							ENGINEERING, GEOLOGICAL 工程：地质	2
237	COMPUTERS & INDUSTRIAL ENGINEERING	1	4.135	4.296	工程技术	2	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	2
							ENGINEERING, INDUSTRIAL 工程：工业	2
238	WEAR	1	4.108	4.169	工程技术	1	ENGINEERING, MECHANICAL 工程：机械	1
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
239	TOXICOLOGY	1	4.099	3.908	医学	2	PHARMACOLOGY & PHARMACY 药学	2
							TOXICOLOGY 毒理学	2
240	TRANSPORTATION	1	4.082	4.574	工程技术	2	ENGINEERING, CIVIL 工程：土木	2
							TRANSPORTATION 交通运输	3

							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	3
241	AGRICULTURAL WATER MANAGEMENT	1	4.021	4.469	农林科学	1	AGRONOMY 农艺学	1
							WATER RESOURCES 水资源	1
242	RESULTS IN PHYSICS	1	4.019	3.706	物理与天体物理	3	PHYSICS, MULTIDISCIPLINARY 物理：综合	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
243	ALGAL RESEARCH-BIOMASS BIOFUELS AND BIOPRODUCTS	1	4.008	4.555	生物学	2	BIOTECHNOLOGY & APPLIED MICROBIOLOGY 生物工程与应用微生物	2
244	COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS	1	3.990	3.480	化学	2	CHEMISTRY, PHYSICAL 物理化学	3
245	IEEE SYSTEMS JOURNAL	1	3.987	4.261	计算机科学	2	OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	2
							COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							ENGINEERING, ELECTRICAL &	3

							ELECTRONIC 工程：电子与电气	
							TELECOMMUNICATIONS 电信学	3
246	MACROMOLECULAR MATERIALS AND ENGINEERING	1	3.853	3.368	材料科学	2	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							POLYMER SCIENCE 高分子科学	3
247	APPLIED MATHEMATICS LETTERS	1	3.848	3.092	数学	1	MATHEMATICS, APPLIED 应用数学	1
248	JOURNAL OF NATURAL GAS SCIENCE AND ENGINEERING	1	3.841	4.090	工程技术	2	ENGINEERING, CHEMICAL 工程：化工	2
							ENERGY & FUELS 能源与燃料	3
249	URBAN CLIMATE	1	3.834	N/A	工程技术	3	ENVIRONMENTAL SCIENCES 环境科学	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
250	GEOTECHNIQUE	1	3.830	4.331	工程技术	2	ENGINEERING, GEOLOGICAL 工程：地质	2
251	GEOMORPHOLOGY	1	3.819	3.948	地球科学	2	GEOGRAPHY, PHYSICAL 自然地理	2
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
252	COMPLEX & INTELLIGENT SYSTEMS	1	3.791	N/A	计算机科学	3	COMPUTER SCIENCE, ARTIFICIAL	3

							INTELLIGENCE 计算机：人工智能	
253	MARINE AND PETROLEUM GEOLOGY	1	3.790	4.463	地球科学	2	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
254	GEOCARTO INTERNATIONAL	1	3.789	2.957	地球科学	3	ENVIRONMENTAL SCIENCES 环境科学	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	3
							REMOTE SENSING 遥感	3
255	SURFACE & COATINGS TECHNOLOGY	1	3.784	3.754	材料科学	1	MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	1
							PHYSICS, APPLIED 物理：应用	2
256	CHAOS SOLITONS & FRACTALS	1	3.764	3.046	物理与天体物理	2	PHYSICS, MATHEMATICAL 物理：数学物理	1
							MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	2
							PHYSICS, MULTIDISCIPLINARY 物理：综合	2
257	JOURNAL OF PETROLEUM SCIENCE	1	3.706	3.770	工程技术	2	ENGINEERING, PETROLEUM 工程：石油	1

	AND ENGINEERING						ENERGY & FUELS 能源与燃料	3
258	ARCHIVES OF CIVIL AND MECHANICAL ENGINEERING	1	3.672	3.561	工程技术	2	ENGINEERING, CIVIL 工程：土木	2
							ENGINEERING, MECHANICAL 工程：机械	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
259	IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT	1	3.658	3.419	工程技术	2	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	2
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	2
260	INTERNATIONAL JOURNAL OF IMPACT ENGINEERING	1	3.642	4.122	工程技术	1	MECHANICS 力学	1
							ENGINEERING, MECHANICAL 工程：机械	2
261	APPLIED MATHEMATICAL MODELLING	1	3.633	3.370	工程技术	2	MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	1
							ENGINEERING, MULTIDISCIPLINARY 工程：综合	2
							MECHANICS 力学	2
262	COMPUTER METHODS AND	1	3.632	3.836	工程技术	2	COMPUTER SCIENCE, THEORY &	2

	PROGRAMS IN BIOMEDICINE						METHODS 计算机：理论方法	
							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	3
							ENGINEERING, BIOMEDICAL 工程：生物医学	3
							MEDICAL INFORMATICS 医学：信息	3
263	SMART MATERIALS AND STRUCTURES	1	3.613	3.988	材料科学	2	INSTRUMENTS & INSTRUMENTATION 仪器仪表	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
264	APPLIED PHYSICS LETTERS	1	3.597	3.400	物理与天体物理	2	PHYSICS, APPLIED 物理：应用	2
265	COMPUTERS & SECURITY	1	3.579	3.756	计算机科学	2	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
266	ATMOSPHERIC POLLUTION RESEARCH	1	3.527	3.436	环境科学与生态学	3	ENVIRONMENTAL SCIENCES 环境科学	3
267	STRUCTURAL CONTROL & HEALTH	1	3.499	3.773	工程技术	2	CONSTRUCTION & BUILDING	2

	MONITORING						TECHNOLOGY 结构与建筑技术	
							ENGINEERING, CIVIL 工程：土木	2
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	2
268	APPLIED MATHEMATICS AND COMPUTATION	1	3.472	2.709	数学	2	MATHEMATICS, APPLIED 应用数学	2
269	JOURNAL OF PETROLOGY	1	3.451	4.332	地球科学	2	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	2
270	JOURNAL OF SOUND AND VIBRATION	1	3.429	3.617	工程技术	2	ACOUSTICS 声学	2
							ENGINEERING, MECHANICAL 工程：机械	2
							MECHANICS 力学	2
271	ENGINEERING FRACTURE MECHANICS	1	3.426	3.433	工程技术	2	MECHANICS 力学	2
272	IEEE TRANSACTIONS ON BROADCASTING	1	3.419	3.272	计算机科学	1	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	1
							TELECOMMUNICATIONS 电信学	1
273	GEOTEXTILES AND GEOMEMBRANES	1	3.400	3.808	地球科学	1	ENGINEERING, GEOLOGICAL 工程：地质	1

							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	1
274	JOURNAL OF BUILDING ENGINEERING	1	3.379	N/A	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	2
							ENGINEERING, CIVIL 工程：土木	2
275	JOURNAL OF GEOCHEMICAL EXPLORATION	1	3.352	3.538	地球科学	2	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	3
276	INDUSTRIAL MANAGEMENT & DATA SYSTEMS	1	3.329	4.379	工程技术	3	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	3
							ENGINEERING, INDUSTRIAL 工程：工业	3
277	FUZZY SETS AND SYSTEMS	1	3.305	2.943	数学	2	MATHEMATICS, APPLIED 应用数学	1
							COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	2
							STATISTICS & PROBABILITY 统计学与概率论	2
278	SYNTHETIC METALS	1	3.286	2.593	材料科学	3	PHYSICS, CONDENSED MATTER 物理：凝聚态物理	3

							POLYMER SCIENCE 高分子科学	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
279	MOLECULES	1	3.267	3.589	化学	3	BIOCHEMISTRY & MOLECULAR BIOLOGY 生化与分子生物学	3
							CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
280	HYDROLOGICAL PROCESSES	1	3.256	3.616	地球科学	2	WATER RESOURCES 水资源	2
281	OPTICS AND LASER TECHNOLOGY	1	3.233	3.041	物理与天体物理	2	OPTICS 光学	2
							PHYSICS, APPLIED 物理：应用	2
282	APPLIED SOIL ECOLOGY	1	3.187	3.716	农林科学	2	SOIL SCIENCE 土壤科学	2
283	MINE WATER AND THE ENVIRONMENT	1	3.184	2.537	环境科学与生态学	3	WATER RESOURCES 水资源	3
284	JOURNAL OF PHYSICS D-APPLIED PHYSICS	1	3.169	2.902	物理与天体物理	3	PHYSICS, APPLIED 物理：应用 -	3
285	APPLIED ORGANOMETALLIC	1	3.140	3.094	化学	3	CHEMISTRY, INORGANIC & NUCLEAR 无机	2

	CHEMISTRY						化学与核化学	
							CHEMISTRY, APPLIED 应用化学	3
286	INTERNATIONAL JOURNAL OF DAMAGE MECHANICS	1	3.125	2.854	材料科学	2	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	2
							MECHANICS 力学	2
287	RSC ADVANCES	1	3.119	3.098	化学	3	CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
288	IMAGE AND VISION COMPUTING	1	3.103	3.019	计算机科学	3	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	3
							COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	3
							COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	3
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
							OPTICS 光学	3
289	OCEAN ENGINEERING	1	3.068	3.302	工程技术	2	ENGINEERING, MARINE 工程：海洋	1

							ENGINEERING, OCEAN 工程：大洋	1
							ENGINEERING, CIVIL 工程：土木	2
							OCEANOGRAPHY 海洋学	2
290	JOURNAL OF FLOOD RISK MANAGEMENT	1	3.066	2.941	环境科学与生态学	3	WATER RESOURCES 水资源	2
							ENVIRONMENTAL SCIENCES 环境科学	3
291	JOURNAL OF APPLIED CRYSTALLOGRAPHY	1	2.995	3.368	材料科学	3	CRYSTALLOGRAPHY 晶体学	2
							CHEMISTRY, MULTIDISCIPLINARY 化学综合	3
292	BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS	1	2.985	2.750	生物学	3	BIOPHYSICS 生物物理	3
							BIOCHEMISTRY & MOLECULAR BIOLOGY 生化与分子生物学	4
293	INTERNATIONAL JOURNAL OF REMOTE SENSING	1	2.976	2.712	工程技术	3	IMAGING SCIENCE & PHOTOGRAPHIC TECHNOLOGY 成像科学与照相技术	3
							REMOTE SENSING 遥感	4
294	PHYSICA A-STATISTICAL MECHANICS AND ITS APPLICATIONS	1	2.924	2.625	物理与天体物理	2	PHYSICS, MULTIDISCIPLINARY 物理：综合	2
295	SENSORS AND ACTUATORS	1	2.904	2.923	工程技术	3	ENGINEERING, ELECTRICAL &	3

	A-PHYSICAL						ELECTRONIC 工程：电子与电气	
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	3
296	APPLIED GEOCHEMISTRY	1	2.903	3.300	地球科学	3	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	3
297	THEORETICAL AND APPLIED CLIMATOLOGY	1	2.882	3.143	地球科学	3	METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
298	INTERNATIONAL JOURNAL OF COMPUTER INTEGRATED MANUFACTURING	1	2.861	2.571	工程技术	3	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	3
							OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	3
							ENGINEERING, MANUFACTURING 工程：制造	4
299	PETROLEUM EXPLORATION AND DEVELOPMENT	1	2.845	3.348	工程技术	2	ENGINEERING, PETROLEUM 工程：石油	1
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	2
							ENERGY & FUELS 能源与燃料	3

300	JOURNAL OF STRUCTURAL GEOLOGY	1	2.836	3.157	地球科学	2	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
301	JOURNAL OF ROCK MECHANICS AND GEOTECHNICAL ENGINEERING	1	2.829	N/A	工程技术	2	ENGINEERING, GEOLOGICAL 工程：地质	2
302	INTERNATIONAL JOURNAL FOR NUMERICAL AND ANALYTICAL METHODS IN GEOMECHANICS	1	2.814	2.562	工程技术	2	ENGINEERING, GEOLOGICAL 工程：地质	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							MECHANICS 力学	3
303	CANADIAN GEOTECHNICAL JOURNAL	1	2.802	3.053	地球科学	3	ENGINEERING, GEOLOGICAL 工程：地质	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
304	JOURNAL OF CLOUD COMPUTING-ADVANCES SYSTEMS AND APPLICATIONS	1	2.788	N/A	计算机科学	3	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
305	INTERNATIONAL JOURNAL OF CONTROL	1	2.780	2.562	计算机科学	3	AUTOMATION & CONTROL SYSTEMS 自动化与控制系统	4
306	JOURNAL OF SYSTEMATICS AND	1	2.779	3.053	生物学	2	PLANT SCIENCES 植物科学	2

	EVOLUTION							
307	SIGNAL PROCESSING-IMAGE COMMUNICATION	1	2.779	2.947	工程技术	3	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
308	WASTE MANAGEMENT & RESEARCH	1	2.771	2.867	环境科学与生态学	4	ENGINEERING, ENVIRONMENTAL 工程：环境	4
							ENVIRONMENTAL SCIENCES 环境科学	4
309	JOURNAL OF SOILS AND SEDIMENTS	1	2.763	2.998	农林科学	3	ENVIRONMENTAL SCIENCES 环境科学	3
							SOIL SCIENCE 土壤科学	3
310	PROCESSES	1	2.753	N/A	工程技术	3	ENGINEERING, CHEMICAL 工程：化工	3
311	JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY	1	2.731	2.325	化学	3	CHEMISTRY, ANALYTICAL 分析化学	3
							CHEMISTRY, PHYSICAL 物理化学	3
							THERMODYNAMICS 热力学	3
312	INTERNATIONAL JOURNAL OF APPROXIMATE REASONING	1	2.678	2.496	计算机科学	3	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	3
313	COMPUTERS & ELECTRICAL ENGINEERING	1	2.663	2.654	计算机科学	3	COMPUTER SCIENCE, HARDWARE & ARCHITECTURE 计算机：硬件	3

							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	3
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	3
314	DIAMOND AND RELATED MATERIALS	1	2.650	2.699	材料科学	2	MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							PHYSICS, APPLIED 物理：应用	3
							PHYSICS, CONDENSED MATTER 物理：凝聚态物理	3
315	JOURNAL OF AEROSOL SCIENCE	1	2.649	2.663	环境科学与生态学	3	ENGINEERING, CHEMICAL 工程：化工	3
							ENGINEERING, MECHANICAL 工程：机械	3
							ENVIRONMENTAL SCIENCES 环境科学	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
316	ROYAL SOCIETY OPEN SCIENCE	1	2.646	2.924	综合性期刊	3	MULTIDISCIPLINARY SCIENCES 综合性期	3

							刊	
317	GEOPHYSICAL JOURNAL INTERNATIONAL	1	2.574	2.834	地球科学	2	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	3
318	JOURNAL OF THERMAL SPRAY TECHNOLOGY	1	2.522	2.587	材料科学	2	MATERIALS SCIENCE, COATINGS & FILMS 材料科学：膜	3
319	ECOLOGICAL INFORMATICS	1	2.511	2.759	环境科学与生态学	3	ECOLOGY 生态学	3
320	JOURNAL OF VISUAL COMMUNICATION AND IMAGE REPRESENTATION	1	2.479	2.652	计算机科学	3	COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	3
							COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	3
321	JOURNAL OF SUPERCOMPUTING	1	2.469	2.025	计算机科学	4	COMPUTER SCIENCE, HARDWARE & ARCHITECTURE 计算机：硬件	4
							COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	4
							ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4

322	APPLIED ACOUSTICS	1	2.440	2.448	物理与天体物理	2	ACOUSTICS 声学	2
323	CLEAN TECHNOLOGIES AND ENVIRONMENTAL POLICY	1	2.429	2.599	环境科学与生态学	4	ENGINEERING, ENVIRONMENTAL 工程：环境	4
							ENVIRONMENTAL SCIENCES 环境科学	4
							GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY 绿色可持续发展技术	4
324	TRANSPORTMETRICA A-TRANSPORT SCIENCE	1	2.424	2.731	工程技术	2	TRANSPORTATION 交通运输	3
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	3
325	PEERJ	1	2.379	2.810	生物学	3	MULTIDISCIPLINARY SCIENCES 综合性期刊	3
326	GEOLOGICAL MAGAZINE	1	2.365	2.764	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
327	GRANULAR MATTER	1	2.347	2.499	工程技术	2	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
							MECHANICS 力学	3

							PHYSICS, APPLIED 物理：应用	3
328	JOURNAL OF THEORETICAL BIOLOGY	1	2.327	2.122	计算机科学	4	BIOLOGY 生物学	3
							MATHEMATICAL & COMPUTATIONAL BIOLOGY 数学与计算生物学	3
329	INTERNATIONAL JOURNAL OF NON-LINEAR MECHANICS	1	2.313	2.353	工程技术	3	MECHANICS 力学	3
330	PHYSICS AND CHEMISTRY OF THE EARTH	1	2.308	2.436	地球科学	3	WATER RESOURCES 水资源	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	4
331	POLYMER COMPOSITES	1	2.265	2.333	材料科学	3	MATERIALS SCIENCE, COMPOSITES 材料科学：复合	3
							POLYMER SCIENCE 高分子科学	3
332	ISPRS INTERNATIONAL JOURNAL OF GEO-INFORMATION	1	2.239	2.402	地球科学	3	REMOTE SENSING 遥感	3
							GEOGRAPHY, PHYSICAL 自然地理	4
333	CHINESE JOURNAL OF AERONAUTICS	1	2.215	2.227	工程技术	2	ENGINEERING, AEROSPACE 工程：宇航	2

334	TRANSPORTMETRICA B-TRANSPORT DYNAMICS	1	2.214	3.364	工程技术	2	TRANSPORTATION 交通运输	3
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	3
335	ENVIRONMENTAL TECHNOLOGY	1	2.213	2.022	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
336	GROUNDWATER	1	2.205	2.381	地球科学	3	WATER RESOURCES 水资源	3
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
337	JOURNAL OF ENVIRONMENTAL HEALTH SCIENCE AND ENGINEERING	1	2.179	3.632	环境科学与生态学	4	ENGINEERING, ENVIRONMENTAL 工程：环境	4
							ENVIRONMENTAL SCIENCES 环境科学	4
338	JOURNAL OF VIBRATION AND CONTROL	1	2.169	2.171	工程技术	3	ENGINEERING, MECHANICAL 工程：机械	3
							ACOUSTICS 声学	4
							MECHANICS 力学	4
339	JOURNAL OF EXPERIMENTAL NANOSCIENCE	1	2.169	2.240	材料科学	4	CHEMISTRY, MULTIDISCIPLINARY 化学综合	4
							MATERIALS SCIENCE,	4

							MULTIDISCIPLINARY 材料科学：综合	
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	4
							PHYSICS, APPLIED 物理：应用	4
340	RARE METALS	1	2.161	1.780	材料科学	2	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	2
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	3
341	CONTINUUM MECHANICS AND THERMODYNAMICS	1	2.139	1.940	工程技术	3	THERMODYNAMICS 热力学	3
							MECHANICS 力学	4
342	METALS	1	2.117	2.244	材料科学	3	METALLURGY & METALLURGICAL ENGINEERING 冶金工程	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
343	MAGAZINE OF CONCRETE RESEARCH	1	2.088	1.933	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4
							MATERIALS SCIENCE,	4

							MULTIDISCIPLINARY 材料科学：综合	
344	JOURNAL OF MOLECULAR GRAPHICS & MODELLING	1	2.079	1.989	计算机科学	4	BIOCHEMICAL RESEARCH METHODS 生化研究方法	4
							BIOCHEMISTRY & MOLECULAR BIOLOGY 生化与分子生物学	4
							COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	4
							CRYSTALLOGRAPHY 晶体学	4
							MATHEMATICAL & COMPUTATIONAL BIOLOGY 数学与计算生物学	4
345	NONLINEAR ANALYSIS-REAL WORLD APPLICATIONS	1	2.072	2.125	数学	2	MATHEMATICS, APPLIED 应用数学	2
346	INTERNATIONAL JOURNAL OF DISASTER RISK SCIENCE	1	2.048	2.728	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
							METEOROLOGY & ATMOSPHERIC SCIENCES 气象与大气科学	3
							WATER RESOURCES 水资源	3

347	STRUCTURAL DESIGN OF TALL AND SPECIAL BUILDINGS	1	2.048	2.003	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3
348	JOURNAL OF MARINE SCIENCE AND ENGINEERING	1	2.033	N/A	地球科学	3	OCEANOGRAPHY 海洋学	3
349	POLYMER BULLETIN	1	2.014	1.936	化学	4	POLYMER SCIENCE 高分子科学	4
350	ACM TRANSACTIONS ON KNOWLEDGE DISCOVERY FROM DATA	1	2.010	2.801	计算机科学	3	COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	3
							COMPUTER SCIENCE, INFORMATION SYSTEMS 计算机：信息系统	4
351	FUNCTIONAL MATERIALS LETTERS	1	2.000	1.436	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
352	JOURNAL OF APPLIED GEOPHYSICS	1	1.975	2.019	地球科学	2	MINING & MINERAL PROCESSING 矿业与矿物加工	2
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3

353	JOURNAL OF MATERIAL CYCLES AND WASTE MANAGEMENT	1	1.974	2.193	环境科学与生态学	4	ENVIRONMENTAL SCIENCES 环境科学	4
354	ACTA GEOLOGICA SINICA-ENGLISH EDITION	1	1.973	2.350	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
355	JOURNAL OF THERMAL SCIENCE	1	1.972	1.426	工程技术	3	ENGINEERING, MECHANICAL 工程：机械	3
							THERMODYNAMICS 热力学	3
356	ADVANCES IN APPLIED MATHEMATICS AND MECHANICS	1	1.961	1.432	工程技术	4	MATHEMATICS, APPLIED 应用数学	4
							MECHANICS 力学	4
357	SIAM JOURNAL ON APPLIED DYNAMICAL SYSTEMS	1	1.956	1.938	数学	3	PHYSICS, MATHEMATICAL 物理：数学物理	2
							MATHEMATICS, APPLIED 应用数学	3
358	PHYSICA B-CONDENSED MATTER	1	1.902	1.591	物理与天体物理	4	PHYSICS, CONDENSED MATTER 物理：凝聚态物理	4
359	INDOOR AND BUILT ENVIRONMENT	1	1.900	1.757	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4
							ENGINEERING, ENVIRONMENTAL 工程：环境	4
							PUBLIC, ENVIRONMENTAL &	4

							OCCUPATIONAL HEALTH 公共卫生、环境卫生与职业卫生	
360	ELECTRONIC JOURNAL OF QUALITATIVE THEORY OF DIFFERENTIAL EQUATIONS	1	1.827	1.492	数学	3	MATHEMATICS 数学	3
							MATHEMATICS, APPLIED 应用数学	3
361	INTERNATIONAL JOURNAL OF CONCRETE STRUCTURES AND MATERIALS	1	1.820	2.316	工程技术	3	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
362	JOURNAL OF HEALTHCARE ENGINEERING	1	1.803	1.802	医学	4	HEALTH CARE SCIENCES & SERVICES 卫生保健与服务	4
363	JOURNAL OF MATHEMATICAL CHEMISTRY	1	1.795	1.623	化学	3	CHEMISTRY, MULTIDISCIPLINARY 化学综合	4
							MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
364	JOURNAL OF CHEMISTRY	1	1.790	1.819	化学	4	CHEMISTRY, MULTIDISCIPLINARY 化学综	4

							合	
365	JOURNAL OF ELECTRONIC MATERIALS	1	1.774	1.684	-	-	-	
366	MOLECULAR PHYSICS	1	1.767	1.640	-	-	-	
367	PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE	1	1.759	1.674	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							PHYSICS, APPLIED 物理：应用	4
							PHYSICS, CONDENSED MATTER 物理：凝聚态物理	4
368	MATHEMATICS	1	1.747	N/A	数学	4	MATHEMATICS 数学	4
369	JOURNAL OF MICROMECHANICS AND MICROENGINEERING	1	1.739	1.882	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							INSTRUMENTS & INSTRUMENTATION 仪器仪表	4
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	4

							PHYSICS, APPLIED 物理：应用	4
370	MATERIALS TECHNOLOGY	1	1.738	1.472	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
371	JOURNAL OF CLUSTER SCIENCE	1	1.731	1.500	化学	4	CHEMISTRY, INORGANIC & NUCLEAR 无机化学与核化学	4
372	EARTHQUAKES AND STRUCTURES	1	1.714	1.624	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							ENGINEERING, GEOLOGICAL 工程：地质	4
373	COMPUTATIONAL PARTICLE MECHANICS	1	1.696	2.540	工程技术	3	MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
							MECHANICS 力学	4
374	CIRCUITS SYSTEMS AND SIGNAL PROCESSING	1	1.681	1.670	工程技术	3	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
375	FRONTIERS OF STRUCTURAL AND CIVIL ENGINEERING	1	1.680	N/A	工程技术	3	ENGINEERING, CIVIL 工程：土木	3
376	ADVANCES IN APPLIED CERAMICS	1	1.669	1.503	材料科学	4	MATERIALS SCIENCE, CERAMICS 材料科学：硅酸盐	3
377	GEOSCIENCES JOURNAL	1	1.651	1.780	地球科学	4	GEOSCIENCES, MULTIDISCIPLINARY 地球	4

							科学综合	
378	FRONTIERS OF EARTH SCIENCE	1	1.620	1.490	地球科学	3	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	3
379	PALAEONTOLOGIA ELECTRONICA	1	1.616	1.694	地球科学	4	PALEONTOLOGY 古生物学	4
380	COMPUTATIONAL AND THEORETICAL CHEMISTRY	1	1.605	1.430	化学	4	CHEMISTRY, PHYSICAL 物理化学	4
381	PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART O-JOURNAL OF RISK AND RELIABILITY	1	1.602	1.622	工程技术	4	ENGINEERING, MULTIDISCIPLINARY 工程：综合	3
							ENGINEERING, INDUSTRIAL 工程：工业	4
							OPERATIONS RESEARCH & MANAGEMENT SCIENCE 运筹学与管理科学	4
382	INTERNATIONAL JOURNAL OF ELECTROCHEMICAL SCIENCE	1	1.573	1.560	化学	4	ELECTROCHEMISTRY 电化学	4
383	ACI STRUCTURAL JOURNAL	1	1.566	1.924	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	4

							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
384	NANO	1	1.566	1.307	材料科学	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	4
							PHYSICS, APPLIED 物理：应用	4
385	ADVANCES IN POLYMER TECHNOLOGY	1	1.539	1.589	工程技术	4	ENGINEERING, CHEMICAL 工程：化工	4
							POLYMER SCIENCE 高分子科学	4
386	JOURNAL OF PHOTONICS FOR ENERGY	1	1.538	1.847	工程技术	4	MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							OPTICS 光学	4
							PHYSICS, APPLIED 物理：应用	4
387	COMPUTERS AND CONCRETE	1	1.507	1.420	工程技术	4	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	4
							CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4

							ENGINEERING, CIVIL 工程：土木	4
							MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	4
388	VISUAL COMPUTER	1	1.456	1.527	计算机科学	4	COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	4
389	EARTH SCIENCE INFORMATICS	1	1.450	1.802	地球科学	4	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	4
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
390	ZEITSCHRIFT FUR ANGEWANDTE MATHEMATIK UND PHYSIK	1	1.428	1.735	数学	3	MATHEMATICS, APPLIED 应用数学	3
391	JOURNAL OF ENHANCED HEAT TRANSFER	1	1.406	1.075	工程技术	4	ENGINEERING, MECHANICAL 工程：机械	4
							THERMODYNAMICS 热力学	4
392	INTERPRETATION-A JOURNAL OF SUBSURFACE CHARACTERIZATION	1	1.394	1.405	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
393	TRAFFIC INJURY PREVENTION	1	1.380	1.575	医学	4	PUBLIC, ENVIRONMENTAL &	4

							OCCUPATIONAL HEALTH 公共卫生、环境卫生与职业卫生	
							TRANSPORTATION 交通运输	4
394	WATER ENVIRONMENT RESEARCH	1	1.369	1.177	环境科学与生态学	4	ENGINEERING, ENVIRONMENTAL 工程：环境	4
							ENVIRONMENTAL SCIENCES 环境科学	4
							LIMNOLOGY 湖沼学	4
							WATER RESOURCES 水资源	4
395	INTERNATIONAL JOURNAL OF COMMUNICATION SYSTEMS	1	1.319	1.137	计算机科学	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							TELECOMMUNICATIONS 电信学	4
396	ADVANCED STEEL CONSTRUCTION	1	1.317	1.257	工程技术	2	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	2
							CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	3
							ENGINEERING, CIVIL 工程：土木	3

397	IEEE TRANSACTIONS ON PLASMA SCIENCE	1	1.309	1.225	物理与天体物理	3	PHYSICS, FLUIDS & PLASMAS 物理：流体与等离子体	4
398	JOURNAL OF MECHANICS	1	1.293	1.074	工程技术	4	MECHANICS 力学	4
399	GEOTECHNICAL TESTING JOURNAL	1	1.289	1.492	工程技术	4	ENGINEERING, GEOLOGICAL 工程：地质	4
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
400	MATHEMATICAL BIOSCIENCES AND ENGINEERING	1	1.285	1.312	工程技术	4	MATHEMATICAL & COMPUTATIONAL BIOLOGY 数学与计算生物学	4
401	NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS	1	1.270	1.299	物理与天体物理	3	INSTRUMENTS & INSTRUMENTATION 仪器仪表	3
							PHYSICS, ATOMIC, MOLECULAR & CHEMICAL 物理：原子、分子和化学物理	3
							PHYSICS, NUCLEAR 物理：核物理	3
							NUCLEAR SCIENCE & TECHNOLOGY 核科学技术	4
402	PHYSICOCHEMICAL PROBLEMS OF MINERAL PROCESSING	1	1.256	1.199	工程技术	4	CHEMISTRY, PHYSICAL 物理化学	4
							MINING & MINERAL PROCESSING 矿业与矿	4

							物加工	
403	JOURNAL OF WATER AND CLIMATE CHANGE	1	1.254	1.271	环境科学与生态学	4	WATER RESOURCES 水资源	4
404	STUDIA GEOPHYSICA ET GEODAETICA	1	1.247	1.200	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
405	INTERNATIONAL JOURNAL OF AUTOMOTIVE TECHNOLOGY	1	1.245	1.395	工程技术	4	ENGINEERING, MECHANICAL 工程：机械	4
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
406	COGNITION TECHNOLOGY & WORK	1	1.206	1.567	工程技术	4	ENGINEERING, INDUSTRIAL 工程：工业	4
							ERGONOMICS 人体工程学	4
407	CANADIAN JOURNAL OF EARTH SCIENCES	1	1.201	1.408	地球科学	4	GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
408	ENERGY SOURCES PART A-RECOVERY UTILIZATION AND ENVIRONMENTAL EFFECTS	1	1.184	0.893	工程技术	4	ENERGY & FUELS 能源与燃料	4
							ENGINEERING, CHEMICAL 工程：化工	4
409	JOVE-JOURNAL OF VISUALIZED EXPERIMENTS	1	1.163	1.539	综合性期刊	4	MULTIDISCIPLINARY SCIENCES 综合性期刊	4

410	ADVANCES IN MECHANICAL ENGINEERING	1	1.161	1.203	工程技术	4	ENGINEERING, MECHANICAL 工程：机械	4
							THERMODYNAMICS 热力学	4
411	EURASIP JOURNAL ON ADVANCES IN SIGNAL PROCESSING	1	1.140	1.406	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
412	JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY	1	1.137	1.059	化学	4	CHEMISTRY, INORGANIC & NUCLEAR 无机化学与核化学	3
							CHEMISTRY, ANALYTICAL 分析化学	4
							NUCLEAR SCIENCE & TECHNOLOGY 核科学技术	4
413	JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY	1	1.134	0.999	材料科学	4	CHEMISTRY, MULTIDISCIPLINARY 化学综合	4
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
							NANOSCIENCE & NANOTECHNOLOGY 纳米科技	4
							PHYSICS, APPLIED 物理：应用	4
							PHYSICS, CONDENSED MATTER 物理：凝聚	4

							态物理	
414	COMMUNICATIONS ON PURE AND APPLIED ANALYSIS	1	1.105	1.070	数学	4	MATHEMATICS 数学	4
							MATHEMATICS, APPLIED 应用数学	4
415	PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS-TRANSPORT	1	1.099	0.845	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
416	JOURNAL OF TRANSPORTATION ENGINEERING PART B-PAVEMENTS	1	1.085	1.085	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
							TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
417	ASIA-PACIFIC JOURNAL OF CHEMICAL ENGINEERING	1	1.060	1.352	工程技术	4	ENGINEERING, CHEMICAL 工程：化工	4
418	PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS-GEOTECHNICAL ENGINEERING	1	1.000	1.083	工程技术	4	ENGINEERING, GEOLOGICAL 工程：地质	4
							GEOSCIENCES, MULTIDISCIPLINARY 地球科学综合	4
419	LINEAR ALGEBRA AND ITS APPLICATIONS	1	0.988	1.074	数学	3	MATHEMATICS 数学	3
							MATHEMATICS, APPLIED 应用数学	3

420	CANADIAN JOURNAL OF CIVIL ENGINEERING	1	0.985	1.110	工程技术	4	ENGINEERING, CIVIL 工程：土木	4
421	PETROLEUM SCIENCE AND TECHNOLOGY	1	0.976	1.016	工程技术	4	ENERGY & FUELS 能源与燃料	4
							ENGINEERING, CHEMICAL 工程：化工	4
							ENGINEERING, PETROLEUM 工程：石油	4
422	MICROWAVE AND OPTICAL TECHNOLOGY LETTERS	1	0.957	0.877	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
							OPTICS 光学	4
423	APPLIED GEOPHYSICS	1	0.954	0.993	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
424	DISCRETE DYNAMICS IN NATURE AND SOCIETY	1	0.870	0.800	数学	4	MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
							MULTIDISCIPLINARY SCIENCES 综合性期刊	4
425	DESALINATION AND WATER TREATMENT	1	0.854	1.324	工程技术	4	ENGINEERING, CHEMICAL 工程：化工	4
							WATER RESOURCES 水资源	4
426	JOURNAL OF ANALYTICAL	1	0.840	0.855	化学	4	CHEMISTRY, ANALYTICAL 分析化学	4

	CHEMISTRY							
427	ELECTRONIC JOURNAL OF DIFFERENTIAL EQUATIONS	1	0.820	0.786	数学	4	MATHEMATICS 数学	4
							MATHEMATICS, APPLIED 应用数学	4
428	EXPLORATION GEOPHYSICS	1	0.758	0.988	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
429	CHINESE JOURNAL OF INORGANIC CHEMISTRY	1	0.756	0.528	化学	4	CHEMISTRY, INORGANIC & NUCLEAR 无机化学与核化学	4
430	INTERNATIONAL JOURNAL OF WAVELETS MULTIRESOLUTION AND INFORMATION PROCESSING	1	0.739	0.724	计算机科学	4	COMPUTER SCIENCE, SOFTWARE ENGINEERING 计算机：软件工程	4
							MATHEMATICS, INTERDISCIPLINARY APPLICATIONS 数学跨学科应用	4
431	JOURNAL OF ELECTRICAL ENGINEERING & TECHNOLOGY	1	0.736	0.681	工程技术	4	ENGINEERING, ELECTRICAL & ELECTRONIC 工程：电子与电气	4
432	ACTA PHYSICA SINICA	1	0.732	0.543	物理与天体物理	3	PHYSICS, MULTIDISCIPLINARY 物理：综合	4
433	INTERNATIONAL JOURNAL OF VENTILATION	1	0.732	0.811	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4

							ENERGY & FUELS 能源与燃料	4
434	JOURNAL OF MATHEMATICS	1	0.712	N/A	数学	4	MATHEMATICS 数学	4
435	JOURNAL OF APPLIED SPECTROSCOPY	1	0.710	0.622	化学	4	SPECTROSCOPY 光谱学	4
436	GEOCHEMISTRY INTERNATIONAL	1	0.688	0.876	地球科学	4	GEOCHEMISTRY & GEOPHYSICS 地球化学与地球物理	4
437	PROMET-TRAFFIC & TRANSPORTATION	1	0.664	0.801	工程技术	4	TRANSPORTATION SCIENCE & TECHNOLOGY 运输科技	4
438	JOURNAL OF MEDICAL IMAGING AND HEALTH INFORMATICS	1	0.659	0.660	医学	4	MATHEMATICAL & COMPUTATIONAL BIOLOGY 数学与计算生物学	4
							RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING 核医学	4
439	INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION	1	0.653	0.661	工程技术	4	EDUCATION, SCIENTIFIC DISCIPLINES 学科教育	4
							ENGINEERING, MULTIDISCIPLINARY 工程：综合	4
440	JOURNAL OF WUHAN UNIVERSITY OF	1	0.640	0.775	材料科学	4	MATERIALS SCIENCE,	4

	TECHNOLOGY-MATERIALS SCIENCE EDITION						MULTIDISCIPLINARY 材料科学：综合	
441	APPLICABLE ALGEBRA IN ENGINEERING COMMUNICATION AND COMPUTING	1	0.600	0.621	工程技术	4	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	4
							COMPUTER SCIENCE, THEORY & METHODS 计算机：理论方法	4
							MATHEMATICS, APPLIED 应用数学	4
442	STRENGTH OF MATERIALS	1	0.592	0.568	材料科学	4	MATERIALS SCIENCE, CHARACTERIZATION & TESTING 材料科学：表征与测试	4
443	WATER RESOURCES	1	0.556	0.656	环境科学与生态学	4	WATER RESOURCES 水资源	4
444	SOIL MECHANICS AND FOUNDATION ENGINEERING	1	0.500	0.542	工程技术	4	ENGINEERING, GEOLOGICAL 工程：地质	4
445	JOURNAL OF GROUP THEORY	1	0.466	0.556	数学	4	MATHEMATICS 数学	4
446	JOURNAL OF WATER CHEMISTRY AND TECHNOLOGY	1	0.390	0.429	化学	4	CHEMISTRY, ANALYTICAL 分析化学	4
							CHEMISTRY, APPLIED 应用化学	4

							CHEMISTRY, PHYSICAL 物理化学	4
447	JOURNAL OF ASIAN ARCHITECTURE AND BUILDING ENGINEERING	1	0.384	0.410	工程技术	4	CONSTRUCTION & BUILDING TECHNOLOGY 结构与建筑技术	4
448	JOURNAL OF NEW MATERIALS FOR ELECTROCHEMICAL SYSTEMS	1	0.259	0.333	材料科学	4	ELECTROCHEMISTRY 电化学	4
							MATERIALS SCIENCE, MULTIDISCIPLINARY 材料科学：综合	4
449	ARS COMBINATORIA	1	0.258	0.290	数学	4	MATHEMATICS 数学	4
450	JOURNAL OF CIVIL ENGINEERING EDUCATION	1	N/A	N/A	-	-	-	-
451	JOURNAL OF ENVIRONMENTAL AND ENGINEERING GEOPHYSICS	1	N/A	N/A	-	-	-	-
452	ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL	1	N/A	N/A	-	-	-	-

注：

2019 年未被 SCIE 收录的期刊，没有当年影响因子；被 SCIE 收录未满 5 年的期刊，没有 5 年影响因子。

附录 I　2020 年各单位发表的 SCIE 论文详细情况

公路学院

第 1 篇

标　　题：The Change Of Rock Mass Pressure Of Lianchengshan Tunnel

作　　者：[Chen, Jianxun; Luo, Yanbin; Li, Yao; Zhao, Pengyu; Wang, Qingsong] Changan Univ, Xian, Shaanxi, Peoples R China; [Xu, Dao] Guiyang Engn Corp Ltd, Guiyang, Guizhou, Peoples R China

通讯作者：Zhao, PY (corresponding author), Changan Univ, Xian, Shaanxi, Peoples R China.

期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：Based on Lianchengshan tunnel, the changing of rock mass pressure with deformation, time and distance from the excavation face is analyzed by means of field monitoring and numerical simulation, and the main conclusions are as follows: (1) When the deformation increases rapidly, the rock mass pressure decreases first and then increases. After the settlement and clearance convergence are stable, the pressure of rock mass in each part is still increasing slowly. (2) The rock mass pressure is mostly between 0.1 and 0.3 MPa, and the variation lasts about 65 to 70 days. (3) During the period from mid-bench construction to inverted arch construction, the variation ratio of rock mass pressure is very high, which indicates that the stabilization time of this stage is too long. Therefore, it is suggested to shorten the length of mid-bench and lower-bench appropriately. (4) The space influence range of the excavation face propulsion is about 2.5 times the tunnel diameter of the hole (42 m). To decrease the rock mass pressure, ring closure should be reached as soon as possible. It is recommended to speed up the construction of middle bench and lower bench.

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第 2 篇

标　　题：Preparation And Evaluation Of Durability Of Color Antiskid Pavement Particles Subjected To Different Treatments

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：To improve the durability of color antiskid pavement and the abrasion resistance of its antiskid particles, an organic treatment agent (OTA) is selected to treat the antiskid particles. The before-and-after study of the OTA treatment on the properties of the antiskid particles is conducted. The abrasion resistance of color antiskid pavement is discussed by using four evaluation indexes: abrasion mass loss rate, British pendulum number attenuation rate, texture depth attenuation rate, and bond strength. In addition, the color durability of color antiskid pavement under single and complex conditions is

studied by using the color brightness coefficient as the evaluation index. Compared with untreated antiskid particles, the OTA demonstrates a 54%, 29%, 44%, and 34% reduction in water absorption, weared stone value, crushed stone value, and mass abrasion shedding rate, respectively, on the treated particles. Furthermore, the OTA produces a 5%, 16.7%, and 9.7% decrease in abrasion mass loss rate, British pendulum number attenuation rate, and texture depth attenuation rate, respectively, whereas it produces a 33.3% increase in bond strength, compared with untreated specimens. Moreover, under four conditions: liquid corrosion, ultraviolet radiation, combined high-temperature and liquid corrosion, and combined high-temperature and ultraviolet radiation, the maximum reduction of the color brightness coefficient of color antiskid pavement with OTA treatment is 85.8%. (c) 2019 American Society of Civil Engineers.

DOI： 10.1061/(ASCE)MT.1943-5533.0002992

WOS 号： 000497709300017

第 3 篇

标　　题： Performance Evaluation Of Desulfurized Rubber Asphalt Based On Rheological And Environmental Effects

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： To understand the performance of desulfurized rubber asphalt (DRA) and its application feasibility comprehensively, the road performance, viscosity-temperature characteristics, rheological properties, storage stability, aging resistance, and environmental performance of DRA were investigated and compared with ordinary rubber (hereinafter called rubberized rubber) asphalt. The test results showed that rubberized rubber asphalt (RRA) performs better than DRA in elastic recovery, aging resistance, and rutting resistance, but DRA performs better than RRA in storage stability and low-temperature performance. DRA has similar fatigue resistance as RRA. Compared with RRA, the construction temperature of DRA can be reduced by about 30 degrees C, which means that DRA has better workability. The performance grade (PG) of DRA was classified as PG 76-34, which indicates that DRA has a wider temperature range and can be applied to lower-temperature environments. In addition, the harmful gas emission of DRA is lower than that of RRA, so DRA is more environmentally friendly. Therefore, it is necessary to modify DRA with compound methodologies to enlarge its application.

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WOS 号： 000497709300016

第 4 篇

标　　题： Effect Of Different Fibers Reinforcement On The Properties Of Pzt/Pva Composites

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期　　刊：MATERIALS CHEMISTRY AND PHYSICS

摘　　要：The poor mechanical properties of piezoelectric ceramic composites limit their application. In this paper, two kinds of fibers were added to piezoelectric ceramic composites to improve their electrical and mechanical properties. Fibers exist in the interior of composites in a network structure. The mechanical properties of the composites can be improved. Moreover, the addition of fibers can improve the polarization degree and the other properties of the composites. Carbon fibers can improve the electrical properties of composites remarkably. Aramid fibers show excellent performance in improving mechanical properties of composites.

DOI：10.1016/j.matchemphys.2019.122063

WOS 号：000503099500085

第 5 篇

标　　题：Application Of The Twin-Tube Complementary Ventilation System In Large-Slopping Road Tunnels In China

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期　　刊：INTERNATIONAL JOURNAL OF VENTILATION

摘　　要：To solve the imbalanced problem of wind pressure between left tunnel and right tunnel in the large-slopping tunnel, the complementary ventilation system is proposed, and the design theory and calculation method are also discussed. Results from a experiment carried out in a model tunnel (1:10) with complementary ventilation are presented and applied to the Dabieshan tunnel. It is found that the twin-tube complementary ventilation system can bridge two tunnels and exchange air between tunnels to ensure adequate air quality. The fresh air in the downhill tunnel can be transfer into the uphill tunnel to dilute air in the uphill tunnel. Field measurements were performed in the Dabieshan tunnel on wind speed, CO concentration, and VI (visibility index) concentration. Measurement results also indicate that the twin-tube complementary ventilation system can meet the ventilation requirements for tunnels. Compared with traditional ventilation systems, the complementary ventilation can be used to ensure adequate air quality in tunnels by eliminating the ventilation shaft in uphill tunnel and saving initial investments and operation costs.

DOI：10.1080/14733315.2018.1549305

WOS 号：000505689600004

第 6 篇

标　　题：Buffeting Response Of A Free-Standing Bridge Pylon In A Trumpet-Shaped Mountain Pass

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通讯作者：Shen, ZF (corresponding author), Changan Univ, Sch Highway, Xian 710064, Shaanxi, Peoples R China.; Shen, ZF (corresponding author), Changan Univ, Key Lab Bridge & Tunnel Shaanxi Prov, Xian 710064, Shaanxi, Peoples R China.

期　　刊：WIND AND STRUCTURES

摘　　要：The accurate estimation of the buffeting response of a bridge pylon is related to the quality of the bridge construction. To evaluate the influence of wind field characteristics on the buffeting response of a pylon in a trumpet-shaped mountain pass, this paper deduced a multimodal coupled buffeting frequency domain calculation method for a variable-section bridge tower under the twisted wind profile condition based on quasi-steady theory. Through the long-term measurement of the wind field of the trumpet-shaped mountain pass, the wind characteristics were studied systematically. The effects of the wind characteristics, wind yaw angles, mean wind speeds, and wind profiles on the buffeting response were discussed. The results show that the mean wind characteristics are affected by the terrain and that the wind profile is severely twisted. The optimal fit distribution of the monthly and annual maximum wind speeds is the log-logistic distribution, and the generalized extreme value I distribution may underestimate the return wind speed. The design wind characteristics will overestimate the buffeting response of the pylon. The buffeting response of the pylon is obviously affected by the wind yaw angle and mean wind speed. To accurately estimate the buffeting response of the pylon in an actual construction, it is necessary to consider the twisted effect of the wind profile.

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WOS 号：000512883600007

第 7 篇

标　　题：A New Type Of Crumb Rubber Asphalt Mixture: A Dry Process Design And Performance Evaluation

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：To obtain a crumb rubber asphalt mixture with excellent performance, this study

combined trans-polyoctenamer rubber (TOR), crumb rubber, and other additives to establish a new type of crumb rubber (CRT). The objective of this study was to design and evaluate the road performance of the new type of crumb rubber asphalt mixture (CRTAM) with a skeleton dense texture through a dry process. First, the skeleton intrusion compact volume method was used to optimize the grading of coarse and fine aggregates, and the design of the CRTAM gradation was carried out through the same and unequal volume replacement grading method. Then, three types of road performance were analyzed: high-temperature stability, low-temperature crack resistance, and water stability. The results showed that 2% and 2.5% CRT met a low-temperature index with equal volume substitution, and the six gradations obtained by unequal volume replacement with 2% CRT complied with the requirements of a skeleton dense texture. When the substitution ratio was 1.5 and 0.5, the high-temperature performance was better. In addition, when the substitution ratio was 0.5, the flexural strain energy density was the highest and the low-temperature performance was the best. Including considerations of economic benefits, it is recommended that the CRT content be 2% and the substitution ratio be 0.5.

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WOS 号： 000509398900372

第 8 篇

标　　题： Preparation And The Effect Of Surface-Functionalized Calcium Carbonate Nanoparticles On Asphalt Binder

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通讯作者： Li, R (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： APPLIED SCIENCES-BASEL

摘　　要： To solve the nanoparticles (NPs) agglomeration phenomena of nanometer calcium carbonate (nano-CaCO3) modified asphalt binder, in this paper, solvent-free CaCO3 nanofluids (NFs) were prepared based on surface-functionalized CaCO3 NPs to study the effect on asphalt. Microscopic structures, compositions, and thermal stability were characterized by Fourier transform infrared spectrometer (FTIR), X-ray diffractometer (XRD), transmission electron microscope (TEM), and thermogravimetric analyzer (TGA), respectively. Results showed that perfect CaCO3 NFs were successfully prepared, and were good enough for asphalt mixing due to their excellent thermal stability. Scanning electron microscopy (SEM), conventional tests, dynamic shear rheometry (DSR), and bending beam rheometry (BBR) were conducted to investigate the modifying effect. The SEM results indicated that CaCO3 NFs had better compatibility with asphalt binder than original CaCO3 NPs. Conventional and DSR test results demonstrated that CaCO3 NFs had slight negative effects on high-temperature performance while improving the low-temperature performance of the asphalt binder. The BBR test results confirmed that the modifier addition effectively enhanced asphalt binders' low-temperature crack resistance performance.

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WOS 号： 000509398900091

第 9 篇
标　　题： Anomalous Thermal Response Of Graphene Kirigami Induced By Tailored Shape To Uniaxial Tensile Strain: A Molecular Dynamics Study
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通讯作者： Cheng, G; Liu, YJ (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.; Zhong, D (corresponding author), Zhuhai Da Hengqin Sci & Technol Dev Co Ltd, Zhuhai 519000, Peoples R China.
期　　刊： NANOMATERIALS
摘　　要： The mechanical and thermal properties of graphene kirigami are strongly dependent on the tailoring structures. Here, thermal conductivity of three typical graphene kirigami structures, including square kirigami graphene, reentrant hexagonal honeycomb structure, and quadrilateral star structure under uniaxial strain are explored using molecular dynamics simulations. We find that the structural deformation of graphene kirigami is sensitive to its tailoring geometry. It influences thermal conductivity of graphene by changing heat flux scattering, heat path, and cross-section area. It is found that the factor of cross-section area can lead to four times difference of thermal conductivity in the large deformation system. Our results are elucidated based on analysis of micro-heat flux, geometry deformation, and atomic lattice deformation. These insights enable us to design of more efficient thermal management devices with elaborated graphene kirigami materials.
DOI： 10.3390/nano10010126
WOS 号： 000516825600126

第 10 篇
标　　题： Experimental Investigation On The Nonlinear Coupled Flutter Motion Of A Typical Flat Closed-Box Bridge Deck
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期　　刊：SENSORS

摘　　要：The nonlinear post-flutter instabilities were experimentally investigated through two-degree-of-freedom sectional model tests on a typical flat closed-box bridge deck (width-to-depth ratio 9.14). Laser displacement sensors and piezoelectric force balances were used in the synchronous measurement of dynamic displacement and aerodynamic force. Beyond linear flutter boundary, the sectional model exhibited heave-torsion coupled limit cycle oscillation (LCOs) with an unrestricted increase of stable amplitudes with reduced velocity. The post-critical LCOs vibrated in a complex mode with amplitude-dependent mode modulus and phase angle. Obvious heaving static deformation was found to be coupled with the large-amplitude post-critical LCOs, for which classical quasi-steady theory was not applicable. The aerodynamic torsional moment and lift during post-critical LCOs were measured through a novel wind-tunnel technique by 4 piezoelectric force balances. The measured force signals were found to contain significantly higher-order components. The energy evolution mechanism during post-critical LCOs was revealed via the hysteresis loops of the measured force signals.

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WOS 号：000517790100242

第 11 篇

标　　题：Tension Monitoring Of Wedge Connection Using Piezoceramic Transducers And Wavelet Packet Analysis Method

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期　　刊：SENSORS

摘　　要：A steel strand is widely used in long span prestressed concrete bridges. The safety and stability of a steel strand are important issues during its operation period. A steel strand is usually subjected to various types of prestress loss which loosens the anchorage system, negatively impacting the stability of the structure and even leading to severe accidents. In this paper, the authors propose a wavelet packet analysis method to monitor the looseness of the wedge anchorage system by using stress wave-based active sensing. As a commonly used piezoceramic material, lead zirconate titanate (PZT) is employed with a strong piezoelectric effect. In the proposed active sensing approach, PZT patches are used as sensors and actuators to monitor the steel strand looseness. The anchorage system consists of the steel strand, wedges and barrel, which forms two different direct contact surfaces to monitor the tension force. PZT patches are pasted on the surface of each steel strand, corresponding wedge and barrel, respectively. Different

combinations of PZTs are formed to monitor the anchoring state of the steel strand according to the position of the PZT patches. In this monitoring method of two contact surfaces, one PZT patch is used as an actuator to generate a stress wave and the other corresponding PZT patch is used as a sensor to detect the propagated waves through the wedge anchorage system. The function of these two PZTs were exchanged with the changing of transmission direction. The wavelet packet analysis method is utilized to analyze the transmitted signal between PZT patches through the steel strand anchorage system. Compared with the wavelet packet energy of received signals under different PZT combinations, it could be found that the wavelet packet energy increased with the increasing of anchorage system tightness. Therefore, the wavelet packet energy of received signal could be used to monitor the tightness of the steel strand during operation. Additionally, the wavelet packet energy of the received signals are different when the same PZT combination exchanges the energy transfer direction. With the comparison on the received signals of different combinations of PZTs, the optimal energy transfer path corresponding to different contact surfaces of the steel strand could be determined and the optimal experimental results are achieved.

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WOS 号： 000517790100038

第 12 篇

标　　题： Experimental Analysis Of Dynamic Characteristics Of Flexible Base Asphalt Pavement Based On Hvs

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期　　刊： ACTA MICROSCOPICA

摘　　要： The purpose of this paper is to study the dynamic characteristics of flexible base asphalt pavement in use, based on the theoretical analysis of fatigue performance of asphalt pavement. The accelerated loading test of flexible asphalt pavement is carried out by using the heavy vehicle simulation equipment. Under the condition of controlling the axle load and speed, the asphalt bottom strain of the test road was collected. Regression analysis was carried out on the correlation among the temperature, the loading times and the tensile strain of the asphalt layer. It is found that the bottom strain of the flexible base asphalt pavement is proportional to the axle load and the temperature, nevertheless it's inversely proportional to the axle load speed. The conclusion contributes to the fatigue damage analysis of the flexible base pavement.

WOS 号： 000520030100010

第 13 篇

标　　题：A Cooperative Data Mining Approach For Potential Urban Rail Transit Demand Using Probe Vehicle Trajectories

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期　　刊：IEEE ACCESS

摘　　要：Promoting the use of public transportation is an important approach to develop sustainable mobility. However, lots of potential users of public transportation chose taxi, a semi-private mode for convenience. In this study, we first define this potential urban rail transit demand based on its spatiotemporal features. Then a novel data mining method is proposed to ascertain the potential urban rail transit demand from taxi trajectory data through considering spatial and temporal constraints simultaneously. Two features of the potential demand, i.e., the zero rates and volatility, are obtained by the combination of statistical and feature extraction (local neighbor descriptive pattern, LNDP) techniques. They are used to classify the urban rail transit stations into different categories which need different improvement measures to promote the attraction to the potential users. The effectiveness of the proposed method is tested using the GPS trajectory data of Shanghai collected from over 10,000 taxis in 12 consecutive days. We find that most urban rail transit stations have the potential to absorb the regular part of taxi ridership. Moreover, obvious imbalances exist between access and egress potential travel demands at these stations. The results show that metro stations can be classified into six groups according to the time-varying laws of potential travel demand, four of which need urgent measures. These findings provide useful insights for developing more effective and targeted strategies to encourage travelers to shift to public transportation. The estimated method of potential demand is the prerequisite for further optimization models.

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第 14 篇

标　　题：Geohazards, Reflection And Challenges In Mountain Tunnel Construction Of China: A Data Collection From 2002 To 2018

作　　者：[Wang, Xiuling; Lai, Jinxing; Qiu, Junling; Xu, Wei; Wang, Lixin; Luo, Yanbin] Changan Univ, Sch Highway, Xian, Peoples R China; [Wang, Lixin] China Railway First Survey & Design Inst Grp Co L, State Key Lab Rail Transit Engn Informatizat, Xian, Peoples R China

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期　　刊：GEOMATICS NATURAL HAZARDS & RISK

摘　　要：In face of the complicated and changing geological conditions, safety issue is always a primary concern during the construction phase of tunnel in the mountainous regions of China. This Express Letter reports data collection concerning the geo-hazardous events recorded in tunnel system in the period from 2002 to 2018. These accidents include

collapse, water inrush, gas explosion, portal landslide, suffocation and avalanche. A total of 97 geohazard events resulted in 393 deaths, 467 injuries and 51 missing. Statistical results indicate that collapse is the primary geohazard in mountain tunnel construction. The data confirmed a high correlation between the number of casualties and geohazard accidents quantity. It is also observed that water inrush is more likely to happen in karst region, while the collapse is mainly recorded in loess and karst areas. During the period under the review, the data illustrates an overall decrease of casualties and geohazard events, but it still faces a grim situation regarding the geohazard prevention in mountain tunnels construction of China. Hence, countermeasures and future research attempts focusing on geohazards prevention and mitigation are recommended.

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WOS 号： 000527111000001

第 15 篇

标　　题： Improving Motorway Mobility And Environmental Performance Via Vehicle Trajectory Data-Based Control

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期　　刊： IEEE ACCESS

摘　　要： High cost and relatively low reliability of stationary sensors hinder the wide spread of advanced motorway traffic control measures. In this research, we propose a vehicle trajectory data based variable speed limit (VSL) controller to improve mobility and environmental performance of motorways. First, a model based estimator is designed to estimate traffic states using data directly derived from probe vehicle with spacing measurement equipment (PVSMEs). Extended kalman filter (EKF) and METANET model are employed as the data assimilation tool and the process model for the estimator, respectively. Next, we incorporate the estimator with a model predictive control (MPC) to realize optimal VSL control. Finally, a 3.2km stretch in Auckland, New Zealand is selected and simulated to evaluate the proposed VSL under various PVSME penetration rates and traffic scenarios. The simulation results reveal that the PVSME-based VSL controller offers an effective solution to improve mobility and environmental performance of motorways. With an increase in PVSME penetration rates, the mobility and environmental benefits of the PVSME-based VSL increase.

DOI： 10.1109/ACCESS.2020.2992722

WOS 号： 000538765600082

第 16 篇

标　　题： Automated Pavement Crack Segmentation Using U-Net-Based Convolutional Neural Network

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期　　刊： IEEE ACCESS

摘　　要： Automated pavement crack image segmentation is challenging because of inherent irregular patterns, lighting conditions, and noise in images. Conventional approaches require a substantial amount of feature engineering to differentiate crack regions from non-affected regions. In this paper, we propose a deep learning technique based on a convolutional neural network to perform segmentation tasks on pavement crack images. Our approach requires minimal feature engineering compared to other machine learning techniques. We propose a U-Net-based network architecture in which we replace the encoder with a pretrained ResNet-34 neural network. We use a one-cycle training schedule based on cyclical learning rates to speed up the convergence. Our method achieves an F1 score of 96% on the CFD dataset and 73% on the Crack500 dataset, outperforming other algorithms tested on these datasets. We perform ablation studies on various techniques that helped us get marginal performance boosts, i.e., the addition of spatial and channel squeeze and excitation (SCSE) modules, training with gradually increasing image sizes, and training various neural network layers with different learning rates.

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WOS 号： 000549169900001

第 17 篇

标　　题： Research On Risk Assessment Of Highway Flood Disaster

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期　　刊： FRESENIUS ENVIRONMENTAL BULLETIN

摘　　要： Highway flood disaster refers to a series of engineering damage phenomena and processes in plain or mountainous areas under the comprehensive effect of natural flood disaster and human intervention activities. Highway flood disaster is an important factor affecting the development of traffic and social economy. The plain highway in a certain area is selected in this paper, the factors such as precipitation, terrain and water system that may cause highway flood disaster are studied. The risk assessment indexes of highway flood disaster is established, and the interaction of each assessment index to the risk degree of highway flood disaster is innovatively analyzed using response surface model. The results showed that days greater than 25 mm annual precipitation, precipitation and regional drainage density have significant differences on the risk

degree of highway flood disaster, and the prediction models have significant differences (P<0.01), which can provide a theoretical basis for the prediction and prevention of highway flood disaster. In addition, highway flood disaster can be reduced by reducing the number of days greater than 25 mm annual precipitation, reducing annual precipitation, and controlling regional drainage density, which are found. After the optimization of response surface model, when the days greater than 25mm annual precipitation are 3, the annual precipitation is 300 mm, the highway terrain slope is 15 and the regional drainage density is 1004.58 m/km(2), the risk degree of highway flood disaster can be controlled to a low risk state (23.82).

WOS 号： 000550823500042

第 18 篇

标　　题： Experimental Study On Microscopic Pore Structure During Consolidation Of Matrix Modified Soil Under Iron Tailings Environment

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期　　刊： FRESENIUS ENVIRONMENTAL BULLETIN

摘　　要： Taking tailings soil as the research object, we conduct consolidation test and SEM scanning experiment on 4 groups of tailings matrix modified soil to explore the changes of matrix modified soil with consolidation pressure, soil compressibility and microstructure changes in iron tailings environment. The research results show that: (1) Under the natural structure state, the tailings matrix modified soil has a complex pore structure, irregular surface contours and large particle dispersion. The improvement measures of composite application of 2% organic fertilizer and 30% loess mixed with the tailings matrix improved soil has a greater impact on the soil structure. (2) As the consolidation pressure increases, the average shape coefficient of the tailings matrix modified soil increases significantly, and the porosity fractal dimension, probability and fractal dimensions all decrease, indicating that the consolidation pressure makes the void structure of the soil uniform. The degree of chemistry increases, the smoothness of the pores increases significantly, the orientation and order of the pore arrangement increases, and the complexity decreases. (3) The fractal dimension and porosity fractal dimension have a large impact on the microscopic characteristic parameters of the pores of the tailings matrix modified soil. The average shape coefficient and probability entropy have small impacts on the compressibility. The microstructure parameters can reflect the macroscopic mechanical properties. This research can provide a scientific reference for the mine ecological environment restoration project.

WOS 号： 000596038700081

第 19 篇

标　　题： Geohazards Regionalization Along Highways In Shandong Province, China

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期　　刊：GEOMATICS NATURAL HAZARDS & RISK

摘　　要：The disturbance of the highway construction to the terrain and the natural environmental factors are the main causes of the geohazards along the highway. We collected geohazards along the highway in Shandong Province and put forward the comprehensive geohazard index to reflect the risk of geohazards along the highway. The index consists of an intensity index describing the development of geohazards and a sensitivity index describing the potential risk of geohazards. The article uses an incomplete additive language matrix to calculate the weight of each index and factor. Based on the Getis-Ord Gi* statistic tool, the spatial distribution of landslides and collapses, debris flows, ground collapses, and unstable slopes are analyzed, and the geohazard intensity index is calculated by spatial superposition. The relationship between slope gradient, rainfall, vegetation coverage, rock type and geohazards is analyzed, and the geohazard sensitivity index is calculated by spatial superposition. Based on the comprehensive geohazard index and geomorphological characteristics, Shandong Province is divided into 4 geohazard first-level regions and 11 geohazard second-level regions, providing a basis for highway planning and construction.

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第 20 篇

标　　题：Temperature Response Of Asphalt Pavement To Low Temperatures And Large Temperature Differences

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：Temperature responses of asphalt pavements are significant, because of their potential influence on pavement structure design and distress prevention, particularly in areas that experience large temperature difference. In this study, a 3D finite element model is developed based on transient heat transfer. The aim is to analyse the temperature responses of the Karamay-Altay Highway in northern Xinjiang, which tends to experience large temperature differences and low temperatures. First, the climatic characteristics and pavement distresses in northern Xinjiang were investigated, and the condition defining a large temperature difference was established. Then, to guide the design of the Karamay-Altay Highway pavement structure, the temperature fields of seven pavement structures were determined. The temperature field of the Str-m structure in the Karamay-Altay area was compared to that in Xi'an. In the Karamay-Altay area, it was observed that Str-4 exhibited the minimum temperature

variation at the bottom of the asphalt course and base course. It was clear that the degree of downward temperature transfer was closely related to the structure combination type. The results also suggested that a thicker asphalt layer would effectively reduce temperature effects and diminish distresses resulting from temperature. By comparing of the temperature fields of the Str-m structure in the Karamay-Altay area and in Xi'an, it was observed that pavement temperature fields changed drastically in the case study area, and hence revealed that severe pavement cracks in this area were closely related to abrupt temperature changes, low temperatures and large temperature differences. Hence, it was concluded that in northern Xinjiang, pavement designers should consider the large temperature difference condition very carefully.

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第 21 篇

标　　题： Application Of Numerical Simulation Method To Improve Shear Strength And Rutting Resistance Of Asphalt Mixture

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： The interlocking force of aggregates, which is closely related to mixture gradation, is one of the main factors that influence the shear strength and rutting resistance of an asphalt mixture. Gradation is optimised by traditional methods, including the step-filling test and experimental tests on shear strength such as the uniaxial penetration test (UPT). However, both methods have disadvantages. Thus, research has focused on a virtual method based on the numerical simulation method (NSM). Here, a visual method for the UPT based on the NSM (UPT-NSM) is developed, which optimises the mixture gradation to improve the shear strength and rutting resistance of asphalt mixtures. The UPT-NSM results are consistent with those of an indoor test, with an error of less than 4%, thus proving the reliability of the UPT-NSM. From the perspective of the aggregate fraction, using the UPT-NSM can optimise the gradation better than the step-filling test in order to improve the shear strength and rutting resistance of the asphalt mixture. The anti-shear strength and dynamic stability of the asphalt mixture with gradation optimised by UPT-NSM are 25.5 and 27.0% higher, respectively, than those of the specified gradation.

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第 22 篇

标　　题：Thermosetting Powder Coating For Asphalt Pavement

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期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：The high temperature in asphalt pavement during summer accelerates the rutting and aggravates the phenomenon of urban heat island (UHI). One of the mitigation methods is the use of heat-reflective coating (HRC) on asphalt pavement. However, conventional HRC faces some challenges such as poor abrasion resistance, poor skid resistance and environment pollution. In this paper, a new type of coating, named thermosetting powder coating (TPC), was developed for reflecting heat off asphalt pavement. Four types of TPCs, including the polyester powder coating (PPC), modified polyester powder coating (MPPC), polyester/epoxy powder coating (PEPC) and modified polyester/epoxy powder coating (MPEPC) were made. Meanwhile, A type of conventional HRC was chosen as a reference. Performances tests were conducted to evaluate the cooling effect, skid resistance, abrasion resistance, adhesion strength, anti-glare performance and erosion resistance of the asphalt concrete specimens coated by the TPCs or conventional HRC. Impacts on performances of several factors such as resin type, application rate and texture agent were discussed. Finally, the costs of the TPC and conventional HRC were compared. Results indicate that though the cooling effect and anti-glare performances of these two types of coatings are resembled, the skid resistance, abrasion resistance and adhesion strength of the TPC are better than those of conventional HRC. What's more, the cost of the former is only 0.1 times of that of the latter. Among four types of TPCs, MPPC is recommended to be used for reflecting heat and its optimum application rate (dosage) is 100-150 g/m(2).

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第 23 篇

标　　题：The Improvement Of Moisture Resistance And Organic Compatibility Of Sral2O4: Eu2+, Dy3+ Persistent Phosphors Coated With Silica-Polymer Hybrid Shell

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期　　刊：MATERIALS

摘　　要：The existing road surface marking with poor visibility at night results in traffic safety hazards in insufficient lighting roads. This study aims to prepare the dedicated aluminate-based persistent phosphors considering the integrated pavement environment, as the first step to achieve the durable luminescent road surface marking.

SrAl2O4: Eu2+, Dy3+ persistent phosphors coated with silica-polymer hybrid shell were prepared by chemical precipitation and sol-gel method to improve moisture resistance and organic compatibility. The optimum silane coupling agent type and dosage, the surfactant dosage, the optimum sodium silicate dosage, and the coating reaction time in silica shell and polymer shell coating were studied based on the moisture resistance test. The silica-polymer hybrid shell coating balances the organic compatibility and thermal stability as compared to the silica or polymer shell coating in the oil absorption test and thermogravimetric analysis. Ex-Em Spectra, XRD, and SEM method were used to characterize the persistent phosphors, indicating the preparation does not destroy the persistent phosphors. The outstanding durable properties of SrAl2O4: Eu2+, Dy3+ persistent phosphors coated with silica-polymer hybrid shell as shown in this research is crucial for its potential application in waterborne luminescent coatings of road surface marking.

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第 24 篇

标　　题： Study On The Effect Of Microwave Processing On Asphalt-Rubber

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期　　刊： MATERIALS

摘　　要： The addition of crumb rubber (CR) into base asphalt plays a critical role in the improvement of the performance of Asphalt-Rubber (AR) binders. However, due to the problems, like high constructing temperature and energy consumption brought by the additional rubber, the use of AR binders could be limited in some areas. During this study, CR is processed by microwave is adopted to reduce the viscosity of the AR binders system, while the CR processed by long screw extrusion also is studied. First, the swelling (the absorption of light component into the CR particle) and dissolution (some molecules of CR dissolving into the base asphalt), both of which determine the improved performance of AR binders, are investigated by fluorescence microscopy and extraction tests. The size of the CR particle after swelling observed by fluorescence microscopy is used to evaluate the swelling rate of CR samples, and the ratio of the weight loss of CR samples after extraction to the original weight is employed to measure the dissolution rate. Then, Brookfield rotational viscometer and storage stability tests are conducted. Last, the rheologic performance, including high and low-temperature performances, is characterized by the dynamic shear rheometer (DSR) and bending beam rheometer (BBR), respectively. The fluorescence microscopy and extraction results show that microwave processing could effectively increase the swelling and dissolving rate, with the figures rising twofold and more than threefold, respectively. The results show that microwave processing could effectively reduce the viscosity of AR binders, with a viscosity decrease of 65% at 190 degrees C and, at the

same time, the high temperature of Performance Grade (PG) decrease from 88 degrees C to 76 degrees C. The storage stability could be negatively impacted, but it is slight and the low-temperature performance is improved slightly.

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第 25 篇

标　　题： Investigation On Comparison Of Morphological Characteristics Of Various Coarse Aggregates Before And After Abrasion Test

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期　　刊： MATERIALS

摘　　要： Under the repeated loading, the continuous impact and friction of tires on aggregates resulted in some changes in their morphology, which may cause rutting, decrease in skid resistance, and fatigue damage of the road. In order to explore specific changes in coarse aggregate morphology, the Los Angeles abrasion test was used to simulate the force exerted on coarse aggregates and the morphologies of different aggregates before and after abrasion were compared. Four types of coarse aggregates were selected and their mineral compositions were analyzed by X-Ray Diffraction (XRD). The morphological characteristics were measured using Aggregate Image Measurement System (AIMS-?), including angularity, surface texture, sphericity and Flat and Elongation (F and E) ratio. Results showed that the angularity value for each type of aggregates significantly reduced after abrasion and the angularity reductions of various aggregates were consistent with the results of abrasion test, indicting the angularity reduction was the main component of abrasion loss. Whereas, there was no significant different between the surface texture of coarse aggregates before and after abrasion. For shape properties, both sphericity and F and E ratio results showed that aggregates with excessively high F and E ratio were easy to break, which might cause rutting and were harmful to pavement. Therefore, for pavements with high performance requirement, coarse aggregates with large angularity and low abrasion value should be preferred, whereas the quantity of particles with excessively high F and E ratio should be controlled.

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第 26 篇

标　　题： Modeling Impacts Of Speed Reduction On Traffic Efficiency On Expressway Uphill Sections

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期　　刊：SUSTAINABILITY

摘　　要：Road geometric design is a key factor impacting driving safety and efficiency. In highway profile design, speed reduction is used to determine critical length of grade. Previous research generally concentrated on the relationship between speed reduction and crash involvement rate to establish the recommended value. Limited research results have been reported at this point concerning speed reduction and traffic efficiency. This study aims to fill the gap by investigating tolerable speed reduction with different vertical slopes considering traffic efficiency. Firstly, appropriate experimental sections were determined after field survey. Traffic data including vehicle count, timely speed, vehicle type, and headway time were then collected on an expressway in Shaanxi Province. The associated traffic efficiency was derived from traffic volume and average speed. After this, the modeling between speed reduction and traffic efficiency was processed with different slopes. The correlation between speed reduction and traffic efficiency was therefore verified. Finally, the prediction model of optimum speed reduction concerning traffic efficiency under different vertical slopes was introduced. It was found that the critical length of grade can be longer with traffic efficiency as the major design control incorporated with slopes of 3-3.5%. The existing regulation in critical length of grade at 3.5-5% can benefit both safety and efficiency. The findings can provide a reference for vertical alignment design, leading to high-efficiency road systems.

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第 27 篇

标　　题：Performance Of Prestressed Concrete Box Bridge Girders Under Hydrocarbon Fire Exposure

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期　　刊：ADVANCES IN STRUCTURAL ENGINEERING

摘　　要：This article presents an approach for investigating performance of prestressed concrete box bridge girders under hydrocarbon fire exposure. A three-dimensional nonlinear finite element model, developed in computer program ANSYS, is utilized to analyze the response of prestressed concrete box bridge girders under combined effects of fire exposure duration and simultaneous structural loading. The model validation is performed using a scaled prestressed concrete box girder exposed to ISO834 fire in furnace. Subsequently, the validated model is used to investigate fire performance of prestressed concrete box bridge girders through taking into consideration some variables, namely concrete cover thickness to prestressing strands, prestress degree, load level, fire exposure length, and position. Through a case study, results from numerical analysis show that concrete cover thickness to prestressing strands and load level has significant effect on fire resistance of prestressed concrete box bridge girders.

Increasing prestress degree in prestressing strands can speed up the progression of deflection (sudden collapse) in prestressed concrete box bridge girder toward the final fire exposure stage. Reducing fire exposure length or preventing fire exposure on mid-span zone can highly enhance the fire resistance of simply supported prestressed concrete box bridge girders. Failure of prestressed concrete box bridge girder, under hydrocarbon fire exposure conditions, is governed by rate of deflection failure criterion in particular cases.

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第 28 篇

标　　题： Influence Of Large Vehicles On The Speed Of Expressway Traffic Flow

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通讯作者： Xu, JL (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Large vehicles impact the quality of traffic flow. To predict the impact of large-scale vehicles on the average speed of traffic flow, vehicle speeds under different vehicle mixing rates were collected through field observations. A laser roadside traffic survey instrument with automatic vehicle type identification functionality was used to collect cross section traffic flow data. The v/C ratio, large vehicle mixing rate, and average speed of traffic were calculated for each data set. A total of 158 traffic flow data sets were captured and divided into three groups according to the v/C ratio of the expressway. The v/C ratio ranges of the three groups are v/C <= 0.35, 0.35<v/C <= 0.55, and 0.55<v/C <= 0.90. SPSS software was used to analyze the correlation between the vehicle mixing rate and the average speed under different traffic flow conditions, and a model was determined between the average speed of the vehicle flow and the large vehicle mixing rate. Analysis of the results with SPSS revealed a negative logarithmic linear relationship between the average traffic speed and the mixing rate of large vehicles. The results could also be applied to passenger cars. The models are considered as corrections of the average speed of the traffic flow after the mixing of large vehicles. When the mixing rate of large vehicles is close to zero, the forecast value of the model is the average speed of passenger cars. Furthermore, as the traffic volume of the road section increased, the influence of the mixing rate on traffic flow speed became more obvious. The adaptability of the proposed prediction model of the expressway mixing rate was verified by evaluating model predictions against actual measurements.

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第 29 篇

标　　题： Optimal Structure Combination For Inverted Asphalt Pavement Incorporating Cracks In

Cement-Treated Subbase

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期　　刊：TRANSPORTATION RESEARCH RECORD

摘　　要：The structure design and mechanistic calculation of inverted asphalt pavements are mainly based on linear layer elastic theory with the assumption that the cement-treated subbase (CTB) is complete without cracks. This study investigates the optimal structure combination for inverted pavements according to calculated critical responses considering cracks in the CTB layer. A three-dimensional finite element (3D FE) model of inverted pavement with a transverse crack through the CTB layer was developed. Four full-scale inverted pavement sections were built, and a crack 0.01 m wide and 0.05 m deep was sawn on top of each CTB layer after construction. The 3D FE model was validated by strain and deformation measured in falling weight deflectometer tests and used for a parametric study of dominating structure combination factors. Variance analysis results show that interactions with thickness or stiffness of the asphalt concrete (AC) layer presented the most significant effect on critical responses, while CTB stiffness (12588 similar to 7668 MPa) had the least impact. Structure variation effect analysis results illustrated that 0.1 m aggregate base (AB) thickness is enough to prevent the CTB crack propagating to the surface. Thin AC structures are highly sensitive to variations in AC and AB stiffness. A thin AC and AB combination (0.05 and 0.10 m) can provide low critical strains similar to a thick AC and thin AB (0.15 and 0.10 m) combination if the stiffness of AC and AB can be maintained at 7175 and 358 Mpa, respectively, or higher. AC thickness of 0.1 m and the combination of thin AC and thick AB are two unfavorable conditions for inverted pavements.

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第 30 篇

标　　题：Research On Decision-Making Behavior Of Discretionary Lane-Changing Based On Cumulative Prospect Theory

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：In this paper, the decision-making model of discretionary lane-changing is established using cumulative prospect theory (CPT). Through analyzing the vehicles' dynamic running states, safety spacing calculating approaches for discretionary lane-changing and lane-keeping have been put forward firstly. Then, based on CPT, a lane-changing

decision model with accelerating space as its utility is proposed by estimating the difference between actual spacings and the safety spacings for discretionary lane-changing as well as lane-keeping. In order to calculate the utility of discretionary lane-changing, dynamic reference points and a parameter representing driver's risk preference are introduced into the model. With the real data collected from an urban expressway, the distribution of discretionary lane-changing duration is analyzed, and the model parameters are also calibrated. Furthermore, the applicability of the model is evaluated by comparing with the actual observation and random unity model. Finally, the sensitivity analysis of the model is carried out, that is, assessing the influence degree of each variable on the decision result. The study reveals that the CPT-based model can describe discretionary lane-changing behavior more accurately, which consider drivers' risk-aversion during decision-making.

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第 31 篇

标　　题： The Horizontal Bearing Capacity Of Composite Concrete-Filled Steel Tube Piles

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Steel casings (SCs) are extensively and increasingly used to stabilize the borehole wall in the construction of bridge pile foundations. Steel casings (SCs), together with reinforced concrete piles (RCPs), form composite concrete-filled steel tube piles (CCFSTPs), which differ significantly from ordinary RCPs in horizontal bearing capacity. In this study, based on the characteristics of CCFSTPs, the horizontal bearing capacity of a CCFSTP was examined through a centrifugal model test with the length of the steel casing (L-SC) and the modulus of the soil mass in the steel casing soil compaction zone (E-SCSC_zone) as variables. Pile-side soil resistance, load-displacement curves, and pile moment curves were obtained for the CCFSTP. The results show that increasing L-SC within a range of 12 cm significantly increases the ultimate horizontal bearing capacity of the CCFSTP, and further increasing L-SC beyond 12 cm produces a continuous increase in the ultimate horizontal bearing capacity of the CCFSTP but only to an insignificant extent. In addition, increasing E-SCSC_zone increases the ultimate horizontal bearing capacity of the CCFSTP, but to a relatively small extent. The results of this study provide a theoretical basis and technical support for the design and construction of CCFSTPs.

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第 32 篇

标　　题：High-Temperature Rheological Behavior And Fatigue Performance Of Lignin Modified Asphalt Binder

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：The objective of this study was to introduce lignin as a bio-additive to modify the base asphalt and investigate the high-temperature rheological performances of lignin modified asphalts and virgin asphalt. In this study, asphalt PG 58-28 was selected as the virgin asphalt, and four contents, 2%, 4%, 6% and 8%, of the total binder by weight of lignin were incorporated in the base binder. Rotational viscosity (RV), dynamic shear rheometer (DSR), and multiple stress creep recovery (MSCR) tests were conducted to characterize the rheological performances of different types of asphalts. Linear amplitude sweep (LAS) test was employed to evaluate the fatigue performance. The results showed that the incorporation of lignin increased the viscosity of virgin asphalt at different rotational speeds. The activation energy showed an increasing trend as the lignin increased compared with the virgin asphalt. Meanwhile, the lignin incorporated into the asphalt binder increased the elastic components, and improved the resistance of asphalt binder to the permanent deformation regardless of the lignin contents. The addition of lignin in the asphalt binder could retard oxidation reactions that occurred in the asphalt during the rolling thin film oven aging. In addition, the incorporation of lignin may degrade the fatigue life of asphalt. However, when the content of lignin was less than 8%, the reduction was small. This study could provide a prospective foundation for the utilization of lignin extracted from waste biomass as an exceptional and renewable bio-additive in the field of asphalt pavement engineering. (C) 2019 Elsevier Ltd. All rights reserved.

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第 33 篇

标　　题：Monitoring And Optimizing The Surface Roughness Of High Friction Exposed Aggregate Cement Concrete In Exposure Process

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Exposed aggregate cement concrete (EACCP) is a novel cement concrete, which has completely different roughness with the traditional cement concrete pavement since its roughness is formed by the exposure of the aggregate on the surface. A well-constructed EACCP can bring benefits to the road safety by improving its skid resistance. However, it is challengeable for user to control the exposing degree during the practical exposure process. This study aims to investigate the effect of exposure process on EACCP's roughness and skid resistance. To this end, two groups of EACCP specimens with the most commonly used 4.75-9.5 mm single-sized and 4.75-16 mm continuously graded gradation are prepared, respectively. Specifically, the specimens are purpose-scrubbed to creat seven levels of scrubbing degree. In addition, the three-dimensional data on the specimen surface was obtained by a laser scanner, and the surface roughness of EACCP was jointly characterized via (1) height parameters: the arithmetical mean height Sa and root-mean-squared (RMS) height Sq; (2) feature parameters: the peak density Spd, the arithmetic mean peak curvature Spc, (3) the Power spectrum density (PSD), (4) a purpose-designed parameter aggregate exposed height, and (5) the mean texture depth (MTD) measured by the sand patch method. Furthermore, the skid resistance is investigated by the joint use of the British Portable Pendulum and Dynamic Friction tester. For obtaining a reliable evaluation result, the measurements are carried out with different testing speeds and water film depths. The data analysis indicates that the roughness parameters changed with exposing process significantly, in which a close relationship between a MID and other parameters is evidently found. It is recommended to adopt MTD as the representative parameter for controlling and monitoring the scrubbing degree of EACCP to obtain a desirable roughness and better skid resistance. The results indicate that a EACCP could have a desirable skid resistance when its MTD is 0.72-0.80 mm. Results of this study contribute to the current knowledge by revealing the relationship between roughness parameters and skid resistance of EACCP, and providing a practical reference for exposing process, which may be of interest to road constructors.

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第 34 篇

标　　题： The Effect And Mechanism Of La2O3 On The Anti-Ultraviolet Aging Characteristics Of Virgin Bitumen

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Modified bitumen was prepared by adding the rare earth oxide La2O3 to virgin bitumen to improve its anti-ultraviolet aging performance. An ultraviolet aging chamber was used to simulate the ultraviolet aging process of bitumen. Ultraviolet aged and non-aged bitumen were then tested to evaluate the ultraviolet aging degree from both the macro and micro perspectives and to analyze the effect of La2O3 on anti-ultraviolet aging performance. A dynamic shear rheometer, bending beam rheometer, infrared spectrum, and scanning electron microscope were used to conduct these tests. The results showed that, compared with virgin bitumen, the complex shear modulus, creep stiffness, creep rate, and sulfoxide index of 1-3% La2O3 modified bitumen after ultraviolet aging were reduced under the same aging condition. When the La2O3 content was 2%, the modified bitumen aging degree was the lowest, and its ratios of complex shear modulus, creep stiffness and creep rate were 1.26, 1.09, and 0.87 respectively. The sulfoxide index increment was 0.07, while the four corresponding indexes of virgin bitumen were 1.44, 1.11, 0.85 and 0.12. The SEM image analysis showed that the modification of bitumen by La2O3 was a physical modification. La2O3 that is evenly distributed in bitumen can absorb and reflect ultraviolet radiation, reduce the absorption of ultraviolet energy by bitumen molecules, improve the anti-ultraviolet aging performance, and effectively extend the service life of asphalt. (C) 2019 Elsevier Ltd. All rights reserved.

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第 35 篇

标　　题： Morphology-Based Indices And Recommended Sampling Sizes For Using Image-Based Methods To Quantify Degradations Of Compacted Aggregate Materials

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Particle breakage and abrasion of crushed aggregate materials may cause significant changes in particle morphologies, which can adversely affect their engineering properties. Previous studies have identified the research needs of more accurately and quickly quantifying particle morphology changes and establishing specifications for controlling aggregate degradation caused by handling and compaction during constructions. In this study, a previously developed laboratory testing method by the authors, termed the Gyratory Abrasion and Image Analysis (GALA) test, was conducted on five types of aggregate materials to evaluate their particle breakage and abrasion characteristics under simulated compaction loading conditions. Based on the laboratory testing and image analysis data, this paper proposes new indices to quantify the breakage and abrasion characteristics in terms of changes in the particle morphologies of aggregate materials and also recommends the minimum representative sample sizes for using 2D image-based analysis methods to quantify distributions of the particle size and morphology of aggregate materials. The previously developed GALA test, the proposed morphology-based aggregate breakage and abrasion indices, and the recommended sampling sizes for 2D image analysis of aggregate materials can help both researchers and practitioners to quickly and accurately quantify the breakage and abrasion characteristics of aggregate materials under various simulated compaction loads in laboratory, which may help to develop field QC/QA specifications to control the aggregate degradation caused by handling and compaction. (C) 2019 Elsevier Ltd. All rights reserved.

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第 36 篇

标　　题：Optimization Design And Verification Of Large Stone Porous Asphalt Mixes Gradation Using Compressible Packing Model

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：As a unique gradation type of asphalt mixtures, Large Stone Porous asphalt Mixes (LSPM) has advantages in promoting pavement performance including cracking resistance, rutting resistance, and moisture susceptibility. The gradation design is a critical determining factor for the LSPM performance. Therefore, this paper aims at optimizing the gradation design of LSPM, as well as testing its mechanical performance and microstructural characteristics. Firstly, a new gradation of LSPM is designed and optimized on basis of the Compressible Packing Model (CPM) theory. Then, the basic pavement performance of the new LSPM are verified, and compared to an existing LSPM. The cracking resistance of the new and existing LSPM is measured by the

Overlay Tester. Meanwhile, the pore structure characteristics are analyzed for further elaborating the differences between the two mixes. The result shows that the CPM model can simulate packing state. The new LSPM gradation is proposed using the CPM and correction coefficient k. The first cycle load loss rate P 1 and loading cycles of 50% load loss rate N-0(.S) can evaluate the anti-reflection cracking performance more effectively. Air void content of LSPM in vertical direction is heterogeneity distribution. The macropores and extra-macropores are major components of pores, above 80% of all. It indicates that the CPM method is applicable in LSPM gradation design. Moreover, performance of the optimized LSPM have been significantly improved. (C) 2019 Elsevier Ltd. All rights reserved.

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第 37 篇

标　　题： An Improved Car-Following Speed Model Considering Speed Of The Lead Vehicle, Vehicle Spacing, And Driver'S Sensitivity To Them

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： This paper introduces an improved car-following speed (CFS) model that simultaneously considers speed of the lead vehicle, vehicle spacing, and driver's sensitivity to them. Specifically, the proposed model extends the Helbing-Tilch model and Yang et al. model developed based on the principle of grey relational analysis where vehicle spacing is considered as the primary factor contributing to car-following speed choices. A computational experiment is conducted for model calibration using vehicle spacing, speed, and acceleration data derived from vehicle trajectory data of the Next Generation Simulation (NGSIM) project sponsored by the Federal Highway Administration (FHWA). It shows that speed of the lead vehicle and vehicle spacing significantly affect speed of the lag vehicle. Further, model validation is carried out using an independent NGSIM dataset by comparing vehicle speed predictions made by the calibrated CFS model with Helbing-Tilch model and Yang et al. model as benchmarks. Compared with speed prediction results of the benchmark models, mean relative errors, root mean square errors, and equal coefficient of speed predictions of the CFS model have reduced by 72.41% and 61.85%, 70.14% and 57.99%, and 33.15% and 14.48%, respectively. The findings of model validation reveal that the CFS model could improve the accuracy of speed predictions in the car-following process.

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第 38 篇

标　　题： Defining Highway Node Acceptance Capacity (Hnac): Theoretical Analysis And Data

Simulation

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：A new concept of Highway Node Acceptance Capacity (HNAC) is proposed in this paper inspired by a field data observation. To understand HNAC in microscopic view, boundary condition of successful merging is found using car-following behaviours and lane-changing rules, which could also explain traffic oscillations. In macroscopic view, linear positive relationship between HNAC and background traffic volume is obtained based on moving bottleneck. To determine the explicit form of the relationship, data simulation considering car-following behaviours and traffic flow theory is used. In the results, the synchronization phenomenon of oscillation in on-ramp (with respect to main road) and intersected road is found. The explicit equation of HNAC is determined based on standard deviation and correlation coefficient analysis, and also proved to be accurate with model validation, which is helpful in studies related to propagation mechanism of traffic emergencies on highway network.

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第 39 篇

标　　题：The Thermoregulation Effect Of Microencapsulated Phase-Change Materials In An Asphalt Mixture

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Temperature plays an important role in the long-term performance and service life of pavement. With the large-scale use of asphalt pavement, the paving industry is now more interested in the related pavement distress generated by temperature. Against this background, this paper presents the test results for pure microencapsulated phase change materials (micro-PCMs), as well as asphalt mixtures containing micro-PCMs, with the aim of reducing the temperature difference. The latent heat storage capacity of pure micro-PCMs was evaluated by the T-history method, and C-h was proposed to characterize their latent heat storage capacity. Outdoor experiments were performed to observe the temperature change behavior of seven asphalt mixture specimens manufactured by the wheel-grind method. Two specimens were mixed with -5 degrees C micro-PCMs, with micro-PCM contents of 0.3% and 0.5% respectively, substituting the equivalent amount of mineral filler. Another two specimens were mixed with 0

degrees C micro-PCMs, with micro-PCM contents of 0.3% and 0.5%. Two other specimens were mixed with -5 degrees C micro-PCMs, with micro-PCM contents of 0.3% and 0.5%. The results show that the thermoregulation ranges of different micro-PCMs differ. As the micro-PCM content increases, the temperature difference between the ordinary AC-13 asphalt mixture and AC-13 mixed with micro-PCMs increases. The use of 5 degrees C micro-PCMs in an asphalt mixture can significantly improve its thermal behavior. (C) 2019 Elsevier Ltd. All rights reserved.

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第 40 篇

标　　题： Investigation Of Thermal Degradation Of Asphalt Binders During Storage And Transportation

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： A disadvantage of current asphalt performance evaluation systems is that thermal degradation during storage and transportation is rarely considered, especially for polymer modified asphalt binders. The thermal degradation test in thin air (TDTTA) was designed to simulate the aging during storage and transportation. The aim of this study is to evaluate the change in properties of polymer modified asphalt binders during storage and transportation by the convention tests, gel permeation chromatography (GPC) and Fourier transform infrared spectroscopy (FTIR). Based on the above analysis, the main factors affecting the performance of polymer modified asphalt binders were obtained. The results showed that storage time, oxygen concentration and polymer type have a greater impact on the properties erosion, while type of base asphalt binders has a lesser effect. For TFOT or TDTTA, the asphalt binders exhibit performance erosion with aging time increases. Compared with the change in the properties of base asphalt binders after TDTTA, the TDTTA caused a large change in the properties of polymer modified asphalt binders. The degradation in polymer also can be clearly occurred as gel permeation chromatography (GPC) and Fourier transform infrared spectroscopy (FTIR) results showed. In addition, the chemical structure and physical properties also showed the deterioration after TDTTA aging and different polymer modifiers have different influences. The performance degradation is more obvious when the air/oxygen is present. But the performance degradation needs to pay attention in thin air/oxygen in practical applications. (C) 2019 Elsevier Ltd. All rights reserved.

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第 41 篇

标　　题：A Comparative Study Of Protective Schemes For Shield Tunneling Adjacent To Pile Groups

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Shield tunneling adjacent to pile groups is always an unavoidable problem in urban metro construction. A case was found in the project of Tianjin Metro Line 7, where a shield tunnel would be constructed near the existing pile groups of Shiyou Bridge. The whole shield tunnel is close to pile groups, and the minimum distance is only 0.8 m. Therefore, four kinds of protective schemes are proposed in this paper. It is vital to select an appropriate protective scheme to guarantee the safety during the tunnel construction. In this study, the main mechanical characteristic and physical parameters of site soil were obtained through laboratory tests. Besides, the three-dimensional finite element method was carried out to compare and analyze the effectiveness of the protective schemes in mitigating the effects of tunneling on adjacent pile groups. The results show that the deep-hole grouting scheme has better control effect on the lateral deformation and bending moment of piles, while the pile foundation underpinning scheme has better effectiveness on reducing the settlement of bridge structure and ground deformation. Finally, the deep-hole grouting reinforcement scheme will be adopted to ensure the shield passing through the pile groups smoothly.

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第 42 篇

标　　题：Investigation On The Morphological And Mineralogical Properties Of Coarse Aggregates Under Vsi Crushing Operation

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：In this paper, the role of crushing operation on the cubical controlling features of coarse

aggregates, and its influence on the shape distribution characteristics of aggregates (i.e. angularity, sphericity, and flatness & elongation ratio) were investigated through the second version of Aggregate Image Measuring System (AIMS II). Three types of aggregate from different origins were chosen and crushed by the vertical shaft impactor (VSI) with fixed rotational speed. The results indicate that the rotation speed of VSI is influenced by the input power of the machine to the particle sizes, and higher speed leads to more cracks on aggregates during the crushing process. By using X-ray diffraction (XRD), the aggregate samples from different origins and mineral compositions were analysed under the same working operation of crusher. Besides that, the correlation between particle shape characteristics influenced by the mineralogical composition, and their collision behaviours have been discussed according to the tested results. A recommendation for optimal operation of VSI on crushing granite aggregates is given based on this study. Whereas, the cubical condition of aggregates and energy saving factors were taken into account. Furthermore, petrographic analyses were imposed to correlate particle mineralogy to its collision behaviour during crushing.

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第 43 篇

标　　题： Effect Of Aggregate Contact Condition On Skeleton Stability In Asphalt Mixture

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： To investigate the effect of aggregate contact condition on the deformation stability of asphalt mixture (DSAM), computed tomography system was used to acquire a contact parameter of aggregates - the aggregate contact index (ACI) characterising the contact characteristic for coarse aggregate. The aggregate slip tests were conducted under different test conditions . This paper investigates the relationship between ACI and slip energy index (SEI), and discusses the effects of aggregate-asphalt combined action and aggregate gradation on DSAM. The results indicate that SEI shows a good relationship with ACI. At 60 degrees C, SEI has the best linear correlation with the parameter ACI*VFA (Voids Filled with Asphalt), and the deformation stability has the biggest increase amplitude with the increase in ACI*VFA. In the high-temperature range (higher than 50 degrees C), there is a good linear relationship between SEI and ACI/VFA, and the contribution of aggregate contact to DSAM is bigger under a higher temperature. However, the action of asphalt changes to lubrication from cementation with the increase in temperature, so the growth of SEI with ACI/VFA becomes smaller. AC-13b mix has a better deformation stability than AC-13a and AC-13c mixes at 60 degrees C though they have the same nominal maximum aggregate size.

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第 44 篇

标　　题：Study On Road Performances Of Asphalt Mixtures With Granulated Polymer Anti-Rutting Additive

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：Rutting has been one of the primary concerns for highway engineers in China. Granulated polymer anti-rutting additive may be an effective way to solve this problem. However, it is difficult to find previous research on the application of granulated polymer as an anti-rutting additive in different types of asphalt mixtures. This research aims to investigate the influences of the anti-rutting additive contents on road performances based on different types of asphalt mixtures, and also explores potential reasons for road performance improvement. Three types of asphalt mixtures: dense-graded asphalt concrete (DG-AC), dense-graded Superpave (DG-Superpave)?semi-open-graded asphalt macadam (SOG-AM), were included. Road performances, including high-temperature performance, low-temperature performance and moisture susceptibility, were studied at three anti-rutting additive percentages: 0.2, 0.3 and 0.4% weight of the asphalt mixture. The mixtures without the anti-rutting additive were regarded as control groups. In order to better analyse the road performance improvements, the properties of modified asphalt with 0.4% anti-rutting additive were studied, as well as the anti-rutting additive physical form in the asphalt mixture. It was found that the anti-rutting additive improved mixture's high-temperature performance significantly while its effects on low-temperature performance were not so. It reduced low-temperature tensile strain within 12.9% range. Moisture susceptibility was improved greatly after adding 0.2% anti-rutting additive as compared to the corresponding control groups. By increasing the additive contents to 0.3 and 0.4%, the moisture susceptibility had no significant difference compared with that of the 0.2% additive content group. Road performance improvements may relate to the combined action of reinforcement and gap filling by the elongated anti-rutting additive, as well as asphalt modification within short time. When the additive content is no more than 0.3%, the materials costs of the additive-modified asphalt mixtures are less than that of SBS-modified asphalt mixtures.

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第 45 篇

标　　题：Evaluation Of The Spatial Pattern Of The Resolution-Enhanced Thermal Data For Urban Area

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期　　刊： JOURNAL OF SENSORS

摘　　要： With the development of urbanization, land surface temperature (LST), as a vital variable for the urban environment, is highly demanded by urban-related studies, especially the LST with both fine temporal and spatial resolutions. Thermal sharpening methods have been developed just under this demand. Until now, there are some thermal sharpening methods proposed especially for urban surface. However, the evaluation of their accuracy still stopped at the level that only considers the statistical aspect, but no spatial information has been included. It is widely acknowledged that the spatial pattern of the thermal environment in an urban area is relatively critical for urban-related studies (e.g., urban heat island studies). Thus, this paper chose three typical methods from the limited number of thermal sharpening methods designed for the urban area and made a comparison between them, together with a newly proposed thermal sharpening method, superresolution-based thermal sharpener (SRTS). These four methods are analyzed by data from different seasons to explore the seasoning impact. Also, the accuracy for different land covers is explored as well. Furthermore, accuracy evaluation was not only taken by statistical variables which are commonly used in other studies; evaluation of the spatial pattern, which is equally important for urban-related studies, was also carried out. This time, the spatial pattern not only was analyzed qualitatively but also has been quantified by some variables for the comparison of accuracy. It is found that all methods obtained lower accuracies for data in winter than for data in other seasons. Linear water features and areas along it are difficult to be detected correctly for most methods.

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第 46 篇

标　　题： Strengthening Hollow Core Concrete Bridges With Deficient Transverse Hinge Joints With A Steel And Concrete Composite Anchorage System

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期　　刊： TRANSPORTATION RESEARCH RECORD

摘　　要： Hollow core concrete bridges have been widely constructed in China during the last two decades. The most simple span bridges, with standard lengths of 13 m, 16 m and 20 m, are hollow core concrete bridges. For this type of bridge, the hollow core slabs are

precast and simply lifted into place. After the prefabricated hollow core slabs are put in place, the embedded rebars extending from the prefabricated slabs are bound together and the concrete is poured into the space between the slabs, forming a lateral hinge joints between the slabs. A lot of hollow core concrete bridges built early in the 1990s have small hinge joints and very few rebars embedded to form strong lateral connections between the slabs. With an increase of overweight vehicles and the continuous aging of the structures, structural deficiencies such as intensive cracks running through the mid-span and severe deflection progress rapidly resulting in loss of structural capacity and even collapse. The failure of hollow core concrete bridges usually initiates from the failure of the hinge joints, which are the weakest links of the system. When the hinge joints start to lose their ability to hold the adjacent slabs securely, more and more vehicle loads are shifted onto the slabs with deficient hinge joints, which worsens the condition of the slabs and eventually results in systematic failure. To save the hollow core concrete bridges from failure, the authors propose an effective strengthening method to stop the progress of the deficiencies and improve the capacity of the structure.

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第 47 篇

标　　题： Traffic Conflict Analysis Of Motor Vehicles And Nonmotor Vehicles Based On Improved Cellular Automata

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： In recent years, with the rapid development of China's logistics industry and urban service industry, electric bicycles have gradually become an important means of transportation in cities due to their flexibility, green technology, and low operating costs. Because electric bicycles travel though motor vehicle lanes and nonmotor vehicle lanes, the conflict between motor and nonmotor vehicles has become increasingly prominent, and the safety situation is not optimistic. However, most theories and models of mixed traffic flow are based on motor vehicles and bicycles and few involve electric bicycles. To explore the traffic safety situation in an urban mixed traffic environment, this paper first uses cellular automata (CA) to establish a three-strand mixed traffic flow model of motor vehicles, electric bicycles, and bicycles and verifies the reliability of the model by using a MATLAB simulation based on the actual survey data. Then, using the technology of traffic conflicts and the conflict rate as the index to evaluate the traffic safety situation, the change in the conflict rate with different road occupancies and different proportional coefficients of motor vehicles is studied. In the end, the conflict rate is compared between the mixed traffic flow and the setting of a

physical isolation divider, which provides some suggestions on when to set a physical isolation divider to separate motor vehicles from nonmotor vehicles. The results show that in a mixed traffic environment, the conflict rate first increases and then decreases with increasing road occupancy and reaches a peak when the road occupancy is 0.6. In addition, in mixed traffic environments, the conflict rate increases with an increasing proportional coefficient of the motor vehicle. When the road occupancy rate is within the range of [0.6, 0.9] or when the proportional coefficient of motor vehicle is between [0.8, 0.9], a physical isolation divider can be set to separate motor vehicles and nonmotor vehicles from the space to improve traffic safety.

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第 48 篇

标　　题： Damage Management And Safety Evaluation For Operating Highway Tunnels: A Case Study Of Liupanshan Tunnel

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期　　刊： STRUCTURE AND INFRASTRUCTURE ENGINEERING

摘　　要： Under the combined impacts of the operation time, design concept, and construction technology, extensive damage has occurred in tunnels built in China during the early stages of rapid development. Therefore, relevant research on tunnel damage is of urgent importance. This study takes the Liupanshan Highway Tunnel on G312 in Guyuan City as a case study, and uses field investigations, radar scans, and other methods to investigate the occurrence of a series of defects in the tunnel, including lining splitting, water leakage, and tunnel bottom damage, to analyze the damage characteristics and occurrence mechanism in detail based on both external causes and internal causes. From the results, by combing relevant materials both in China and abroad with the engineering characteristics, a comprehensive management method for reinforcing and strengthening damaged tunnels with a reinforced concrete umbrella arch is proposed. At the same time, considering the degradation in the bearing capacity of the existing lining structure and utilization degree of the bearing capacity of newly increased reinforced concrete umbrella arch, this study performs a theoretical analysis of the calculation for the safety factor of the reinforced damaged tunnel. The calculation results show that the reinforced Liupanshan Tunnel is in a secure state, which can provide references for similar projects in the future.

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第 49 篇

标　　题： Performance Of Polyurethane Mixtures With Skeleton-Interlocking Structure

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： Asphalt is a kind of temperature-sensitive material, and the temperature stability of asphalt mixtures is not very good. The production of hot-mix asphalt mixtures consumes a substantial amount of energy and produces carbon dioxide (CO2) emissions. Polyurethane (PU) mixtures have better high-temperature stability and durability. Besides, the production of PU mixtures can save energy and reduce CO2 emissions because the materials can be prepared at room temperature. However, traditional mixture structures were not suitable for PU binders. In this work, the GB5 mix design was used to decrease the influence of boundary interactions and discrete interactions on the void ratio of aggregates; therefore, a PU mixture with a skeleton-interlocking structure (PUM) was prepared. Properties and functional groups of the PU were assessed by use of the Brookfield rotational viscosity test, Fourier transform infrared spectroscopy (FTIR), and dynamic mechanical analysis (DMA). The high- and low-temperature stability, water stability, and fatigue resistance of mixtures were evaluated by use of the wheel-tracking test, low-temperature bending test, freeze-thaw splitting test, and fatigue test. Results suggested that the PU material was the prepolymer of isocyanate and polyhydric alcohols, and the isocyanate group was present in excess. Higher construction temperatures were indicative of shorter operating times of PUM. Additionally, 3% retarder of PU can prolong the allowable operating time for 5-10 min, and 5% retarder can prolong for 10-20 min. Measurements of PUM met requirements for hot-mixed modified-asphalt mixtures. The low-temperature stability, water stability, and fatigue resistance of PUM were improved when compared with other mixtures. In addition, PUM demonstrated excellent high-temperature stability. (C) 2019 American Society of Civil Engineers.

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第 50 篇

标　　题： Surface Treatment Optimization Of Thermal-Resistant Aggregate For Pavement

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： To render thermal-resistant aggregates more suitable in asphalt mixtures, the optimal

process for treating three typical thermal-resistant aggregates-shale ceramsite (SC), porous volcanic rock (PVR), and refractory gravel (RG)-with two organic treatment agents-silicone resin (SR) and silicone-acrylic (SA) emulsion-was determined according to the basic properties test. Further, the best agent for different aggregates was recommended according to a scanning electron microscopy and road performance. The results indicate that the optimum concentrations of SR for SC, PVR, and RG are 25%, 25%, and 15%, respectively, and the curing temperature is 160 degrees C. In contrast, the optimum concentrations of the SA emulsion are 35%, 25%, and 15%, respectively, the additive content is 3%, and the film formation temperature is 30 degrees C. Furthermore, the surface package effect of SR-treated aggregates is better than that of the SA-treated aggregates. Both agents can improve the road performance of thermal-resistant aggregates. Finally, using SR to treat SCs and PVRs, and to treat RGs with a SA emulsion, is recommended.

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第 51 篇

标　　题： Experimental Study On Improving The Engineering Properties Of Coarse Grain Sulphate Saline Soils With Inorganic Materials

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通讯作者： Zhang, SS (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY

摘　　要： Coarse grain soils are a good kind of embankment fill material. However, when they contain a high-level soluble salt, the engineering consequences can include salt expansion and collapsibility. The main objective of this study was to improve the salt expansion, collapsibility, and strength characteristics of coarse grain sulphate saline soils using inorganic binders and to provide an optimal proportion for the improvements. Coarse grain sulphate saline soils with 2% soluble salt contents were improved using different ratios of slaked lime, slaked lime-fly ash, and slaked lime-volcanic ash. Meanwhile, salt expansion tests, collapsibility tests, saturated unconfined compressive strength (SUCS) tests, and SEM tests were performed for the improved soils using different proportions. The results demonstrated that adding slaked lime, slaked lime-volcanic ash, or slaked lime-fly ash could not only effectively reduce the salt expansion amount, but also reduce the sensitive temperature range of the salt expansion. The deformation rate of salt expansion and collapsibility were < 1% after adding > 11% slaked lime or 15% slaked lime-volcanic ash (or fly ash). The 7 curing day SUCS of the improved soil was not < 0.35 MPa. Compared with the strength of the slaked lime improved soil and the slaked lime-fly ash improved soil, the strength of the slaked lime-volcanic ash modified coarse grain sulphate saline soil was stronger. Also, the addition of volcanic ash could increase the strength gain rate in these improved saline soils. Furthermore, the feasibility and rationality of using inorganic binder to

improve coarse grain sulphate saline soil were clarified by discussing the microstructure and improvement mechanism of coarse grain sulphate saline soil before and after improvement.

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第 52 篇

标　　题： A Lower-Bound Formulation For Unsaturated Soils

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期　　刊： GEOTECHNIQUE

摘　　要： A lower-bound formulation is proposed for consistent stability analysis of saturated and unsaturated soils with the suction stress-based effective stress employed to represent the shearing strength variation caused by matric suction. All constraints are expressed in terms of the effective stress. The body and surface forces induced by the suction stress are established and their effect on the equilibrium of unsaturated soils is studied in detail. Numerical solutions of the formulation are obtained by utilising linear triangular finite elements in combination with the second-order cone programming. Some numerical tests are given, and the lower-bound solutions are compared with the experimental data, the field measurements and the results of other methods. Close agreement is seen in all cases and the bounding property of the upper- and lower-bound formulations is guaranteed. The impact of the suction stress and the hydraulic state on the stability of some unsaturated earth structures is discussed.

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WOS 号： 000506684800003

第 53 篇

标　　题： Reinforcing Distressed Lining Structure Of Highway Tunnel With Bonded Steel Plates: Case Study

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期　　刊： JOURNAL OF PERFORMANCE OF CONSTRUCTED FACILITIES

摘　　要： Lining cracks are one of the most common distresses in in-service highway tunnels and pose severe threats to the safety of tunnel operation. Traditional methods for retrofitting distressed tunnel lining all have limitations, and the inner-surface reinforcing method using bonded steel plates is becoming increasingly popular. However, research into its use for reinforcing the distressed lining of highway tunnels is limited. This paper intends to fill this knowledge gap by presenting a case study of using bonded steel plates for strengthening the cracked lining of highway tunnels. First, the cracking status of tunnel lining was thoroughly analyzed through field investigation. It is found that water-induced swelling and softening of surrounding rock increases the overburden

pressure on the structure and an aging effect accelerates the degradation of the lining concrete, finally causing the cracking of the tunnel lining. Second, the thickness, width, and spacing of bonded steel plates that have a significant effect on the reinforcing performance were studied numerically by FLAC3D software. It is found that bonded steel plates with a thickness of 8 mm, a width of 30 cm, and spacing of 20 cm can achieve optimum reinforcing performance. Finally, the field implementation scheme for reinforcing the cracked tunnel is proposed accordingly. (C) 2019 American Society of Civil Engineers.

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第 54 篇

标　　题： Wear Evaluation On Slide Bearings In Expansion Joints Based On Cumulative Displacement For Long-Span Suspension Bridge Under Monitored Traffic Flow

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期　　刊： JOURNAL OF PERFORMANCE OF CONSTRUCTED FACILITIES

摘　　要： Expansion joints of bridge superstructures generally suffer deterioration more severely than their main structures, and their actual service life is generally shorter than their design service life. This paper aims at evaluating the wear condition of slide bearings in expansion joints for long-span suspension bridges under monitored traffic flow in the operation stage. The spring element was introduced to model the expansion joint and verified by field load tests. The vehicle-bridge dynamic analysis on a steel truss girder bridge was realized in a nonlinear analysis system, in which the monitored traffic flow was simulated to investigate the back-and-forth displacements of expansion joints. Finally, the wear condition of slide bearings was evaluated by comparing cumulative displacements with the critical value specified by the wear criterion. Findings from this research led to the development of an approximate formula to estimate the cumulative displacement at the expansion joint for long-span suspension bridges, suitable for hand calculations. (C) 2019 American Society of Civil Engineers.

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第 55 篇

标　　题： Strengthening Prestressed Concrete Box Girder Bridge By Upgrading Structural System

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期　　刊： JOURNAL OF PERFORMANCE OF CONSTRUCTED FACILITIES

摘　　要： The Yellow River Dongming Highway Bridge (YRDMHB) is a prestressed concrete rigid frame-continuous girder bridge located in Shandong Province, China, constructed in 1993. After 10 years of operation, a deflection of 150 mm was observed at the midspan of the bridge, and this deflection had a considerable negative influence on the serviceability of the structure. This research presents a strengthening process for the YRDMHB using stay cables to mitigate the midspan deflection. Specifically, the girder structure is modified to a pseudo-cable-stayed bridge by adding an extension system, which consists of two pairs of stay cables, towers, and joist-bracket structures. Furthermore, steel joist-bracket structures are added below the four sections of the main girder to anchor the cables. The load of the girder is shared by the cables and transferred to the new main towers, changing the internal force and line shape of the girder. Through this strengthening method, the original girder structure is upgraded to a cable-girder cooperative work system. The strengthening work includes theoretical analysis, laboratory tests, plan implementation, and field load tests. First, the strengthening scheme using stay cables is illustrated and laboratory static load tests are conducted to verify the applicability of the proposed plan. Second, the strengthening scheme is implemented and the key mechanical and geometrical parameters are monitored. Third, to examine the effectiveness of the strengthening project, field load tests are conducted. The results show that the static and dynamic performance of different span box girders is better than that before strengthening. Through the strengthening process described in this paper, the stiffness of the structure is improved by strengthening. (C) 2019 American Society of Civil Engineers.

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第 56 篇

标　　题： Modelling Nonlinear Aerodynamic Damping During Transverse Aerodynamic Instabilities For Slender Rectangular Prisms With Typical Side Ratios

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期　　刊： JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS

摘　　要： The transverse aerodynamic instabilities of rectangular cylinders with three typical side ratios (width-to-depth-ratio as 2:1, 1:1 and 1:2) were investigated through a series of elastically-supported sectional model tests. Experimental results indicate that side ratio

plays an important role in the phenomena of transverse instabilities and a larger side ratio B/D generally corresponds to a stronger interaction of VIV and galloping. For side ratio B/D = 2, all test cases exhibited unsteady galloping starting from the Karman vortex resonance wind speed. When Scruton number is larger than a threshold value between 12.1-19.4, the unsteady galloping of B/D = 1 shows a separate behavior of VIV and galloping with a twofold-amplitude phenomenon. Whereas, side ratio B/D = 0.5 exhibited a pure transverse VIV. The feasibility of classical quasi-steady theory was found not able to predict the onset wind speeds and stable amplitudes. An empirical model was established to consider the aerodynamic nonlinearity by two amplitude-dependent damping terms and aerodynamic unsteadiness by expressing aerodynamic parameters as functions of reduced frequency. The empirical model was validated, having a satisfactory accuracy in predicting the vibration amplitudes of unsteady galloping and VIV. The proposed model represents a promising tool in engineering applications where the interference of VIV and galloping is concerned.

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第 57 篇

标　　题： Geometrical Heterogeneity Of The Joint Roughness Coefficient Revealed By 3D Laser Scanning

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期　　刊： ENGINEERING GEOLOGY

摘　　要： The joint roughness coefficient (JRC) is an important indicator that characterizes the physical and mechanical behaviors of a jointed rock mass. To investigate the distribution characteristics of the JRC, 31 joint samples belonging to the same joint group with dominant attitude of 209 degrees angle 71 degrees were collected from the Guanshan railway tunnel, and the morphologies of the joint samples were digitized using 3D laser scanning. The JRC values in different directions were obtained based on the fractal theory, and the effects of sampling interval on JRC were assessed during the JRC calculation process. The results show that the sampling intervals of profile line and digital point both affect the calculated JRC values. With sampling interval increasing, there exists an obvious threshold above which the JRC value changes from constant to variable. It is found that, the JRC value keeps constant if the profile line sampling interval is smaller than the threshold value (4 mm), which is independent of the roughness degree of the joint. However, the threshold of digital point sampling interval

is influenced by joint roughness and has a negative exponential relationship with the JRC value. According to the calculated results of JRC in different directions of the 31 joint samples, it is clear that the JRC values present significant anisotropy and large variation in certain directions. Meanwhile, it is verified that the JRC values in the same direction follow a log-normal distribution. The expected JRC values calculated depending on the probability density function are generally larger than the arithmetic mean values, with a maximum difference up to 23.1%. In consideration of natural distribution, the expected JRC values calculated from probability density function should be more reliable than the arithmetic mean values. Therefore, accurate understanding on the geometrical heterogeneity of JRC will significantly affect the evaluation of mechanical effects of rock mass structure.

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第 58 篇

标　　题： Deformation Characteristics And Failure Mechanisms Of A Rainfall-Induced Complex Landslide In Wanzhou County, Three Gorges Reservoir, China

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期　　刊： LANDSLIDES

摘　　要： A rainfall-induced complex landslide occurred on April 4, 2013, in Wanzhou County, Three Gorges Reservoir, China. Approximately 1.5 x 10(6) m(3) of earth and rock mass slid over a distance of 30 m, destroying residential buildings and rural roads. We perform a comprehensive assessment of the cause of this landslide using field surveys, borehole drillings, and interpretations of aerial photographs. This landslide exhibited a complex failure mode in which the upper part of the earth slope first deformed and slid along geotechnical interfaces. This then triggered the slide of the lower part of the flysch bedding rock. In this study, the landslide mass was divided into nine separate blocks considering their internal geological features and movements. The study also shows that antecedent rainfall, in association with the geological and morphological features of the steep slope, the presence of weak interlayers, and human interventions such as slope excavations, jointly caused this disaster. This well-observed event study facilitates comprehensive recognition of the deformation characteristics and failure mechanisms of rainfall-induced complex landslides and also provides an insight into landslide hazard mitigation.

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第 59 篇

标　　题： Evaluation Of An Exclusive Spur Dike U-Turn Design With Radar-Collected Data And

Simulation

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期　　刊：JOVE-JOURNAL OF VISUALIZED EXPERIMENTS

摘　　要：Traditional U-turn designs can improve operational features obviously, while U-turn diversions and merge segments still cause traffic congestion, conflicts, and delays. An exclusive spur dike U-turn lane design (ESUL) is proposed here to solve the disadvantages of traditional U-turn designs. To evaluate the operation performance of ESUL, a traffic simulation protocol is needed. The whole simulation process includes five steps: data collection, data analysis, simulation model build, simulation calibration, and sensitive analysis. Data collection and simulation model build are two critical steps and are described later in greater detail. Three indexes (travel time, delay, and number of stops) are commonly used in the evaluation, and other parameters can be measured from the simulation according to experimental needs. The results show that the ESUL significantly diminishes the disadvantages of traditional U-turn designs. The simulation can be applied to solve microscopic traffic problems, such as in single or several adjacent intersections or short segments. This method is not suitable for larger scale road networks or evaluations without data collection.

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第 60 篇

标　　题：Low-Carbon Impact Of Urban Rail Transit Based On Passenger Demand Forecast In Baoji

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期　　刊：ENERGIES

摘　　要：There are increasing traffic pollution issues in the process of urbanization in many countries; urban rail transit is low-carbon and widely regarded as an effective way to solve such problems. The passenger flow proportion of different transportation types is changing along with the adjustment of the urban traffic structure and a growing demand from passengers. The reduction of carbon emissions brought about by rail transit lacks

specific quantitative research. Based on a travel survey of urban residents, this paper constructed a method of estimating carbon emissions from two different scenarios where rail transit is and is not available. This study uses the traditional four-stage model to forecast passenger volume demand at the city level and then obtains the basic target parameters for constructing the carbon emission reduction model, including the trip origin-destination (OD), mode, and corresponding distance range of different modes on the urban road network. This model was applied to Baoji, China, where urban rail transit will be available from 2023. It calculates the changes in carbon emission that rail transit can bring about and its impact on carbon emission reductions in Baoji in 2023.

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第 61 篇

标　　题： Effect Of The Compactness On The Texture And Friction Of Asphalt Concrete Intended For Wearing Course Of The Road Pavement

作　　者： [Wang, Tengda; Hu, Liqun; Pan, Xiaodong; Xu, Song; Yun, Di] Changan Univ, Sch Highway, South 2nd Ring Rd Middle Sect, Xian 710064, Peoples R China; [Hu, Liqun] Changan Univ, Minist Educ, Key Lab Special Area Highway Engn, South 2nd Ring Rd Middle Sect, Xian 710064, Peoples R China

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期　　刊： COATINGS

摘　　要： Maintaining good friction performance of highway pavement is important for road safety. The friction is affected by many factors, and the present study investigates the effect of the compactness on the texture and friction of asphalt concrete during the polishing process. Two three-dimensional (3D) texture parameters and the mean texture depth (MTD) were used to characterize the surface texture of AC-13 asphalt concrete. The differences of surface texture are then being analyzed among the pavement in the field, rutting slabs with 97% compactness (RS-97), rutting slabs with 100% compactness (RS-100), and rutting slabs with 103% (RS-103). The rutting slabs were polished by a circular vehicle simulator (CVS). The 3D surface topography, British pendulum number (BPN), and MTD were obtained during the polishing process. Test results show that the surface of the rutting slab can be smoother as the compactness increased from 97% to 103%. During the whole polishing process, the rutting slab with smaller compactness had higher value of the MTD. The impact of compactness on the BPN is insignificant during the polishing process, but rutting slabs with smaller compactness had better friction at high speed as the result of the higher MTD.

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第 62 篇

标　　题： A Modified Car-Following Model Considering Traffic Density And Acceleration Of

Leading Vehicle

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：Although the difference between the velocity of two successive vehicles is considered in the full velocity difference model (FVDM), more status information from preceding vehicles affecting the behavior of car-following has not been effectively utilized. For improving the performance of the FVDM, an extended modified car-following model taking into account traffic density and the acceleration of a leading vehicle (DAVD, density and acceleration velocity difference model) is presented under the condition of vehicle-to-vehicle (V2V) communications. Stability in the developed model is derived through applying linear stability theory. The curves of neutral stability for the improved model indicate that when the driver pays more attention to the traffic status in front, the traffic flow stability region is larger. Numerical simulation illustrates that traffic flow disturbance could be suppressed by gaining more information on preceding vehicles.

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第 63 篇

标　　题：Tire-Road Contact Area On Asphalt Concrete Pavement And Its Relationship With The Skid Resistance

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期　　刊：MATERIALS

摘　　要：Sufficient pavement skid resistance is one of the essential factors to ensure traffic safety. The real contact area (Ar) between the tire and road is significant for understanding and improving the skid resistance performance. In this study, the tire-road contact area is measured by squeezing a smooth underside-dyed rubber block into the specimens, using a self-designed fixture mounted on the universal test machine. The three-dimensional (3D) printing technology is used to separate the specimens with multi-scale roughness. Surface texture on 29 AC pavements is obtained by a 3D scanner and qualified by the root-mean-square surface height (Sq), to investigate the impact of pavement texture on the Ar. The skid resistance on 23 AC road sections is measured using the T2GO system, and the pavement texture is recorded, to discuss the influence of the Ar on the skid resistance. The results indicate that the multi-scale roughness rarely affects the measured contact area once the concerned wavelength is less than 0.6

mm. The Ar decreases with the Sq following a power function but has weak correlation with the friction coefficient. This study could provide an in-depth understanding of the tire-road contact and lays a foundation for optimizing the contact-related pavement performance.

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第 64 篇

标　　题： A Numerical Model For Evaluating Fire Performance Of Composite Box Bridge Girders

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期　　刊： JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要： This paper presents an approach for evaluating fire performance of composite box bridge girders exposed to fire. The model takes into account critical parameters, namely, fire scenario, fire exposure length, load level, numbers of longitudinal stiffeners in web and bottom flange and web pattern, that influence fire performance of bridges. A three dimensional finite element model, developed in the computer program ANSYS, is applied to model the fire response of composite box bridge girders. The finite element model is validated by comparing predicted sectional temperatures and deflections from the model with fire test data generated from a test on box bridge girder. The applicability of the numerical model in practical application is illustrated through numerical analysis on a composite box bridge girder subjected to simultaneous structural loading and fire exposure. Results from the numerical study clearly show that fire severity, fire exposure length, load level, number of longitudinal stiffeners and web slenderness have significant influence on the fire resistance of composite bridge girders. Provision of longitudinal stiffeners can result in lower deflections; thus enhancing fire resistance. Further, inclined web (configuration) incorporated into sectional shape can enhance fire resistance of composite box bridge girders.

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第 65 篇

标　　题： An Extended Car-Following Model Considering The Drivers' Characteristics Under A V2V Communication Environment

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期　　刊：SUSTAINABILITY

摘　　要：In intelligent transportation systems, vehicles can obtain more information, and the interactivity between vehicles can be improved. Therefore, it is necessary to study car-following behavior during the introduction of intelligent traffic information technology. To study the impacts of drivers' characteristics on the dynamic characteristics of car-following behavior in a vehicle-to-vehicle (V2V) communication environment, we first analyzed the relationship between drivers' characteristics and the following car's optimal velocity using vehicle trajectory data via the grey relational analysis method and then presented a new optimal velocity function (OVF). The boundary conditions of the new OVF were analyzed theoretically, and the results showed that the new OVF can better describe drivers' characteristics than the traditional OVF. Subsequently, we proposed an extended car-following model by combining V2V communication based on the new OVF and previous car-following models. Finally, numerical simulations were carried out to explore the effect of drivers' characteristics on car-following behavior and fuel economy of vehicles, and the results indicated that the proposed model can improve vehicles' mobility, safety, fuel consumption, and emissions in different traffic scenarios. In conclusion, the performance of traffic flow was improved by taking drivers' characteristics into account under the V2V communication situation for car-following theory.

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第 66 篇

标　　题：Preparation Of Rejuvenating Agent And Property Evaluation Of Rejuvenated Sbs Modified Asphalt Binders

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Currently, more and more waste SBS modified asphalt binders (SBSMA) were produced from asphalt pavement. To achieve concept of green development of asphalt pavement, thus, the objective of rejuvenation of waste SBSMA become very important. This paper investigates physical and chemical properties of rejuvenated SBSMA. The optimal content of rejuvenating agent was determined by conventional tests to rejuvenate aged SBSMA to its unaged level. The research about conventional tests indicated that rejuvenating agent can both improve the ductility at low temperature of aged SBSMA and elastic recovery of aged SBSMA. Physical properties and microstructures of unaged, aged, and rejuvenated SBSMA were then investigated, and by contrast, rejuvenating agent can improve workability of aged SBSMA due to the reduction of viscosity and improve its cracking resistance at low temperature. Moreover, the fourier transform infrared spectroscopy (FTIR) illustrated that there was

no chemical reaction occur between rejuvenating agent and aged SBSMA. The original structure of SBS modifier can be partly rebuilt through adding the rejuvenating agent. In thermal analysis and GPC analysis, the large molecule size (LMS) content of aged SBSMA are decreased due to physical dilution and the thermal stability of aged SBSMA is increased when rejuvenating agent was added. From the analysis, it is found that the properties of aged SBSMA would be improved with the addition of rejuvenating agent. (C) 2019 Elsevier Ltd. All rights reserved.

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第 67 篇

标　　题： Displacement Characteristics Of An Urban Tunnel In Silty Soil By The Shallow Tunnelling Method

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The urban shallow tunnelling process in silty soil is easy to cause large displacement of surface and tunnel. Obviously, if the strata and the tunnel face are not treated by reasonable reinforcement method, instability and collapse phenomenon will be encountered during the tunnel excavation. There are a series of studies on construction methods of shallow tunnels, but these methods have limitations in silty soil. In this study, a comprehensive construction plan of the urban shallow tunnel in silty soil was proposed and applied to a case study in Fuzhou, Fujian Province in South China. The in situ monitoring tests and numerical simulation were employed to address displacement characteristics of surface and tunnel. Results indicated that the urban shallow tunnelling process could achieve good effect by dewatering of silty soil, reinforcing surface by vertical jet grouting piles, and advanced small pipes and circumferential grouting in the tunnel face; surface settlement during dewatering process accounted for about 30% of total surface settlement in silty soil; the excavation of the top heading, the middle, and lower benches had great effect on displacement of surface and tunnel for three-bench seven-step excavation method in silty soil; surface settlement troughs in silty soil were deeper and wider; lock-feet bolts had good effect on restricting horizontal convergence; and ratio of total crown settlement and total horizontal convergence was in range of 1.43 similar to 1.59 when b/h was 0.88 in silty soil. The construction plan proposed in this paper is helpful for further study of shallow tunnel tunnelling process in silty soil.

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第 68 篇

标　　题：A Hybrid Model For Prediction In Asphalt Pavement Performance Based On Support Vector Machine And Grey Relation Analysis

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Pavement performance prediction is a crucial issue in big data maintenance..is paper develops a hybrid grey relation analysis (GRA) and support vector machine regression (SVR) technique to predict pavement performance..e prediction model can solve the shortcomings of the traditional model including a single consideration factor, a short prediction period, and easy overfitting. GAR is employed in selecting the main factors affecting the performance of asphalt pavement..e SVR is performed to predict the performance. Finally, the data collected from the weather station installed on Guangyun Expressway were adopted to verify the validity of the GRA-SVR model. Meanwhile, the contrast with the grey model (GM (1, 1)), genetic algorithm optimization BP [[parms resize(1),pos(50,50),size(200,200),bgcol(156)]]081%, - 0.823%, 1.270%, and - 4.569%, respectively..e study concluded that the nonlinear and multivariate prediction model established by GRA-SVR has higher precision and operability, which can be used in long-period pavement performance prediction.

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WOS 号：000535911900001

第 69 篇

标　　题：Strain Rate Effect On Acoustic Emission Characteristics And Energy Mechanisms Of Karst Limestone Under Uniaxial Compression

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：In this paper, the strain rate effect on mechanical properties, failure modes, acoustic emission (AE) characteristics, and energy mechanism of the karst limestone was analyzed based on uniaxial compression tests with different strain rates (5 x 10(-6)-5 x 10(-4)/s). The results showed that the peak strength increased linearly and peak strain increased quadratically with the logarithm value of the strain rate. Moreover, the strain rate effect on elastic modulus was not significant. Under low strain rates, the rock was

damaged seriously, AE signals appeared continuously, and the cumulative number of AE signals was high. Under high strain rates, the total quantity of the macroscopic cracks decreased, but the crack length extended with better coalescence. The AE peak significantly increased under high strain rates, while the cumulative AE activity significantly reduced. The energy evolution of the karst limestone failure process had significant stage characteristics, and the strain energy ratio presented an S-shape. The maximum value of the elastic strain energy at peak stress showed a linear relationship with the logarithm value of the strain rate.

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第 70 篇

标　　题： Experimental Investigation On The Mechanical Properties Of A Novel Anchorage For Carbon Fiber Reinforced Polymer (Cfrp) Tendon

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期　　刊： COMPOSITE STRUCTURES

摘　　要： Carbon fiber reinforced polymer (CFRP) has the advantages of light weight, high tensile strength, superior corrosion resistance, and anti-fatigue properties. However, its low transverse compressive strength and innerlaminar shear strength render it difficult to be anchored through traditional anchorages for steel cables. This study proposes a novel composite anchorage for CFRP tendon and validates its novelty by finite element (FE) method. Then the mechanical performance of this novel anchorage was experimentally compared with that of traditional inner cone anchorage. The effects of parameters such as pre-tightening force, embedded length, inclination angle of the barrel, and grouted material on the anchorage performance of the novel composite anchorage were further studied. Results reveal that this novel composite can increase the load-carrying capacity by 60.4% and exhibits an ideal anchorage efficiency above 0.9, largely reduce the slip of the CFRP tendon under both ultimate and short-time sustained loads, and prevent stress concentration at the loaded end. For further design of this novel anchorage, an empirical embedded length of 30d-40d is proposed. Besides, the anchorage performance of this anchorage does not always increase with the dosage of the sand. The optimum dosage of sand should not exceed 10%. This study provides insights into the mechanical properties of the novel composite anchorage and design guidance for the novel composite anchorage.

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第 71 篇

标　　题：A Theoretical Solution For The Pullout Properties Of A Single Frp Rod Embedded In A Bond Type Anchorage

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期　　刊：MECHANICS OF ADVANCED MATERIALS AND STRUCTURES

摘　　要：This paper proposes a theoretical solution for predicting the pullout properties of a single fiber-reinforced polymer (FRP) rod embedded in a bond type anchorage based on a trilinear bond-slip model. The radial variation of the shear stress and reaction of the steel sleeve are considered in the solution. Pullout procedure with elastic, elastic-softening, elastic-softening-debonding, pure softening, softening-debonding, and debonding stages, as well as the corresponding critical stages, are analyzed. In this theoretical solution, the maximum pullout load, shear stress along the rod-grout interface, axial tensile stress of the FRP rod, and load-slip relationship are derived with explicit formulations. Effective bond length of bond type anchorage is also discussed. The solution is validated against experimental results available in literature. The theoretical solution reveals that the anchorage may attain its maximum pullout load in the elastic-softening, pure softening, or elastic-softening-debonding stage. Moreover, the effects of embedded length, ultimate shear stress, and residual shear stress on maximum pullout load closely related with the stage in which the anchorage attains its maximum pullout load. However, the effect of radius of FRP rod on the maximum pullout load increases with the embedded length, no matter in which stage the anchorage attains its maximum pullout load.

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第 72 篇

标　　题：Preparation And Properties Of High Viscosity And Elasticity Asphalt By Styrene-Butadiene-Styrene/Polyurethane Prepolymer Composite Modification

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期　　刊：JOURNAL OF APPLIED POLYMER SCIENCE

摘　　要：The porous asphalt pavements is often used in important occasion for its special properties and performance which can be to a great extent attributed to the binder-high viscosity and elasticity asphalt (HVEA). To prepare high demanding binder for porous asphalt pavements, the polyurethane prepolymer (PUP) and styrene-butadiene-styrene (SBS) were used to modify the matrix asphalt compositely. First, based on a series of

physical tests, the effects of binder composition on performance of SBS/PUP HVEA binder (SBS/PUP-HVEA) were investigated. Then the Fourier transform infrared (FTIR) test was conducted to investigate the reaction mechanism of SBS/PUP-HVEA binder. Last, the fluorescence microscopy, stability tests, multiple stress creep recovery test, and differential scanning calorimetry test were carried out to evaluate and compare the phase structure, storage, high-temperature performance, thermostability characteristics of several HVEA binders. It is found that the composite modification of SBS and PUP can produce high quality binder which possesses high viscosity and high elasticity. And the composition of SBS/PUP-HVEA were recommended as follows: Shell-70# can be chosen as matrix asphalt, the contents of SBS modifier (SBS1301:SBS4303 = 1:2), H2122A PUP, chain extender M-OEA, and crosslinker sulfur were suggested 4%, 5%, 0.5%, and 1 parts per thousand, respectively. The new functional groups observed in FTIR confirmed the existence of physical and chemical reactions in the modification process, which were beneficial to improve the high temperature performance and storage stability of the binder. SBS/PUP-HVEA had good phase structure, storage stability, high temperature performance, and thermostability compared to other HVEA binders. This study demonstrated that the SBS/PUP compositely modified asphalt possessed high viscosity and high elasticity, which can be used in the porous asphalt mixture and other highly demanding working environment as well.

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第 73 篇

标　　题： Theoretical And Practical Engineering Significance Of British Pendulum Test

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： The British pendulum test is commonly used to measure low-speed pavement friction and provide a measure of the quality of pavement surface micro-texture in terms of skid resistance contribution. Generally, it is considered an empirical test, and the measured British Pendulum Number (BPN) taken as an index value. The present study shows that this interpretation is a misrepresentation of the test, and that the British pendulum test is a theoretically sound test, and there exists a unique one-to-one mechanistic relationship between the measured BPN and friction coefficient. By means of a three-dimensional finite-element simulation model developed using theories of physics, it is demonstrated mechanistically that for each test surface with a known coefficient of friction, there is a unique corresponding BPN value. That is, BPN is not an empirical index, but an engineering quantity that has a mechanistic relationship with the friction coefficient of

the test surface. The theoretical model makes it possible to interpret mechanistically the results of tests conducted in the field and laboratory. The theoretical soundness of the test has high practical significance in evaluating the low-speed friction coefficients of pavement materials during mix design in the laboratory, and friction management of in-service pavements.

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第 74 篇

标　　题： Experimental Investigation Surface Abrasion Resistance And Surface Frost Resistance Of Concrete Pavement Incorporating Fly Ash And Slag

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： This investigation was carried out to study the effects of the type and amount of supplementary cementitious materials on mechanical properties and surface durability of Portland cement concrete (PCC) pavement. Three supplementary cementitious materials, two types of fly ash and one ground granulated blast furnace slag, were selected to substitute for a portion of Portland cement with three level contents (5, 15, 25 wt% and 15, 25, 35 wt% for single and compound adding, respectively) in the concrete mixtures. Properties of the concrete were evaluated in laboratory including compressive strength, flexural strength, surface abrasion resistance, surface frost resistance,and microstructure analysis. The results show that the early age strength values of concretes were affected as increasing the replacement contents regardless of fly ash and slag. Effects of both the type and dosage of supplementary cementitious materials on surface abrasion resistance and frost resistance of concrete were remarkable. The concrete with slag had poorer wear resistance than reference concrete and those with fly ash. In addition, general fly ash concrete had worse surface frost resistance than other mixtures, and concrete with slag exhibited better surface frost resistance in saturated sodium chloride solution than reference one and fly ash concrete.

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第 75 篇

标　　题： Covering Effects Under Diurnal Temperature Variations In Arid And Semiarid Areas

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Covering effects dominated by water vapor migration in arid and semiarid areas threaten the stability of engineering entities. To explore the covering effects dominated by water vapor migration under the influence of diurnal temperature variations, a series of one-side evaporation experiments were conducted. Characteristics of water vapor migration between the unsaturated loess soil column with and without a lid were compared in detail to illustrate the covering effects on water vapor migration, as were the effects of test time. Further, the characteristics of covering effects in loess and sand soil columns were compared. The results show that the covering effects formed in the loess soil column with a lid by cycling day and night temperature differences led water vapor to accumulate and condense beneath the lid. However, unlike the covering effects during freezing conditions that lead to a significant increase in the moisture content in the top layer, in this study, the moisture content in the top layer (0-8 cm) decreased. Although soil lid and the soil covering effects exist in both loess soil columns with and without lids, the soil covering effects for the former are much more obvious, and the moisture content in the upper part of the loess soil column (8-45 cm) shows a significant increase. By cycling day and night temperature differences, the covering effects or soil covering effects grew as the test time increased. Compared to the loess soil column, the covering effects in the sand soil column were extremely weak, and the moisture migration in the sand soil column was dominated by the downward movement liquid water. This paper illustrates the covering effects under the influence of diurnal temperature variations and reveals the mechanism of water vapor migration in subgrade soils in arid and semiarid areas.

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第 76 篇

标　　题：Stress Dependent And Redistribution Behaviour Of Unbound Granular Material

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：The paper is presented to investigate the tensile stress modification effect on unbound granular materials. The theory of tensile stress modification was proposed and discussed. Seven granular constitutive models were applied in finite element analysis and the calculated strains were compared and verified by results measured in the field. It is shown that the stress modification is essential to accurately predict pavement deformation. The distribution of stress attenuation factor in granular layer is plotted and discussed when Uzan model is applied in theory analysis. It is found that the convergent modulus of granular reduces significantly and the tensile stress or strain at the bottom of asphalt layer increases as a result of the stress modification effect.

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WOS 号： 000512683300008

第 77 篇

标　　题： Sbs Content Detection For Modified Asphalt Using Deep Neural Network

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通讯作者： Li, JG (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： This study proposes a prediction model for accurately detecting styrene-butadiene-styrene (SBS) content in modified asphalt using the deep neural network (DNN). Traditional methods used for evaluating the SBS content are inaccurate and complicated because they are prone to produce errors by manual computation. Feature data of SBS content are derived from the spectra, which are obtained by the Fourier-transform infrared spectroscopy test. After designing DNN, preprocessed feature data are utilized as training and testing data and are fed into the DNN via a feature matrix. Furthermore, comparative studies are conducted to verify the accuracy of the proposed model. Results show that the mean square error value decreased by 68% for DNN with noise and dimension reduction. The DNN-based prediction model showed that the correlation coefficient between the target value and the mean predicted value is 0.9978 and 0.9992 for training and testing samples, respectively, indicating its remarkable accuracy and applicability after training. In comparison with the standard curve method and the random forest method, the precision of DNN is greater than 98% for the same test conditions, achieving the best predicting performance.

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WOS 号： 000522104500003

第 78 篇

标　　题： Effect Of Nanoclays On Moisture Susceptibility Of Sbs-Modified Asphalt Binder

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Moisture susceptibility plays an important role in the damage of asphalt pavement. Failure occurs when asphalt is removed from the aggregate particles due to the decreased adhesion between the asphalt and aggregate in comparison with that between water and the aggregate. In recent years, efforts utilizing nanomaterials to improve the diverse properties of asphalt have proven to be effective. In this study, three types of

nanoclays were used to modify styrene-butadiene-styrene- (SBS-) modified asphalt. The resistances to water damage of the modified binders were evaluated using the surface free energy (SFE) and atomic force microscopy (AFM). The results revealed that the total SFE decreased and the energy ratio (ER) increased when the asphalt binder was modified with the nanoclays, indicating that the addition of nanoclays can improve the moisture resistance of these aggregate-binder systems. After immersion, a decreased amount of bee structures was observed in both the SBS and nanoclay-modified asphalts due to the interactions between water and bitumen. However, the residual amount of bee structures was higher in the nanoclay-modified asphalts than in the SBS-modified asphalt, indicating that the addition of nanoclay makes the surface morphology of asphalt more resistant to water damage. Finally, freeze-thaw splitting tests were used to verify the results obtained through the SFE and AFM tests.

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WOS 号： 000522103300005

第 79 篇

标　　题： Temperature-Based Criteria For Opening Newly Laid Repaired Asphalt Pavement Sections To Traffic

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期　　刊： TRANSPORTATION RESEARCH RECORD

摘　　要： To avoid premature damage, a newly laid asphalt pavement repair must be allowed to cool sufficiently before opening to air traffic. This study examines the variations of temperature within different repaired asphalt layers during cooling, and makes recommendations with regard to the choice of temperature-based criteria for determining the earliest time to open a newly laid asphalt pavement section to air traffic in a busy airport. Using finite element simulation analysis, the cooling patterns of asphalt layers under the following conditions were studied: three different weather conditions (sunny daytime, cloudy daytime, and nighttime) with three different wind speeds. It is shown that the common practice of relying on surface temperature to determine the time for opening to traffic is unsatisfactory. This is because under most paving conditions, a large proportion of the newly laid asphalt layer would still have temperatures higher than the surface temperature. From finite element analysis for different paving and environmental conditions, it is recommended that the temperatures at an interior point be measured at either 1/2, 2/3, or 3/4 depth, and that nighttime paving be preferred. This study shows that for common asphalt pavement repairs of thicknesses up to 150 mm, taking the temperature at either 2/3 or 3/4 depth as the guide, a repaired asphalt layer, when opened to air traffic, would have its internal maximum temperature kept within 2 degrees C of the preset maximum allowable temperature. If

the 1/2 depth temperature is selected as a guide, a margin of within 4 degrees C of the preset maximum allowable temperature can be achieved.

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WOS 号： 000517901100001

第 80 篇

标　　题： Preparation And Repeated Repairability Evaluation Of Sunflower Oil-Type Microencapsulated Filling Materials

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期　　刊： JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY

摘　　要： Cracks are the main challenges for asphalt pavement, which should be timely repaired. One of the most commonly used repairing methods is to fill the binding materials into cracks, but the repeated repairing ability is insufficient. The self-healing microcapsule technologies provide the potentials for enhancing the repeated repairing ability of filling materials. Therefore, the microcapsule core material was selected from sunflower oil in this study, and the capsular wall material was selected from melamine-urea-formaldehyde resin, which was used to prepare the microcapsule by using in-situ polymerization method. Three kinds of microcapsules with different particle sizes were prepared by adjusting the emulsifier dosage and core wall ratio. The microstructure, molecular structure, thermal stability, and dispersion features were further studied, and the effects of microcapsules with different particle sizes on the repeated repairability of the filling materials were evaluated via the fatigue-repair-fatigue test. In addition, the traditional regenerative microcapsules were compared to determine the optimal particle size range for sunflower oil microcapsules. According to the experimental research, it was thus concluded that the emulsion droplet size distribution was most concentrated when the emulsifier content was 0.7%; and when the core-wall ratio was 1.3:1, the microcapsules had uniform particle size and good dispersion effect. When the microcapsule emulsification rate was 900 rpm and microcapsule content was 2%, then the repeated repair effect for the microcapsule crack filling materials was optimal. The sunflower oil type microcapsule therefore meets the filling temperature requirement for the filler.

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WOS 号： 000484782900028

第 81 篇

标　　题： Effect Of Microwave-Activated Crumb Rubber On Reaction Mechanism, Rheological Properties, Thermal Stability, And Released Volatiles Of Asphalt Binder

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： Waste crumb rubber (CR) can be used in asphalt pavement construction to develop eco-friendly and sustainable pavements. The objective of this study was to investigate the reaction mechanism, high-temperature properties, thermal stability, and volatiles released by CR-modified asphalt (CRMA) activated using microwaves (i.e., ACRMA). The chemical characteristics determined via Fourier-transform infrared spectroscopy revealed that mainly physical reactions occurred in the CRMA before and after activation; however, the swelling reaction in the ACRMA was more efficient than that in the CRMA. These results were confirmed by gel permeation chromatography and atomic force microscopy. The high-temperature performance of the ACRMA was slightly better than that of the CRMA. Additionally, according to stress creep and recovery test results, the microwave activation reduced the stress sensitivity of the rubber-modified asphalt. Thermogravimetric curves indicated that the microwave activation reduced the decomposition temperature of the rubber-modified asphalt. Moreover, the total amount of released volatiles for the base asphalt was significantly larger than that for rubber-modified asphalts, indicating that the CR suppressed the total amount of released volatile gases from the asphalt during the pyrolysis of asphalt. But the addition of CR can increase the release of some toxic gases in CRMA and increase the toxicological potential of asphalt fumes. However, in the initial pyrolysis of rubber asphalts, microwave treatment can reduce the generation of toxic gases. In the later stages of this process, the introduction of rubber particles before and after activation has little effect on the released volatiles. (c) 2019 Elsevier Ltd. All rights reserved.

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第 82 篇

标　　题： Effects Of Surface Texture On Tire-Pavement Noise And Skid Resistance In Long Freeway Tunnels: From Field Investigation To Technical Practice

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期　　刊： APPLIED ACOUSTICS

摘　　要： In order to effectively control tire-pavement noise in long freeway tunnels, this study aims to determine suitable low-noise pavement texture. The main indicators evaluated include texture parameters, A-weighted sound pressure level, octave, sideway force coefficient and the actual unit cost of building single texture. Sound signals at the

tire-pavement interface are detected by the OBSI system without the influence of other nearby sources, then acquired by Dewesoft system and sent to a laptop computer for post-processing on Coinv DESPET software platform. The continuous friction tester is used to measure sideway force coefficient on each pavement surface at same vehicle speed. All testing efforts are based on previous investigation sections and two specially constructed long freeway tunnel sections with various specific textures. Afterwards, the technique for order preference by similarity to ideal solution, is adopted for the final comprehensive evaluation. The study found that the freeway tunnel is a hostile acoustic environment. The tire-pavement noise inside the tunnel is about 20 dB(A) higher than the external normal sections, whether it is asphalt pavement or cement concrete pavement. In addition, the longitudinal equidistant groove with large center spacing of 25 cm, not only help eliminates the pumping noise but prevents the side sliding of vehicles, is considered to be an effective technique on the premise considering economic cost. Also note that, the section near the tunnel entrance belongs to the transition zone of tire-pavement noise and a bottom area of skid resistance. The transverse unequal spacing groove can yet be regarded as a suitable choice for this section and wet section inside the tunnel. What is more, an interesting finding is that there is no direct correlation between tire-pavement noise and sideway force coefficient, regardless of groove textures. This means that a quieter pavement texture can be obtained without hindering the skid resistance. In this sense, the findings of this study may provide a little practical reference to create a quiet, safe, surface texture suitable for the long freeway tunnels.

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WOS 号： 000512474600013

第 83 篇

标　　题： Seismic Fragility Analysis Of V-Shaped Continuous Girder Bridges

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期　　刊： KSCE JOURNAL OF CIVIL ENGINEERING

摘　　要： This paper presents an improved approach for evaluating seismic performance of V-shaped continuous girder bridges with different V-angles. A 3-D finite element model is established using the OpenSees for tracing the response of a typical three-span V-shaped continuous girder bridge. The analysis is performed in three steps: component fragility analysis, validated system fragility analysis and V-angle analysis. A series of nonlinear time history analysis (NLTHA), considering the uncertainty in bridge structural parameters and ground motions characteristics, is carried out to investigate the potential fragile position of a V-shaped continuous girder bridge. Subsequently, a new improved product of conditional marginal (PCM) method is validated successfully and utilized to form the system fragility curves. The application of the validated method is used to analyse the influence of V-angle on the bridge structural system fragility. The analysis result shows that variation of V-angle has significant influence on seismic

fragility of V-shaped continuous girder bridges. The V-shaped continuous girder bridges with 80 degrees V-angle has good seismic performance when PGA <= 0.8 g. Smaller V-angle can result in higher seismic fragility of V-shaped continuous girder bridges.

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WOS 号： 000512984200014

第 84 篇

标　　题： Field Measurement Of Air Temperature In A Cold Region Tunnel In Northeast China

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期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY

摘　　要： In this paper, a comprehensive measurement of air temperature in Zuomutai tunnel in China was conducted. Meteorological monitoring was performed at both outsides of the tunnel. The results show that the air temperature in the whole tunnel changes periodically with the ambient air temperature out of the tunnel in an approximately trigonometric function, even if the tunnel length is approximately 3000 m and the height is 7.1 m. The lowest temperature is lower than -8 degrees C. In winter, the air temperature outside the tunnel is lower than that inside the tunnel, which causes the dominant airflows from the low elevation portal to high elevation portal. It is contrary in summer. Therefore, the temperature changes in the sections at the two sides of the tunnel are different, and the temperature distributions are asymmetrical along the tunnel length. The air temperature at the tunnel vault is generally higher than that at the waist and side wall in winter, especially nearby the dominant airflow outlet. With the temperature rising, the temperature difference decreases. The sharp rises or drops of air temperature in the tunnel caused by the intermittent traffic winds or natural winds blowing to the tunnel are transient. The air temperature will soon return to the overall change trend. The results can provide references for frost-proof design in cold region tunnels.

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WOS 号： 000512978000001

第 85 篇

标　　题： Settlement Behaviors Of Existing Tunnel Caused By Obliquely Under-Crossing Shield Tunneling In Close Proximity With Small Intersection Angle

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期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要：As an increasing number of metro tunnels are being constructed in congested urban areas, it is inevitable that new tunnels are being constructed in close proximity to existing tunnels. The settlement behaviors of existing tunnel caused by under-crossing tunneling have been intensively investigated; however, settlement characteristics of an existing tunnel caused by under-crossing tunneling in close proximity with small intersection angle is rarely explored. To fill this gap of knowledge, this paper presents a special case study of a shield tunnel obliquely constructed in close proximity to an above existing tunnel with a small intersection angle. Based on monitoring data and numerical simulations using finite difference method (FDM), the settlement characteristics of the existing tunnel were studied. The field monitoring data indicates that the deformation of existing tunnel caused by shield tunneling underneath was dominated by vertical settlement, accompanied by torsional deformation. The existing tunnel experienced the largest settlement and torsional deformation in the intersection zone. The numerical simulation results confirm that existing tunnel tracks experience vertical settlement and torsional deformation, which are in line with the field monitoring results; the settlement trough of existing tunnel becomes increasingly wide and deep with advancement of the under-crossing tunneling. The position of the maximum settlement moves in the direction of tunnel advancing but ultimately stays still in the intersection zone.

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WOS 号：000514214800015

第 86 篇

标　　题：Shield-Driven Induced Ground Surface And Ming Dynasty City Wall Settlement Of Xi'An Metro

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期　　刊：TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要：The influence of metro shield construction in congested urban areas on nearby buildings is of great concern in practice. In this study, 3D-FEM model, validated through comparison with field monitoring results were used to investigate the influence of Xi'an Metro Line 4 excavation on existing city wall of the Ming Dynasty at Heping Gate in loess ground. The research results were found to be in good agreement with field measurement results. Furthermore, the results indicated that because of pre-reinforcement by sleeve valve pipe grouting and supporting by I-shaped steel at openings, the surface settlement within the foundation area on the city wall is reduced

by 4 mm compared with that without the reinforcement, and the settlement of the city wall structure is reduced by approximately 2.2 mm, which prevents excessive local heave of the city wall foundation and out-oflimit of inclination. Additionally, the settlement-time curves of the city wall structure and change laws of surface settlement slot were also obtained. This study provides a valid reference value for protecting historical buildings adjacent shield construction in similar loess areas.

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WOS 号： 000514214800003

第 87 篇

标　　题： Continuum Analysis Of The Structurally Controlled Displacements For Large-Scale Underground Caverns In Bedded Rock Masses

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期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要： Large displacements controlled by the motion of layered rock strata usually pose a high hazard to the stability of high sidewalls of the underground caverns in bedded rock mass. Timely and accurate prediction of structurally controlled displacement can provide more reasonable guidelines for supporting measures during cavern excavation. In this study, an approach integrating the continuum modeling and microseismic (MS) monitoring data, was proposed to quantitatively predict the structurally controlled displacements in bedded rock masses surrounding large-scale underground caverns. First, a comprehensive method based on the MS data was adopted for judging the fracture type of bedded rock mass, and this method was validated by field surveys. Second, the damage scope of the bedded rock mass caused by each MS event was determined on the basis of fracture types. A damage model based on the MS data was successfully developed to be embedded into three-dimensional continuum modeling. Finally, our proposed method was verified by comparing its predictions with the actual data. Good agreements indicated that the large deformations induced by the rotation of layered rock strata with long deformed length, can be fully predicted using the damage model. Complicated geological structures can even be ignored when establishing the three-dimensional continuum model. The reasonable scope of potential failure region can be revealed by the predicted deformation mode, which verified the damage scope corresponding to each MS event.

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第 88 篇

标　　题： Development And Performance Of A Piezoelectric Energy Conversion Structure

Applied In Pavement

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期　　刊：ENERGY CONVERSION AND MANAGEMENT

摘　　要：This paper presents a multi-layer cantilever piezoelectric energy conversion structure for pavement, which avoids weakening the electrical output after the mass contact and realizes the coordinated vibration of each cantilever piezoelectric energy harvester and road driving. In order to ensure the structure meets the requirements of power generation and durability when applied in road engineering, based on the power generation theory of energy harvester, the structural parameters related to the electrical output magnitude are clarified. Based on the power generation performance and durability of energy conversion structure under typical road traffic characteristics, the optimal cantilever position and vibration amplitude are determined, which lay the foundation for the development and application of energy harvester in road field. The results indicate that the improved structure has the best power generation performance and durability with the condition of the distance from the piezoelectric material to the fixed end of 7 mm and the vibration amplitude of 4 mm under under typical road traffic conditions. The output voltage of the monolithic energy harvester at 5 Hz vibration frequency is 5.2 V, the output power can reach 3.14 mW, and the power density is 0.0063 mW/mm(3). This power level and power density are significantly higher than other mechanisms. The structure will make it possible to co-vibrate with the driving, and the structural parameters avoid the misunderstandings of traditional designs that only the power generation performance is valued and the durability can be ignored, which make the structure can be used for collecting electric energy in pavement.

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第 89 篇

标　　题：High-Performance Semi-Flexible Pavement Coating Material With The Microscopic Interface Optimization

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期　　刊：COATINGS

摘　　要：This paper aims to optimize the asphalt-mortar interface characteristics of semi -flexible

pavement coating material (SFPCM), three types of the interface modifiers, namely the silane coupling agent, carboxylated styrene-butadiene latex, and cationic emulsified asphalt, are selected to add into the cement mortar to optimize the asphalt-mortar interface. The microscopic characteristics of the asphalt-mortar interface and the macroscopic pavement performance of the SFPCM after the interface optimization are investigated to reveal the effect of interface modifiers and determine the best formula. Results show that: (1) The dry shrinkage of the cement mortar is increased with the increased dosage of the interface modifiers, while the strength is decreased accordingly; (2) the optimum dosages of the silane coupling agent, carboxylated styrene butadiene latex, and cationic emulsified asphalt are 0.5%, 10%, and 5%, respectively; (3) the microscopic asphalt-mortar interface characteristics of the SFPCM with different interface modifiers have significant differences; (4) the SFPCM with the cationic emulsified asphalt presents the best pavement performance, particularly the high-temperature stability. These results can be attributed to improve the pavement properties of SFPCM.

DOI： 10.3390/coatings10030268
WOS 号： 000524211800073

第 90 篇

标　　题： Development And Performance Evaluation Of Cold-Patching Materials Using Waterborne Epoxy-Emulsified Asphalt Mixtures

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期　　刊： MATERIALS

摘　　要： Patching is one of the most common maintenance methods for potholes in roads. In order to improve the performance of cold-patching asphalt mixtures, an emulsified asphalt modified with waterborne epoxy resin was developed. Two waterborne epoxy resins and two curing agents were selected. The optimal experimental contents of the curing agents were obtained by measuring the compressive strength of the waterborne epoxy mortar (WEM) under different curing agent contents and curing period. The difference between the two waterborne epoxy resins was obtained by the flexural strength and stress-strain curves, which were measured by the modified bending test on the WEM. The evaluation method of the initial strength and forming strength of the waterborne epoxy emulsified asphalt mixture (WEEAM) was proposed by the experimental study of the compaction molding method and curing conditions. The high temperature performance, low temperature performance, and moisture susceptibility of the mixture were verified by comparing various kinds of WEEAM. The results show that using WEEAM as a road repair material has great advantages in improving pavement performance and road service levels.

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WOS 号： 000524060200202

第 91 篇

标　　题：Porosity Prediction Of Granular Materials Through Discrete Element Method And Back Propagation Neural Network Algorithm

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：Granular materials are used directly or as the primary ingredients of the mixtures in industrial manufacturing, agricultural production and civil engineering. It has been a challenging task to compute the porosity of a granular material which contains a wide range of particle sizes or shapes. Against this background, this paper presents a newly developed method for the porosity prediction of granular materials through Discrete Element Modeling (DEM) and the Back Propagation Neural Network algorithm (BPNN). In DEM, ball elements were used to simulate particles in granular materials. According to the Chinese specifications, a total of 400 specimens in different gradations were built and compacted under the static pressure of 600 kPa. The porosity values of those specimens were recorded and applied to train the BPNN model. The primary parameters of the BPNN model were recommended for predicting the porosity of a granular material. Verification was performed by a self-designed experimental test and it was found that the prediction accuracy could reach 98%. Meanwhile, considering the influence of particle shape, a shape reduction factor was proposed to achieve the porosity reduction from sphere to real particle shape.

DOI：10.3390/app10051693

WOS 号：000525298100141

第 92 篇

标　　题：Permeability Evaluation Of Clay-Quartz Mixtures Based On Low-Field Nmr And Fractal Analysis

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：Nuclear magnetic resonance (NMR) technology has been widely used for predicting permeability coefficients of porous medium, such as shales, sandstones, and coals. However, there have been limited studies on the prediction model of clay-quartz mixtures based on NMR technology. In this study, evaporation tests at 40 degrees C and NMR tests were simultaneously performed on eight clay-quartz mixtures with different mineral compositions. The results show that during the evaporation process, the decay rate of T-2 total signal amplitudes was constant at first, and then decreased to 0 after a period of time. Based on the decay rate, the evaporation process was divided into two

stages: the constant rate stage and the falling rate stage. Based on the two stages, the T-2 cut-offs of eight mixtures were determined. The water in the mixture was divided into two parts by the T-2 cut-off: the free water and the bound water. The prediction model of permeability coefficients of clay-quartz mixtures was established based on the Timur-Coates model. In order to simplify the process of predicting the permeability coefficient, fractal analysis was used to develop the relationship between the T-2 cut-off and fractal dimension of the T-2 spectrum of saturated mixture. A simplified method for predicting permeability coefficients of clay-quartz mixtures based on NMR technology without centrifugal and evaporation experiments was also proposed.

DOI： 10.3390/app10051585
WOS 号： 000525298100033

第 93 篇

标　　题： Failure Models Of A Loess Stacked Dam: A Case Study In The Ansai Area (China)

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期　　刊： BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要： A loess dam is not fully compacted, so there may be a high permeability area in a loess dam. The seepage channel appears inside the dam body, and osmosis damage occurs; these events cause the dam body to be unstable and destroyed. In this paper, the loess dam in the Ansai Area, Yan'an, Shaanxi Province, China, is used as an example monitoring target, and the whole life cycle of the dam is monitored by measuring cracks, liquid level and pore pressure. The timeline regarding multiple instances of damage during the period is used as the basis for subdividing the whole life cycle, and dam damage types are distinguished according to the internal factors and external conditions. By analysing the on-site monitoring data, the dam experienced three obvious types of damage from the onset of monitoring until the dam broke. The triggering factors of the three damage types differ. One factor type is the difference in liquid levels on the two sides of the dam and the seepage channel that is then formed inside the dam. The fine-grained soil in the dam is removed from the seepage channel under the action of hydrodynamic force, the soil at the foot of the dam slope tends to be saturated under the action of osmotic water and the shear strength of the dam slope is reduced. When the soil weight of the upper soil is greater than the shear strength of the soil at the foot of the dam, the first damage type occurs; therefore, it is called internal erosion damage. The second type of damage is attributed to the softening of the dam feet under immersion by rainwater, resulting in the dam collapse; it is called slumping damage. The third type of damage is due to the infiltration of rainwater through a crack at the top of the dam. The soil at the top of the dam slides along the rainwater intrusion

surface, and the width of the dam top is continuously decreased until it completely disappears; therefore, it is called slippery damage. On that basis, the loess dam failure modes are proposed due to the difference in hydrodynamic forces on the two sides of the dam and formation of a seepage channel. The fine-grained soil is removed from the seepage channel under the action of hydrodynamic force. The seepage channel is continuously expanded, the soil at the foot of the dam is saturated under the action of seepage water, the soil shear strength is reduced, the dam body becomes unstable and the width of the dam crest is decreased. Under the joint action of infiltration and rainfall, the dam begins the next round of infiltration and erosion and the width of the dam roof continues to decrease. The cycle continues as the width of the dam roof is continuously reduced until overtopping occurs.

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WOS 号： 000526054700029

第 94 篇

标　　题： Influences Of Pavement Material And Structure On The High-Temperature Stability Of Double-Layer Pavements

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： Double-layer paving technology is a new construction technique for asphalt pavements. Few laboratory studies have been conducted on the influences of pavement layer thickness and mixture types on the high-temperature stability of double-layer pavement surfaces. This paper aims to evaluate the effectiveness of different paving technologies, mixture type combinations, and structural layer thickness combinations on the high-temperature stability of pavement surfaces. The results indicate a 15% improvement in the dynamic stability of double-layer paving and a 7% reduction in rutting deformation relative to that of conventional paving. Compared to the AC-13/AC-25 combination, the AC-16/AC-20, AC-16/AC-25, and AC-13/AC-20 mixture type combinations enhance dynamic stability by at least 69%, 58%, and 26%, respectively, and decrease rutting deformation by at least 18%, 5%, and 3%, respectively. Thickness combinations of 4/6 cm and 3/7 cm improve dynamic stability by at least 35% and 67%, respectively, and decrease rutting deformation by at least 14% and 26%, respectively, compared to the 5/5 cm thickness combination. To effectively improve the high-temperature stability of pavements, a double-layer pavement structure

with a 3 cm AC-16 surface layer and a 7 cm AC-20 bottom layer is recommended. The pavement compaction and roughness of double-layer paving meet the standard requirements, as verified, through field testing.

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第 95 篇

标　　题： Performance Characteristics Of Cold-Mixed Porous Friction Course With Composite-Modified Emulsified Asphalt

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： A cold-mixed porous friction course (PFC) with waterborne epoxy resin/polyurethane composite-modified emulsified asphalt was prepared to improve the skid resistance and durability of pavement in hot and rainy areas. The technical parameters of the different structural layers of the cold-mixed PFC were determined. The high-temperature performance, abrasion resistance, water stability, and permeability of the cold-mixed PFC wear layer were investigated systematically. The skid resistance of the cold-mixed PFC wear layer, microsurfacing, and chip seal under different rainfall conditions was compared, and the open traffic time of cold-mixed PFC construction was analyzed. The results showed that the wear layer of cold-mixed PFC exhibited excellent high-temperature performance, abrasion resistance, water stability, and permeability. The skid resistance of the cold-mixed PFC wear layer was less affected by rainfall. When the rainfall intensity was 35mL/s/m2, the British pendulum number (BPN) values of the wear layer of cold-mixed PFC-5 and PFC-8 were 66 and 73 BPN, respectively. The early strength of the different structural layers of cold-mixed PFC forms quickly, which can ensure the rapid opening of traffic after construction.

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WOS 号： 000526721700020

第 96 篇

标　　题： Research On Molecular Weight Distribution And Rheological Properties Of Bitumen During Short-Term Aging

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：In recent years, asphalt pavements have been widely used due to their desirable properties: safety, smoothness, and durability. However, the aging of bitumen during its service period is inevitable, so the performance of asphalt pavement will decline. Thus, it is necessary to investigate the aging mechanism systematically to offer a new way of illustrating changes during the aging process, and the investigation of the short-term aging mechanism could be a first step. This study explored the variations of rheological properties and molecular weight distribution during the aging process, and the data obtained by gel permeation chromatography (GPC) were analyzed by principal component analysis. The experiments in this research include preparing aged bitumen samples under five aging temperatures and six aging durations, and then tests were performed using a dynamic shear rheometer (DSR), bending beam rheometer (BBR), and GPC. The results indicate that the aging increased complex modules (G*), creep stiffness (S), and fatigue resistance index (Nf) but decreased phase angle (delta) and m-values. In addition, the transformation from medium molecular size to large molecular size was found to be the most significant phenomenon during the aging process. Moreover, during the aging process of bitumen, the molecular weight distribution index polydispersity index was found to have the best correlation with rheological properties.

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第 97 篇

标　　题：Investigation Into Creep Characteristics And Model Of Recycled Construction And Demolition Waste Used In Embankment Filler

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期　　刊：SUSTAINABILITY

摘　　要：The creep deformation of recycled construction and demolition waste (CDW) filler is an important factor affecting road performance. In this paper, a series of laboratory tests, including a compaction test, sieving test, California bearing ratio (CBR) test, creep test and unloading test are conducted on CDW filler. The engineering properties of different ratios of CDW mixture are systematically analyzed, the CBR value of CDW filler meets the requirements of an embankment. The creep type of CDW filler under a test load is stable creep, the results of the creep characteristics are analyzed from a microscopic point of view. The filler with a 7:2:1 ratio (brick slag: concrete: mortar) has the densest structure, which is dense and less porous, and the deformation is the smallest. Reasonable proportion control is the key to reducing embankment deformation. The improved Burgers model, which can better describe the creep

characteristics of CDW filler, and the effects of load and ratio on the creep parameters are analyzed using the equivalent creep compliance. This study is of great significance for the promotion of CDW and meets the requirements of sustainable development.

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WOS 号： 000522470900225

第 98 篇

标　　题： A Model For Estimating Passenger-Car Carbon Emissions That Accounts For Uphill, Downhill And Flat Roads

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期　　刊： SUSTAINABILITY

摘　　要： The geometric longitudinal slope line of a given road significantly effects the carbon emissions of vehicles traversing it. This study was conducted to explore the carbon emission rules of passenger cars on various highway slopes. The law of conservation of mechanical energy, the first law of thermodynamics and the vehicle longitudinal dynamics theory were utilized to determine the influence of slope design indicators on fuel consumption. The energy conversion, fuel consumption, and carbon emission models of passenger cars on a flat straight road, uphill road, and downhill road sections were derived accordingly. Two types of passenger cars were selected for analysis. A field test was carried out to verify the proposed model where the vehicle maintained a cruise speed on flat straight road, uphill road and downhill road with equal gradient and mileage, and continuous longitudinal slope to gather fuel consumption data. The proposed model showed strong accuracy and a maximum error of 9.97%. The main factor affecting the vehicle's carbon emissions on the continuous longitudinal slope was found to be the average gradient. For a round-trip longitudinal slope with a small gradient, the main factor affecting the vehicle's carbon emissions is speed: higher speed results in higher carbon emissions. The results of this study are likely to provide the data for support and a workable reference for the low-carbon highway design and operation.

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第 99 篇

标　　题： A Novel Approach For Mixed Manual/Connected Automated Freeway Traffic Management

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期　　刊：SENSORS

摘　　要：Freeway traffic management and control often rely on input from fixed-point sensors. A sufficiently high sensor density is required to ensure data reliability and accuracy, which results in high installation and maintenance costs. Moreover, fixed-point sensors encounter difficulties to provide spatiotemporally and wide-ranging information due to the limited observable area. This research exploits the utilization of connected automated vehicles (CAVs) as an alternative data source for freeway traffic management. To handle inherent uncertainty associated with CAV data, we develop an interval type 2 fuzzy logic-based variable speed limit (VSL) system for mixed traffic. The simulation results demonstrate that when more 10% CAVs are deployed, the performance of the proposed CAV-based system can approach that of the detector-based system. It is demonstrated in addition that the introduction of CAVs may make VSL obsolete at very high CAV-equipment rates.

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第 100 篇

标　　题：Fatigue Behavior Of Integral Built-Up Box Y-Joints Between Concrete-Filled Chords With Perfobond Ribs And Hollow Braces

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期　　刊：JOURNAL OF STRUCTURAL ENGINEERING

摘　　要：A novel integral built-up box Y-joint welded to rectangular hollow section braces and concrete-filled square hollow section chord stiffened by perfobond ribs was proposed and studied in fatigue. Eight specimens, including one control with a hollow chord, were tested under axial loadings in the brace. Static tests initially were conducted to estimate the hot-spot stresses in the brace-chord weld intersection and at the arc transition point of the gusset plate. Stress concentration factors (SCFs) were compared with those of the hollow chord specimen to assess the influence of concrete fill and perfobond ribs. Fatigue tests then were carried out to failure under cyclic tension force in the brace. Crack initiation locations, crack propagations, failure modes, and the corresponding fatigue data were recorded. Using test results, the design S-r,S-hot-N-f curve for the proposed joint based on hot-spot stress method was established, adopting the least-squares method considering a 95th percentile. The S-r,S-hot-N-f curves of the proposed joint and conventional welded joints without gusset plate were compared for both square and circular braces connected to square chords. Additionally, the S-r,S-hot-N-f curves were compared with those in available design guides. It was shown for the proposed joint that SCFs are significantly lower than for joints with hollow chords and its fatigue strength is much higher than other conventional joints. One design guide S-r,S-hot-N-f curve was shown to overestimate the fatigue strength of

the proposed joint, however, curves from other design guides underestimated its fatigue strength. (C) 2019 American Society of Civil Engineers.

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第 101 篇

标　　题： G-C3N4/Ceo2 Binary Composite Prepared And Its Application In Automobile Exhaust Degradation

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期　　刊： MATERIALS

摘　　要： Vehicle exhaust seriously pollutes urban air and harms human health. Photocatalytic technology can effectively degrade automobile exhaust. This work prepared g-C3N4/CeO2 photocatalytic material by constructing heterojunctions. Four kinds of g-C3N4/CeO2 composite photocatalytic materials with different mass ratios were prepared. An indoor exhaust gas purification test was carried out under natural light and ultraviolet light irradiations. The optimum mass ratio of g-C3N4 material and CeO2 material was determined by evaluating the exhaust gas degradation effective. Moreover, the structure and morphology of the g-C3N4/CeO2 composite were investigated with microscopic characterization experiments (including XRD, TG-DSC, FT-IR, UV-Vis, SEM and XPS). The results obtained were that the optimum mass ratio of g-C3N4 material to CeO2 material was 0.75. The degradation efficiencies under ultraviolet irradiation in 60 min for HC, CO, CO2, NOX were 7.59%, 12.10%, 8.25% and 36.82%, respectively. Under visible light conditions, the degradation efficiency in 60 min for HC, CO, CO2 and NOX were 15.88%, 16.22%, 10.45% and 40.58%, respectively. This work is useful for purifying automobile exhaust in the future.

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第 102 篇

标　　题： Study On The Relationship Between Nano-Morphology Parameters And Properties Of Bitumen During The Ageing Process

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期　　刊： MATERIALS

摘　　要： Thermo-oxidative ageing is one of the main factors affecting bitumen performance. At present, the research on bitumen ageing has entered the micro stage. The purpose of this paper was to study the relationship between nano-morphology parameters and

properties of bitumen of bitumen during the ageing process. To this end, bitumen with different ageing degrees was prepared in this paper, and Atomic force microscopy samples with different cooling rates were prepared. The relationship between ageing degree of bitumen and nano-morphology parameters was analyzed. A functional relationship model between nano-morphology parameters and properties of bitumen was established. The results show that the percentage of bee-like structure area (<mml:semantics>Pbee-like</mml:semantics>), maximum amplitude (<mml:semantics>Hmax</mml:semantics>) and roughness (<mml:semantics>Rq</mml:semantics>) increased with the increase of ageing degree. the percentage of bee-like structure area, the maximum amplitude and the roughness increase with the increase of cooling rate. With the increase of the percentage of bee-like structure area, the maximum amplitude and the roughness, the viscosity of bitumen at 60 degrees C increases, penetration decreases, and softening point increases. There is a nonlinear relationship between the nano-morphology parameters and properties of bitumen.

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第 103 篇

标　　题： Displacement Infiltration Diffusion Model Of Power-Law Grout As Backfill Grouting Of A Shield Tunnel

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期　　刊： EUROPEAN JOURNAL OF ENVIRONMENTAL AND CIVIL ENGINEERING

摘　　要： Shield tunnel is widely adopted in the metro construction, and backfill grouting is the significant part. With power-law fluid grouts as the study object, a cylindrical infiltration diffusion model and spherical infiltration diffusion model are developed by applying the generalized Darcy law and theories of seepage mechanics based on the displacement effect of grout on groundwater. Through examples, the impact of factors including grouting pressure and formation permeability coefficient in the spherical displacement infiltration diffusion model on diffusion radius, flow rate, total pressure of grout in segments, and uniform equivalent pressure in grout diffusion area (grout pressure per unit area in a segment) is analyzed. The result shows that, the diffusion speed, injection flow rate and the pressure received in segments increase with an increase of the grouting pressure. Meanwhile, as the injection time increases, the flow rate of grout under conditions of different grouting pressure all decreases, and a sharp decrease exists. The diffusion speed and grouting pressure are positively correlated to the permeability coefficient, and with the increasement of the injection time, the diffusion displacement of grout in different permeability coefficient varies increasingly, the increase amplitude of the pressure acting on the segment by grout increases gradually.

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WOS 号： 000519361300001

第 104 篇
标　　题： Research On Subgrade Differential Settlement Control Standard And Treatment Technology Based On Driving Comfort
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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING
摘　　要： At present, the geogrid is commonly used to treat the differential settlement of the subgrade at the joint of the filling and excavation effectively. In order to further improve the utilization rate of geogrid in the treatment of subgrade, the driving comfort index was proposed innovatively to control the subgrade differential settlement. Based on the human-vehicle-road coupling system model, the influence of subgrade differential settlement area, subsidence value, and vehicle speed on the maximum vertical acceleration of the human body was analyzed. The correlation between the vertical acceleration of the human body under different vehicle speeds and the differential settlement value was obtained through multiple regression calculations, and the subgrade differential settlement control standard based on driving comfort was proposed. By establishing the finite element model of the cut to fill subgrade, the characteristics of differential settlement at the top surface of the subgrade under different geogrid laying positions, densities, and lengths were calculated and analyzed. In addition, the differential settlement layout scheme of the geogrid disposal subgrade based on driving comfort was proposed, and the effectiveness of the scheme was verified by experiments. The results show that the position and length of the grid are the main factors affecting the treatment effect of the vertical and horizontal cut to fill subgrade. The proposed layout scheme can effectively control the differential settlement of the subgrade and raise the utilization rate of the geogrid. The research results can provide theoretical value and reference for the laying of geogrid in mountainous roads.
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WOS 号： 000522434900001

第 105 篇
标　　题： Influence Of Sampling Interval And Evaluation Area On The Three-Dimensional Pavement Parameters
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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：Three-dimensional (3D) parameters are being increasingly used to characterise the pavement macrotexture. This study explores the influence of the evaluation area and sampling interval on the 3D macrotexture parameters. The point clouds of surfaces with different morphologies are captured by a 3D scanner, and is divided into non-overlapping rectangular areas with different sizes. The original point clouds are diluted to obtain data with different sampling intervals. The parameters concerned include the root-mean-square surface height Sq, the root-mean-square surface slope Sdq, the peak density Spd, the arithmetic mean principal curvature Spc, the volume of the peak material Vmp and the volume of the core material Vmc. The results indicate that parameters calculated within an evaluation area of 80*80 mm(2) can properly represent the macrotexture. The sampling interval influence parameters in the order Spc > Spd > Sdq > Sq, Vmp, Vmc. The conclusions lay the foundation for calculating 3D pavement parameters.

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WOS 号：000519425600001

第 106 篇

标　　题：Environmentally Friendly Traffic Control Strategy - A Case Study In Xi'An City

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期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：Given the increasing painful repercussions of air pollution caused by massive vehicular emissions and the unsustainable development of transport sectors, the integration of traffic models with emission estimation models has been investigated in depth to evaluate the performance of the pre-determined environment-friendly transportation policies. Nevertheless, there is a lack of the optimization approach to design the traffic control strategy combining the coupled models. Therefore, an optimization framework is developed to optimize the traffic control strategies to mitigate the vehicular emissions in the considered network. The proposed framework integrates a macroscopic analytical traffic model with a macroscopic emissions estimation model to account for the vehicle emissions, and then genetic algorithm (GA) is employed to minimize vehicle emissions. A congested urban area in Xi'an city that consists of two signalized intersections is selected for a case study. The performance of the signal plans derived by the proposed framework is compared with the currently in use signal plans via the microscopic simulator AIMSUN. It indicates that the proposed traffic control scheme reduces expected vehicle trip travel time and vehicle emissions of four sorts of pollutants for the considered area. This optimization framework helps traffic operators to design environment-friendly traffic signal control strategy. (C) 2019 Elsevier Ltd. All rights reserved.

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第 107 篇

标　　题： Using Random Heterogeneous Dem Model To Simulate The Scb Fracture Behavior Of Asphalt Concrete

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： A heterogeneous fracture simulation approach based on algorithmic technique and discrete element method (DEM) was developed in this paper for simulating the fracture behavior of asphalt concrete under semi-circular bending (SCB) test. Asphalt concretes were modeled as heterogeneous materials with random aggregate structures and asphalt mastic by a novel algorithm. A bilinear cohesive fracture model was used as the constitutive law for modeling crack initiation and propagation. The simulation approach was verified by experimental results of asphalt concretes with different nominal maximum aggregate sizes (NMAS) at different temperatures. Moreover, the contact force and crack evolution were analyzed to study the failure mechanism of SCB specimen. Lastly, a parametric analysis was performed to investigate the effect of aggregate strength on the fracture behavior of asphalt concrete. Results showed that simulation results agreed well with the experimental results at different test conditions. NMAS, temperature and aggregate strength had significant influences on the hardening and softening behavior as well as crack propagation paths. The fracture failure mechanism of SCB specimen was mainly attributed to the tension force. The random heterogeneous fracture simulation approach has significant potential to aid in understanding the fracture mechanism of asphalt concrete, and reduce the required number of expensive and time-consuming experimental tests. (C) 2019 Elsevier Ltd. All rights reserved.

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第 108 篇

标　　题： Effects Of Alumina Trihydrate (Ath) And Organic Montmorillonite (Ommt) On Asphalt Fume Emission And Flame Retardancy Properties Of Sbs-Modified Asphalt

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The objective of this study was to evaluate the flame retardancy and emission properties of asphalt binders containing ATH and OMMT. Limit oxygen index test was performed

to evaluate the flame retardancy of each asphalt binder. Volatile organic compound (VOC) emission properties of the asphalt mixture in the mixing process were investigated using a designed test method. Thermogravimetry and Fourier transform infrared spectroscopy were used to evaluate the thermal stability and volatile-release properties of the asphalt binders. The results indicated that both ATH and OMMT effectively suppress the VOC release of the modified asphalt. The flame retardancy and VOC-emission properties of the OMMT/ATH modified asphalt were significantly improved. The addition of ATH/OMMT delayed the thermal decomposition and exhibited good thermal-insulation performance, reducing the heat release during asphalt combustion. Additionally, The ATH/OMMT compounds prevented the breakage of molecular chains in the asphalt, promoting the charring of the asphalt during combustion. According to the engineering-property tests of modified asphalt mixtures, the ATH/OMMT significantly improved the high-temperature performance of the asphalt mixture. However, it slightly reduced the thermal-cracking resistance and moisture susceptibility of the asphalt mixture. (C) 2019 Elsevier Ltd. All rights reserved.

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第 109 篇

标　　题： Simple Prediction Model For Plastic Deformation Of Graded Crushed Stone Base For Flexible Pavement

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通讯作者： Chen, ZD (corresponding author), Changan Univ, Minist Educ, Key Lab Special Area Highway Engn, Xian 710064, Peoples R China.

期　　刊： MATERIALS AND STRUCTURES

摘　　要： Plastic deformation behaviour of graded crushed stone (GCS) base affects the service life of flexible pavement. This paper presents a simple prediction model to characterize the plastic deformation behaviour of GCS base. A relative deformation model was proposed based on the deformation model developed by Perez. The plastic deformation test was conducted using a rutting tester under different moisture contents, test times, aggregate gradations and load stresses, respectively. The model coefficients were calibrated, and the model was validated by comparing the measured value and predicted value of relative deformation under different test conditions. The plastic deformation model for GCS base, based on the relationship between relative deformation and plastic deformation ratio, was ultimately determined by taking a standard stress of 0.7 MPa and the plastic deformation of GCS in the 60th min corresponding to this stress as the reference standard. The correlation coefficient (R-2 > 98%) indicates that the developed model has a desirable prediction accuracy. The developed model can be used to predict

the plastic deformation of GCS base, evaluate its plastic deformation performance and provide support for highway maintenance management.

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第 110 篇

标　　题： Refined Vehicle-Bridge Interaction Analysis Using Incompatible Solid Finite Element For Evaluating Stresses And Impact Factors

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The vehicle-bridge interaction can induce bridge vibration and consequently fatigue, durability deterioration, local damage, and even collapse of bridge structure. In this paper, a solid vehicle-bridge interaction (VBI) analysis method is developed to provide refined analysis on the bridge responses including displacement and local stress under vehicle loads. The incompatible solid finite element (FE) is introduced to model the bridge, where the element shear locking is alleviated by incompatible displacement modes without sacrificing the computational efficiency. Benchmark example shows the incompatible solid element has superior computational efficiency compared to the conventional solid element. By virtue of the mass-spring-damper vehicle model, the interaction between vehicle and bridge is simulated with point-to-point contact assumption and the coupled dynamic equations are solved via nonlinear iteration. A case study on a simply supported T-girder bridge is conducted to validate the developed solid VBI analysis method and then the dynamic impact factor (DIF) of the bridge is evaluated based on the computed stress results and compared to code values. Results show that the solid VBI analysis method yields more accurate time-history bridge responses including displacement and stress under moving vehicles than the grillage method despite higher computational cost. Particularly, it can simulate realistic stress distribution and concentration along any concerned sections as well as in local components, which can provide detail information on the bridge behavior under dynamic loads. On the other hand, the DIF based on the computed stress result generally agrees well with the code values except for heavy vehicles where the stress-based DIF is slightly higher than the value in Chinese code while lower than that of AASHTO, suggesting the value specified by Chinese code may underestimate the DIF of heavy vehicles in certain circumstances to which more attention should be paid.

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WOS 号： 000522368500003

第 111 篇

标　　题： Research On The Impact Of Mineral Type And Bitumen Ageing Process On Asphalt-Mineral Adhesion Performance Based On Molecular Dynamics Simulation

Method

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期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：The chemical compositions of asphalt and mineral type are always related to interface adhesion performance, and further affect the field performance of asphalt mixture. This study aims to evaluate the effects of mineral type as well as bitumen types experiencing different ageing process on the adhesion property of interface. Adhesion energy and adhesion work of different bitumen and mineral combinations were calculated in dry or wet condition. Results show that different asphalt ageing mechanisms have significantly different effects on bitumen-mineral interface adhesion performance. Interfacial adhesion work increases with the increase of asphaltene and resin fractions in bitumen. Both sulfoxide and ketone can effectively improve the interface adhesion between bitumen and mineral. Water adversely affects the adhesion of asphalt-mineral interface. Calcite-bitumen has excellent resistance to water stripping for lower adhesion work loss rate than quartz-bitumen combination no matter what SARA or chemical structure of bitumen.

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WOS 号：000519914400001

第 112 篇

标　　题：Evaluation Of The Cooling Effect And Anti-Rutting Performance Of Thermally Resistant And Heat-Reflective Pavement

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：To reduce asphalt pavement temperature and improve its anti-rutting performance in summer, thermally resistant friction course (referred to as TRFC-13), heat-reflective coating (referred to as HRC) and thermally resistant and heat-reflective coating integrated pavement (referred to as TR-HRC) were developed, and their cooling effect, anti-rutting performance and durability were evaluated. In addition, machine-made sands were applied to improve the anti-skid performance of the coating. The results show that compared with ordinary SMA-13 samples, the surface temperature of the TRFC-13, HRC and TR-HRC samples decreased by approximately 6.8 degrees C, 11.2 degrees C and 13.2 degrees C, respectively. At the air temperature of approximately 40 degrees C, the field road surface temperature of the TRFC-13, HRC and TR-HRC decreased by approximately 7.4 degrees C, 12.2 degrees C and 14.0 degrees C, respectively. The higher the air temperature is, the better the anti-rutting performances of these three kinds of pavement. At the air temperature of 39 degrees C, the dynamic

stability of the TRFC-13, HRC and TR-HRC is 1.56 times, 1.86 times and 1.88 times that of the ordinary SMA-13, respectively. The results also show that HRC has a strong abrasion resistance and that spreading 40 wt% of machine-made sands can ensure the coatings achieve the best British Pendulum Number, without influencing its cooling performance.

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WOS 号： 000517863000005

第 113 篇

标　　题： Moisture Absorption Characteristics And Thermal Insulation Performance Of Thermal Insulation Materials For Cold Region Tunnels

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Laying thermal insulation is one of the common thermal insulation measures to prevent frost damage of tunnels in cold regions and the performance of thermal insulation material directly determines the effectiveness of freeze-proofing and insulation of thermal insulation layer. As an important parameter for evaluating the performance of thermal insulation materials, thermal conductivity is generally affected by density, humidity, temperature and other factors, therefore this paper will mainly focus on when the air humidity in the tunnel is too high, the moisture absorption of insulation materials may occur in the humid environment for a long time, which will lead to the increase of moisture content of insulation materials. Hence tunnels in cold regions, generally exhibit lower temperature conditions, thus the water inside the insulation material is easy to freeze, which will greatly improve the thermal conductivity of the material and reduce its thermal insulation effect. Therefore, it is of great significance to study the thermal insulation performance of cold-regions tunnel thermal insulation materials after moisture absorption and complete freezing.

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WOS 号： 000527320400083

第 114 篇

标　　题： Absorption Characteristics And Shrinkage Mitigation Of Superabsorbent Polymers In Pavement Concrete

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： To explore the absorption characteristics and swelling behaviour of SAPs under different working conditions of pavement concrete, the optical microscopy was conducted to capture the swelling process during the absorption period. Then, the absorption kinetic parameters were deduced, and swelling models were developed at different working temperatures. Furthermore, the humidity and shrinkage of pavement concrete were monitored synergistically at multiple scales with a cloud signal acquisition system, and the pore structures and hydration products were analysed by mercury intrusion porosimetry (MIP) tests and scanning electron microscopy (SEM) observations. The results show that a relatively high temperature increases the SAP absorption and the absorption rate. The hydrophobic interaction of the SAP groups and the hydrogen bonding between the macromolecular chains alter the time point of the gel phase change. Increasing the temperature accelerates the swelling rate of SAP gel network and increases the SAP absorption. Various water film layers emerge and become narrow within the early transient seconds as the SAP particles begin to crosslink and aggregate. A period of accelerated shrinkage occurs within 100 h in the SAP-pavement panel. At 28 days, SAP increases the concrete porosity but refines the pore structure, and additional hydration products are formed.

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WOS 号： 000524007400001

第 115 篇

标　　题： Surface Free Energy Method For Evaluating The Effects Of Anti-Stripping Agents On The Moisture Damage To Asphalt Mixtures

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期　　刊： JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY

摘　　要： The moisture stability of an asphalt mixture was enhanced with cement, hydrated lime, and an anti-stripping agent (called AMR II) to improve the adhesive bond of asphalt with the aggregate. A total of eight asphalt binders and three aggregates (crushed gravel, limestone, and granite) were used for the preparation of different asphalt mixtures. Indirect tensile strength and residual stability tests were carried out to determine the moisture stability. The surface free energy (SFE) of the asphalt binder and aggregates were measured using the sessile drop method and universal sorption device method, respectively. Based on the SFE method, the cohesive, adhesive, and stripping energies of the asphalt and asphalt mixtures were studied. Moreover, the SFE parameters were introduced while analyzing the correlation of the cohesive, adhesive, and stripping

energies of the asphalt with the moisture stability. The results show that the incorporation of a single or compound anti-stripping agent can improve the moisture stability of the asphalt mixture, and the improvement effect of compound agents is greater. Furthermore, the SFE components improved after the addition of the anti-stripping agent. The addition of the anti-stripping agent influenced the cohesive and adhesive energy remarkably, whereas the aggregate type, especially its silica content and specific surface area, has a significant effect on the adhesive and stripping energy of the asphalt mixture. A linear regression analysis suggested that the SFE parameters have a good correlation with the moisture damage properties. The SFE parameters can be used to determine the moisture damage performance, and the SFE method can be used to verify the moisture stability of asphalt mixtures.

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第 116 篇

标　　题： Composite Adaptive Fuzzy Prescribed Performance Control Of Nonlinear Systems

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： This paper proposes an adaptive fuzzy prescribed performance control (PPC) method of a class of uncertain nonlinear systems. Different from the traditional PPC approach that requires the exact values of the initial conditions, by using a new type of performance function, the proposed PPC scheme together with a composite adaptation law works effectively even without the knowledge of initial conditions. Meanwhile, the constructed disturbance observer and fuzzy logic systems can estimate system uncertainties including external disturbances and fuzzy approximation errors. Under the proposed tracking controller, the boundedness of all involved signals is guaranteed, and the tracking errors satisfy the prescribed performance bounds all the time. Finally, simulation results show the efficacy of the proposed method.

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WOS 号： 000524593600003

第 117 篇

标　　题： Nonlinear Deformation Behaviors And A New Approach For The Classification And Prediction Of Large Deformation In Tunnel Construction Stage: A Case Study

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期　　刊： EUROPEAN JOURNAL OF ENVIRONMENTAL AND CIVIL ENGINEERING

摘　　要： Reasonable evaluation and prediction of squeezing condition to avoid large deformation

disaster in tunnels have been an important research issue. In order to accurately and rapidly predict the large deformation under complex geological conditions, this paper proposes a classification and prediction method for quick identification of large deformation in tunnel construction stage in a case study of Muzhailing Tunnel. Previous prediction methods of large deformation are usually based on the stages of geological survey and engineering design, and there are great difficulties in obtaining some prediction indexes in soft and fractured strata, such as uniaxial compressive strength. In this paper, the nonlinear deformation behaviors of surrounding rock were analyzed. The geo-stress condition, strata occurrence, rock strength, rock intactness and groundwater condition were chosen as evaluation indexes (including eight sub-indexes). The classification of large deformation was carried out based on the deformation statistics in Muzhailing Tunnel. And the fuzzy prediction was conducted and compared with other methods in engineering. The comparison results show that the new method has higher accuracy and applicability in predicting the large deformation of weak rock mass. This study provides a new approach for rapid identification and prediction of large deformation in tunnel construction stage.

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WOS 号： 000523671600001

第 118 篇

标　　题： High Temperature Rheological Properties Of High Modulus Asphalt Cement (Hmac) And Its Definition Criteria

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to study the high temperature rheological properties of high modulus asphalt cement (HMAC) and clarify its definition criteria, firstly, three kinds of HMAC binders were prepared with high modulus modifiers and subjected to dynamic shear rheological test (DSR), zero shear viscosity test (ZSV) and multi-stress creep recovery test (MSCR). Based on the tests and analysis, the complex shear modulus (G*), rutting factor (G*/sin d), zero shear viscosity (ZSV) and unrecoverable creep compliance (Jnr) were taken as technical indexes for the performance evaluation of HMAC. Further, through analyzing the consistency of evaluation results of different evaluation indicators and the correlation between evaluation indicators of HMAC binders and HMAC mixtures, the definition criteria of HMAC binder are eventually given. The test results show that the three high modulus modifiers can improve the viscoelastic properties and high temperature properties of the matrix asphalt, but the modification effect is slightly different; the rheological properties index can basically make a consistent evaluation of the high temperature performance of three kinds of HMAC

binders, but the correlation degree is different. The dynamic stability (DS) of the mixture is well correlated with G* (60 degrees C, 10 Hz, 0.1%) (refers to the complex shear modulus measured at 60 degrees C, loading frequency 10 Hz and strain level 0.1%), G*/sin delta (76 degrees C, 5 Hz, 0.1%) (refers to the rutting factor measured at 76 degrees C, loading frequency 5 Hz and strain level 0.1%), zero shear viscosity (60 degrees C) and Jnr. 3.2 (76 degrees C) (refers to the unrecoverable creep compliance measured at the stress level of 3.2kpa and the temperature of 76 degrees C), but the correlation of dynamic modulus (E*) with zero shear viscosity (60 degrees C) and Jnr. 3.2 (76 degrees C) is poor. In summary, it is recommended that HMAC binder should meet both G*(60 degrees C, 10 Hz, 0.1%) >= 60.0 kPa and G*/sin d (76 degrees C, 5 Hz, 0.1%) >= 5.0 kPa, and the definition criteria can be as a design basis for HMAC binder. At the same time, it is recommended to use J(nr 3.2) (76 degrees C) to evaluate the high temperature performance of HMAC. (C) 2019 Elsevier Ltd. All rights reserved.

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第 119 篇

标　　题： Properties Of Polystyrene Grafted Activated Waste Rubber Powder (Ps-Arp) Composite Sbs Modified Asphalt

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Activated rubber powder (ARP) was grafted into polystyrene (PS) by in-situ polymerization to obtain PS-ARP which was used as a modifier to prepared styrene-butadienestyrene (SBS) modified asphalt. Three indicators, dynamic shear rheology (DSR), multi-stress creep recovery (MSCR), time scan, bending beam rheology (BBR) and segregation tests results showed that PS-ARP can improve low temperature plasticity, heat resistance, viscoelasticity, anti-rutting, fatigue and low temperature performance of modified asphalt. The addition of 3-PS-ARP improved the ductility of SBS modified asphalt from 13.03 cm to 23.1 cm (5 degrees C) while fatigue and anti-rutting performance were enhanced about 85.53% (30 degrees C) and 97.28% (82 degrees C), respectively. FT-IR and SEM analyses showed successful synthesis of PS-ARP. FM analyses confirmed that large number of PS microspheres were encapsulated on the surface of PS-ARP resulting in a composite network structure with SBS in asphalt. (C) 2019 Elsevier Ltd. All rights reserved.

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第 120 篇

标　　题：Application Of Flat-Joint Contact Model For Uniaxial Compression Simulation Of Large Stone Porous Asphalt Mixes

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Discrete element method has been widely used to simulate performance indicators of asphalt mixture, but the contact model of particles is still the most key step in the simulation. The Flat-Joint Contact (FJC) model is a new theory to describe the contact conditions among the particles in granular materials, which is a new proposed model for geotechnical materials numerical simulation and has been integrated in the Particle Flow Code (PFC) recently. The applicability of the FJC model in Large Stone Porous asphalt Mixes (LSPM) is investigated in this paper. This paper rebuilds the irregular particles of field coring specimens using the image processing technology. Then, a three-dimensional discrete element program is developed to simulate the uniaxial compression test of LSPM with different aggregate gradations. The compressive strength, coordination number, contact point, and energy of LSPM are analyzed to characterize the performance in the testing process, and the simulation is compared with the laboratory testing to verify the reliability. Results show that the average coordination number can be used to evaluate the compressive strength, the four-parameter Boltzmann distribution can be used to describe the cumulative distribution probability of contact points. Energy indicator can be estimated by macroscopic compressive strength and reflected the mechanical property. Compared with the parallel bonding contact model (PBC), the FJC model simulation is closer to the laboratory test. Therefore, the proposed programs and FJC model are suitable to simulate the uniaxial compression process of the LSPM. (C) 2019 Elsevier Ltd. All rights reserved.

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第 121 篇

标　　题：Evaluation Of The Compatibility Between Rubber And Asphalt Based On Molecular Dynamics Simulation

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期　　刊：FRONTIERS OF STRUCTURAL AND CIVIL ENGINEERING

摘　　要：Using of rubber asphalt can both promote the recycling of waste tires and improve the performance of asphalt pavement. However, the segregation of rubber asphalt caused by the poor storage stability always appears during its application. Storage stability of asphalt and rubber is related to the compatibility and also influenced by rubber content. In this study, molecular models of different rubbers and chemical fractions of asphalt were built to perform the molecular dynamics simulation. The solubility parameter and binding energy between rubber and asphalt were obtained to evaluate the compatibility between rubber and asphalt as well as the influence of rubber content on compatibility. Results show that all three kinds of rubber are commendably compatible with asphalt, where the compatibility between asphalt and cispolybutadiene rubber (BR) is the best, followed by styrene-butadiene rubber (SBR), and natural rubber (NR) is the worst. The optimum rubber contents for BR asphalt, SBR asphalt, and NR asphalt were determined as 15%, 15%, and 20%, respectively. In addition, the upper limits of rubber contents were found as between 25% and 30%, between 20% and 25%, and between 25% and 30%, respectively.

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WOS 号：000522694500002

第 122 篇

标　　题：Safety Risks And Protection Measures For City Wall During Construction And Operation Of Xi'An Metro

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期　　刊：JOURNAL OF PERFORMANCE OF CONSTRUCTED FACILITIES

摘　　要：The Xi'an City Wall (XCW) is a typical ancient building in Xi'an that is well known for its history and culture. The Xi'an Metro crosses below the XCW at various locations, which may pose hazards of cracking or collapsing the XCW due to the irregular settlement of the wall foundation during tunneling and vibrations induced by train operation. To minimize the effect of the metro on the XCW, the authors exhibit different mitigation measures in this paper, mainly including route optimization, active control technology during tunneling, foundation reinforcement, building reinforcement, and floating slab technology for damping train vibrations. Meanwhile, the case studies about the construction stage in Line 4 of the Xi'an Metro near the Heping Gate and the vibration effect during the metro operation stage were conducted. After employing the suitable countermeasures, the maximum foundation settlement and the maximum vibration velocity of the XCW could be controlled effectively within the guideline values.

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第 123 篇
标　　题： Failure Mechanisms And Modes Of Tunnels In Monoclinic And Soft-Hard Interbedded Rocks: A Case Study
作　　者： [Chen, Jianxun; Liu, Weiwei; Chen, Lijun; Luo, Yanbin; Li, Yao; Gao, Haijiang; Zhong, Daochuan] Changan Univ, Sch Highway, Xian 710064, Peoples R China
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期　　刊： KSCE JOURNAL OF CIVIL ENGINEERING
摘　　要： The issue of large deformation mechanism in soft rock tunnels has puzzled tunnel scholars for decades. Previous studies have not evolved a clear and common understanding. Therefore, detailed on-site measurement, full investigation and statistical analysis have been conducted on the instability and failure of Muzhailing Tunnel since its construction, whose length is beyond 15 km. The study aims at systematically analyzing the failure mechanisms and modes of Muzhailing Tunnel in monoclinic and soft-hard interbedded rock strata. Study results show that the angle between strata strike and tunnel axis greatly determines the magnitude of deformation, the dip direction significantly controls the bias direction and maximum deformation direction, and the dip angle deeply affects the deformation form. The failure modes of surrounding rock mainly include four types: spalling and overturning failure, bending failure, shear slip failure and buckling failure. Large deformation characteristics are summarized from six aspects: failure form, groundwater, sensitivity to influencing factors, deformation degree, deformation speed and deformation duration. The instability modes of primary lining include in-plane (transverse) instability and out-plane (longitudinal) instability. Finally, the causes of large deformation are analyzed from geological, structural, engineering and human factors.
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WOS 号： 000519927100029

第 124 篇
标　　题： Effects Of Initial Particle Gradation And Rock Content On Crushing Behaviors Of Weathered Phyllite Fills - A Case Of Eastern Ankang Section Of Shiyan-Tianshui Highway, China
作　　者： [Liu, Feifei; Mao, Xuesong; Fan, Yushuo] Changan Univ, Sch Highway, Xian, Peoples R China; [Fan, Yushuo] Shijiazhuang Transportat Survey & Design Inst, Shijiazhuang, Hebei, Peoples R China; [Liu, Feifei; Wu, Linping; Liu, Wei Victor] Univ Alberta, Dept Civil & Environm Engn, Edmonton, AB, Canada
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期　　刊： JOURNAL OF ROCK MECHANICS AND GEOTECHNICAL ENGINEERING
摘　　要： The objective of this paper is to investigate the effects of initial particle gradation and

rock content on the crushing behavior (i.e. grain size before and after crushing) of weathered phyllite fills. Compaction tests were conducted on weathered phyllite fills with rock contents of 35%, 45%, 55%, 65% and 75% (by weight). First, the particle size distributions (PSDs) were observed before and after compaction, and then the particle breakage of weathered phyllite fills was analyzed by fractal dimension. Relative fractal dimension was proposed to evaluate the effects of initial rock content and initial gradation on the particle breakage. It was found that the fractal dimension method can well characterize the crushing behaviors of the weathered phyllite fills. The finer the fills were, the more they were compacted. That is, after the first compaction, the relative fractal dimension of the weathered phyllite fills increased as the rock content increased, reaching the values of 0.013, 0.016, 0.024, 0.037 and 0.08, respectively. After the second compaction, these relative fractal dimension values, dominated by the initial particle gradation, became 0.059, 0.072, 0.052, 0.095 and 0.118, respectively. In conclusion, the weathered phyllite fills with 55% rock content exhibited the least breakage and were most suitable for filling the subgrade. Findings in this paper will provide significant guidance for the construction of weathered phyllite filling subgrade in future projects. (C) 2020 Institute of Rock and Soil Mechanics, Chinese Academy of Sciences. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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第 125 篇

标　　题： Evaluation Of The Effect Of Fiber Type, Length, And Content On Asphalt Properties And Asphalt Mixture Performance

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期　　刊： MATERIALS

摘　　要： Fiber-reinforced asphalt mixture has been widely used in pavement engineering to not only prevent asphalt binder leakage but also improve engineering properties of asphalt mixture. However, the research on three key parameters, namely fiber type, fiber length, and fiber content, which significantly affect the performance of fiber-reinforced asphalt mixture, have seldom been conducted systematically. To determine these three key parameters in the support of the application of fibers in mixture scientifically, three commonly used fibers were selected, basalt fiber, polyester fiber, and lignin fiber, and the testing on fibers, fiber-reinforced asphalt binders, and fiber-reinforced asphalt mixtures was conducted afterwards. The results showed: the favorable fiber type was basalt fiber; the favorable basalt fiber length was 6mm; the engineering properties including high temperature stability, low temperature crack resistance, and water susceptibility were clearly improved by the added basalt fiber, and the optimum basalt fiber content was 0.4 wt.%. The obtained results may be valuable from a practical point

of view to engineers and practitioners.

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WOS 号： 000529875600074

第 126 篇

标　　题： Application Of Atomic Force Microscope To Investigate The Surface Micro-Adhesion Properties Of Asphalt

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期　　刊： MATERIALS

摘　　要： The surface energy and bonding coefficient of asphalt are important factors that affect the adhesion performance of asphalt/aggregate. In this study, the micro-bee-like-structure of asphalt and force curves between the microscope-probe and asphalt were measured via atomic force microscopy (AFM). To investigate the influence of asphalt properties on micro-adhesion of asphalt, five types of asphalt were used in four states: original, aged at 163 degrees C, immersed in water and added anti-stripping agent. The results demonstrate that the surface energy of grade 90 asphalt is greater than that of grade 70 asphalt when oil source is the same and that of modified asphalt is greater than matrix asphalt. The surface energies and bonding coefficients of asphalts decreased after aging and immersion. The surface energies of asphalts were greatly improved by adding anti-stripping agent and the bonding coefficients of the asphalts increased by 5.04-37.14% after adding an anti-stripping agent.

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第 127 篇

标　　题： Performance Characterization Of Waterborne Epoxy Resin And Styrene-Butadiene Rubber Latex Composite Modified Asphalt Emulsion (Wesae)

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期　　刊： COATINGS

摘　　要： Neat asphalt emulsions have poor physicochemical properties. In order to endow neat asphalt emulsions with excellent physicochemical properties and broaden their application as pavement, this study adopted the composite modification method using waterborne epoxy resin (WER) and styrene-butadiene rubber (SBR) latex. Firstly, a waterborne-epoxy-SBR composite modified asphalt emulsions (WESAEs) with different amounts of WER were prepared, and the storage stability, workability, and

residual properties were characterized with a series of tests. Then, the performance of the WESAEs was comprehensively evaluated by multiobjective gray target decision-making method, through which the optimal amount of WER in WESAE was determined. Lastly, the modification mechanism of WER was revealed by Fourier-transform infrared spectroscopy test. The results show that the incorporation of WER improves the high-temperature performance, thermal stability, rheological property, and adhesion of the SBR modified asphalt emulsion (SBRAE) residues. However, an excessive amount of WER will adversely affect the storage stability, particle distribution uniformity, and workability of the WESAE binder. The WESAE with 3% WER showed the best comprehensive performance; thus, the optimal amount of WER is 3% of the weight of the WESAE. Additionally, modification of the SBRAE by WER is a physical blending process, meaning no chemical reaction occurs in the blending process.

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WOS 号： 000534630600049

第 128 篇

标　　题： Analysis Of Deformation Characteristics Of Foundation-Pit Excavation And Circular Wall

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期　　刊： SUSTAINABILITY

摘　　要： The surrounding ground settlement and displacement control of an underground diaphragm wall during the excavation of a foundation pit are the main challenges for engineering safety. These factors are also an obstacle to the controllable and sustainable development of foundation-pit projects. In this study, monitoring data were analyzed to identify the deformation law and other characteristics of the support structure. A three-dimensional numerical simulation of the foundation-pit excavation process was performed in Midas/GTS NX. To overcome the theoretical shortcomings of parameter selection for finite-element simulation, a key data self-verification method was used. Results showed that the settlement of the surface surrounding the circular underground continuous wall was mainly affected by the depth of the foundation-pit excavation. In addition, wall deformation for each working condition showed linearity with clear staged characteristics. In particular, the deformation curve had obvious inflection points, most of which were located deeper than 2/3 of the overall excavation depth. The characteristics of the cantilever pile were not obvious in Working Conditions 3-9, but the distribution of the wall body offset in a D-shaped curve was evident. Deviation between the monitoring value of the maximal wall offset and the simulated value was only 4.31 %. The appropriate physical and mechanical parameters for key data self-verification were proposed. The concept of the circular-wall offset inflection point is proposed to determine the distribution of inflection-point positions and offset curves.

The method provides new opportunities for the safety control and sustainable research of foundation-pit excavations.

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第 129 篇

标　　题： Carbon Emission Calculation Method And Low-Carbon Technology For Use In Expressway Construction

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期　　刊： SUSTAINABILITY

摘　　要： There is a need for a quantitative calculation method for carbon emissions during asphalt pavement construction. In this study, the carbon sources were detected and carbon emission during pavement construction was divided into two parts-the emission resulting from energy consumption and that arising from the volatilization of asphalt mixtures itself. The carbon emission calculation model of energy consumption is presented based on the energy consumption list and calorific value method proposed by the Intergovernmental Panel on Climate Change. The model of the carbon emission from volatilization of asphalt mixtures was introduced based on a combination of on-site inspection data and the greenhouse gas diffusion rate and calculated volume. Finally, high-carbon emission processes and total carbon emissions were obtained, and the corresponding low-carbon technologies were proposed for different types of carbon emissions. The results show that the ratio of carbon emission generated by energy consumption and the volatilization of asphalt mixtures is 3:2; aggregate and asphalt heating are high-carbon emission processes of energy consumption, while asphalt mixture rolling and mixing are the high-carbon emission processes of asphalt mixture. Furthermore, the use of natural gas can control carbon emission in energy consumption; low-carbon asphalt mixtures and warm mixing technology can effectively reduce carbon emission from the volatilization of asphalt mixtures. This study lays a theoretical foundation for green pavement construction.

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WOS 号： 000535598700152

第 130 篇

标　　题： A Novel Construction Technology For Self-Anchored Suspension Bridge Considering Safety And Sustainability Performance

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期　　刊： SUSTAINABILITY

摘　　要： To promote sustainable development of civil infrastructures, minimizing environmental impact and mobility disruptions have been elevated to a higher priority during decision-making for bridge construction scheme. This study presents a novel temporary pylon-anchor (TPA) technology for construction of self-anchored suspension bridges by considering not only safety performance, but also environmental impacts. A practical assessment method and index of sustainability associated with bridge construction technology are established to facilitate the selection of construction schemes. The sustainability index takes the environmental impact, traffic disruption, onsite construction materials and equipment, onsite construction cost, and onsite construction risk into consideration. The sustainability index associated with both conventional and novel construction methods is assessed and compared in this paper. Specifically, a novel girder-pylon antithrust system (GPAS) is proposed, which is the crucial component of the TPA technology in engineering application. In addition, an analytical approach is developed, considering both global load-carrying capacity and local stress distribution within the design and construction of the GPAS. The applicability and rationality of the proposed construction technology are illustrated by the successful application in real-world engineering. The field tests and sustainability assessment during the construction stage reveal that the proposed sustainability assessment method and analytical approach can facilitate the implementation of sustainable construction for self-anchored suspension bridges by considering both construction safety and sustainability.

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WOS 号： 000531558100398

第 131 篇

标　　题： Moisture Transfer And Formation Of Separate Ice In The Freezing Process Of Saturated Soils

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期　　刊： WATER

摘　　要：The formation and layer of ice lenses during the freezing of soil in cold regions is closely related to frozen heave and moisture immigration. The purpose of the paper is to explain the physical mechanisms pertaining to ice lens formation, which were analyzed and verified using numerical simulation results. Based on a few assumptions, the formation and layers of ice lenses are illuminated in the following steps: the initial stage of freezing, formation of the first layer of ice lens, formation of the second layer of ice lens, and formation of the final layer of ice lens. Compared with the numerical results of coupled thermo hydro mechanical simulations of one-side freezing of soil columns in an open system, the proposed analysis method of the formation and layers of ice lenses is verified to be reasonable, and it is demonstrated that the classical criterion for the formation of ice lens in freezing saturated soil is only suitable for the final layer of ice lens. Finally, a new criterion, in terms of flux rate, for the formation of ice lens is proposed.

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WOS 号：000539527500121

第 132 篇

标　　题：Performance Of Stone Mastic Asphalt Mixtures Fabricated By Different Compaction Methods

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：In this study, stone mastic asphalt (SMA-13) mixtures were designed using three methods, namely the vertical-vibration testing method (VVTM), Marshall method, and superpave gyratory compactor method (SGC). The performances of SMA-13 designed by all three methods were measured and compared. Results show that the optimal asphalt content of the asphalt mixture was 5% lower in the VVTM-designed SMA-13 than in the Marshall-designed and SGC-designed asphalts mixture. In comparison with the Marshall- and SGC-designed asphalts mixture, the VVTM-designed SMA-13 exhibited higher density (2.4% and 2.2% increase, respectively), mechanical properties (32% and 13% increase, respectively), high-temperature rut resistance (30% and 8% increase, respectively), low-temperature crack resistance (20% and 17% increase, respectively), water stability (4% and 3% increase, respectively), and fatigue life (at least 33% and 9% increase, respectively). The VVTM-designed SMA-13 exhibited a deeper short-term aging degree than the other SMA-13 specimens, but a smaller long-term aging degree. In summary, the SMA-13 mixture designed by the VVTM method delivered a better road performance and durability than the traditional design method, enabling improved designs of SMA mixtures.

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第 133 篇
标　　题： In-Door Laboratory High-Speed Testing Of Tire-Pavement Noise
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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING
摘　　要： The ability to measure traffic-speed tire-pavement noise in the laboratory is useful for predicting the tire-pavement noise performance of a design mix without conducting expensive and time-consuming field trials. This research developed an in-door high-speed test facility HTP(2)for tire-pavement noise measurements. Housed in a semi-anechoic room, HTP(2)has a circular test track of vertical wall, and a horizontal rotating arm system mounted with full-scale test tires. The test track can accommodate 12 specimens in each test run. The highest test speed achievable is currently 70 km/h, eventually 100 km/h when fully developed. The On-Board Sound Intensity Method was adopted for tire-pavement noise measurement. Tests were conducted to assess the reliability and repeatability of the test facility. Additional tests involving eight different pavement surface types were performed to illustrate that HTP2 was able to (i) measure sound intensity-frequency characteristics of tire-pavement noise matching those of actual vehicles and pavements, (ii) differentiate sound intensity of tire-pavement noise generated by different pavement types, (iii) identify increase in tire-pavement noise caused by texturing of concrete pavement, (iv) detect differences between tire-pavement noise generated by longitudinally and transversely tined concrete pavements, and (v) measure effects of surface macrotexture on tire-pavement noise.
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WOS 号： 000557977900001

第 134 篇
标　　题： Thermal Conductivity Characteristics Of Thermal Insulation Materials Immersed In Water For Cold-Region Tunnels
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通讯作者： Li, YY; Sun, YM (corresponding author), Changan Univ, Key Lab Special Area Highway Engn, Minist Educ, Xian 710064, Peoples R China.
期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING
摘　　要： This study investigates the distribution of pore water on the basis of the measured mass moisture content after soaking the tunnel insulation material. This study also analyzes the influence of the distribution of pore water on the thermal conductivity of the

material on the basis of this mass moisture content. Scanning images of phenolic and polyurethane insulation boards are obtained by computer tomography (CT). The gray volume moisture content (Gv) is deduced based on the CT scanning images, to determine the distribution of pore water (Gv is the ratio of the volume of the water sample (represented by the gray value) to the volume of the saturated water sample (represented by the gray value) which is the gray volume moisture content of the sample). The correlation between gray volume moisture content and mass moisture content is determined by comparing different algorithms of gray volume moisture content and volume moisture content. The relationship between mass moisture content and thermal conductivity can be determined using a self-made quasi-steady-state tester, whereas the relationship between gray volume moisture content and thermal conductivity can be derived indirectly. Related experimental research can predict the thermal conductivity of thermal insulation materials by using a new perspective and shows the influence of pore water distribution on the thermal conductivity of materials.

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WOS 号： 000528978300003

第 135 篇

标　　题： Graphene/Tourmaline Composites As A Filler Of Hot Mix Asphalt Mixture: Preparation And Properties

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： This study addresses how to reduce the emission of asphalt smoke in the construction process of traditional hot mix asphalt mixture. The graphene/tourmaline composites were prepared based on tourmaline having the effect of adsorbing pollutants. The basic properties of composites and their adsorption effect on asphalt smoke were analyzed. Then, the composite powder was added into the environment-friendly asphalt mixture as filler. And the pavement performances and emission reduction performance of asphalt mixtures were studied. The results indicated that the basic properties of composite powder meet the requirements of specifications about filler in asphalt mixtures. Composite powder could be used to replace part of mineral powder, and the optimum replacement content was 17-20 wt%. The environment-friendly asphalt mixtures can effectively reduce asphalt smoke emission. The reduction rate of emission can reach 76.9-80.5%.

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第 136 篇

标　　题：Analysis Of Mechanical Properties For Two Different Structures Of Photovoltaic Pavement Unit Block

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Recently, photovoltaic (PV) pavement has widely attracted attention as an alternative to provide renewable energy. Research which focuses on the mechanical properties of a PV pavement is still at an early stage of exploration. This study adopted two types of PV pavement unit block structure, namely grid unit block and hollow unit block based on previous literature. ABS was selected as the material of the unit block body, which is proven has strong mechanical properties and can be recycled. Effects of various factors on the mechanical properties of the unit blocks were analysed, including (i) structure length, (ii) structure width, (iii) thickness of bottom plate and (iv) thickness of grid or wall. Orthogonal test was used to obtain 16 sets of experiment for each unit block structure and numerical simulation was conducted by ABAQUS. The surface longitudinal deformation l(s) and the maximum tensile stress sigma(m) at the centre of the bottom of the light-transmitting plate are the main indexes for mechanical response analysis. Mean analysis was used to determine the optimal combination of the structural sizes, meanwhile multivariate analysis of variance was used to rank the significance of each factor. Results have demonstrated that the optimal size combinations for the two structures are: (i) for grid unit block structure -120 cm length x 120 cm width x 8 cm-thickness bottom plate x 2 cm-thickness grid (ii) for hollow unit block structure -60 cm length x 60 cm width x 6 cm-thickness bottom plate x 10 cm-thickness side walls. Meanwhile, the ranks significance of each factor are: (i) for grid unit block structure - plate thickness > grid thickness > width > length (ii) for hollow unit block structure - only width is significant to sigma(m). The results also suggested that grid unit block structure for a PV pavement is better than hollow unit block structure. (C) 2019 Elsevier Ltd. All rights reserved.

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第 137 篇

标　　题：A Study On The Calculation Of Platform Sizes Of Urban Rail Hub Stations Based On Passenger Behavior Characteristics

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： The Chinese national rail transit design specification decides the size of urban rail transit platforms in China. This suggested method treats passengers as homogeneous individuals when calculating the walking area within a platform. However, the heterogeneity of passenger behavior in a rail hub station has not been considered. It is not reasonable to see passengers as homogeneous individuals. In this study, by observing passenger behavior characteristics at rail hub platforms, two parameters were obtained, walking speed and luggage size. Passengers were then accordingly put into different groups, and dynamic spatial demands for each passenger group were calculated by parameter fitting functions. Based on the theory of spatiotemporal consumption, the nonlinear constraint model was constructed to determine the space-time consumption of each passenger group, and finally the area demands of different types of passengers were obtained for different time and passenger flows. An application was made to Beikezhan Station on Xi'an Metro line 2. The calculation results show the area demands ranges of four passenger groups with distinct characteristics, and their space-time consumption varied. The study can calculate the space demands for all passenger varieties within a rail hub transit platform and provide suggestions for the determination of the ideal walking area size of rail transit platforms.

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第 138 篇

标　　题： Research On Temperature Action And Cracking Risk Of Steel-Concrete Composite Girder During The Hydration Process

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期　　刊： ARCHIVES OF CIVIL AND MECHANICAL ENGINEERING

摘　　要： Temperature changes due to hydration heat often cause cracks in the early-age concrete deck of steel-concrete composite girder bridges, even before opening to traffic. However, no available methods are provided in current specifications for the thermal effect calculation. To fill this gap, large-scale temperature measurements and fine finite-element model (FEM) analysis were performed on an actual composite girder bridge. Based on the fully validated FEM, a comprehensive parametric study was carried out to establish the spatio-temporal pattern of hydration-caused temperature, including a vertical pattern and an evolutionary pattern. Finally, a simplified method was presented for the thermal stress calculation of composite girders, and a case study was also provided. Measurements showed that temperature differences of concrete deck

varied below 5 degrees C, much smaller than the entire composite section. FEM analysis then suggested that the influence of solar radiation can be basically ignored compared with hydration heat. The spatio-temporal pattern in the form of the coefficient of temperature rise was proposed based on the above findings and parametric study, and the reliability was properly verified with experimental or FEM results. For the final simplified method, the case study demonstrated that it can effectively facilitate the thermal stress calculation of composite girders during hydration process by adopting the proposed spatio-temporal pattern. As such, preliminary curing schemes can be easily selected to control the concrete cracking risk before casting.

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第 139 篇

标　　题： Friction Characteristics Of Post-Tensioned Tendons Of Full-Scale Structures Based On Site Tests

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In the design of prestressing concrete structures, the friction characteristics between strands and channels have an important influence on the distribution of prestressing force, which can be considered comprehensively by curvature and swing friction coefficients. However, the proposed friction coefficient varies widely and may lead to an inaccurate prestress estimation. In this study, four full-scale field specimens were established to measure the friction loss of prestressing tendons with electromagnetic sensors and anchor cable dynamometers to evaluate the friction coefficient. The least square method and Bayesian quantile regression method were adopted to calculate the friction coefficient, and the results were compared with that in the specifications. Field test results showed that Bayesian quantile regression method was more effective and significant in the estimation of the friction coefficient.

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第 140 篇

标　　题： Using Surface Free Energy To Evaluate The Fracture Performance Of Asphalt Binders

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Surface free energy has been mainly employed to determine the adhesive bond energy for the evaluation of moisture resistance between binder and aggregate, but its

association with binder fracture resistance has not been fully explored yet. Surface free energy was successfully measured for five binders by using sessile drop method. The Double-Edge Notched Tensile and Binder Fracture Energy tests were used to establish the correlation between binder fracture parameters and surface free energy. Correlation results indicated that surface free energy is a good indicator for binder fracture performance. (C) 2020 Elsevier Ltd. All rights reserved.

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第 141 篇

标　　题： Effects Of Pre-Curing Treatment And Chemical Accelerators On Portland Cement Mortars At Low Temperature (5 Degrees C)

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Artificial heating and chemical admixtures are widespread solutions to keep and improve the early strength of cement concretes in cold weather. The research analyzed the performance of cement mortar at low temperature (5 degrees C) in combination with pre-curing treatment and the use of chemical accelerators, e.g., calcium chloride (CaCl2), sodium nitrite (NaNO2), potassium carbonate (K2CO3), and sodium sulfate (Na2SO4). The investigation comprised the mechanical behavior, setting time, released heat of hydration, and microstructures. The standard curing pretreatment at 20 degrees C, differently from curing at 5 degrees C, engendered a reduction in the mechanical strength of both untreated and chemically treated cement mortar samples. Although all chemicals accelerated the reactions of hydration, the achieved compressive strengths of the mortars were different. The specimens treated with calcium chloride (CaCl2) reached the highest compressive strength, followed by sodium nitrite (NaNO2) and sodium sulfate (Na2SO4). Specimens containing potassium carbonate (K2CO3) attained the lowest compressive strength. Further analyses highlighted the importance of the time interval between initial and final setting: a shorter time interval led to lower mechanical strength due to more cracks in the cement matrix. (C) 2019 Elsevier Ltd. All rights reserved.

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第 142 篇

标　　题：Lateral Load Distribution For Hollow Slab Bridge: Field Test Investigation

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期　　刊：INTERNATIONAL JOURNAL OF CONCRETE STRUCTURES AND MATERIALS

摘　　要：Distribution factors (DFs) for one typical cross-section as specified in the AASHTO LRFD specification can be varied when the bridge parameters such as span length, loading lanes and skew are changed. The diversity between design and actual DFs may be varied as the bridge parameters changed. To study this diversity, this paper presents an evaluation of lateral load DFs for prefabricated hollow slab bridges. The response of the bridge was recorded during the field test. This field test was divided into two stages: a concentrated force loading test on the prefabricated girder that settled on the bridge supports before the girders were connected transversely and a vehicle loading test after the girders were connected transversely. The instruments used to record the response of the bridge were strain gauges and dial indicators. The measured data in the multi-stages of the field test could be used to calibrate the support condition of the bridge and transverse connection between adjacent girders in the finite element model (FEM) using beam and plate elements. From the FEM, DFs for this hollow slab bridge were determined and compared with the DFs in the AASHTO LRFD specification. A parametric study using the calibrated FEM was then used to investigate the effect of various parameters including span length, skew and bridge deck thickness on the DFs. It was found that AASHTO LRFD specification is conservative compared with the analysis in the FEM, while this conservatism decreased as the span length and skew of the hollow slab bridge increased.

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第 143 篇

标　　题：Influence Of Tire-Recycled Steel Fibers On Strength And Flexural Behavior Of Reinforced Concrete

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：Tire production is increasing every year due to the increase in vehicle sales. The generation and disposal of waste are inherent to life itself and have presented very

serious problems to the human community in China. Recently, some research has been devoted to the use of tire-recycled steel fibers in concrete. This study is focusing on the use of tire-recycled steel fibers. Several volume ratios of tire-recycled steel fibers were used in concrete mix to fabricate and test. Reinforced concrete obtains evidence and satisfactory improvement by adding tire-recycled steel fibers, mostly in compressive strength, splitting strength, flexural tensile strength, and flexural toughness. The strength and flexural toughness of the tire-recycled steel fiber reinforced concrete are lower than those of industrial steel fibers. To obtain concrete with approximately the same strength or toughness, the content of tire-recycled steel fibers should be about 1%-2% higher than that of industrial steel fibers. In addition, the load-deflection curve tends to become fuller after the first crack, and the second peak of the load continues to increase. The steel fiber reinforced concrete is getting closer to the ideal elastic-plastic material.

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第 144 篇

标　　题： Automated Modal Identification Based On Improved Clustering Method

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： The automated modal identification has been playing an important role in online structural damage detection and condition assessment. This paper proposes an improved hierarchical clustering method to identify the precise modal parameters by automatically interpreting the stabilization diagram. Two major improvements are provided in the whole clustering process. The modal uncertainty is first introduced in the first stage to eliminate as many as possible mathematical modal data to produce more precise clustering threshold, which helps to produce more precise clustering results. The boxplot is introduced in the last stage to assess the precision of the clustering results from a statistical perspective. Based on an iterative analysis of boxplot, the outliers of the clustering results are found out and eliminated and the precise modal results are finally produced. The Z24 benchmark experiment data are utilized to validate the feasibility of the proposed method, and comparison between the previous method and the improved method is also provided. From the result, it can be concluded that the modal uncertainty is more effective than the other modal criteria in distinguishing the mathematical modal data. The modal results by clustering process are not precise in statistic and the boxplot can find out the outliers of the clustering results and produce more precise modal results. The improved automated modal identification method can automatically extract the physical modal data and produce more precise modal parameters.

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第 145 篇

标　　题： Study On A Thermosetting Polyurethane Modified Asphalt Suitable For Bridge Deck Pavements: Formula And Properties

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： High-cost and unsatisfactory flexibility generally reduce the application possibility of epoxy asphalt binders in bridge deck asphalt pavements. To solve these defects, a novel idea that develops a thermosetting polyurethane (TS-PU) modified asphalt binder is put forward in this work. First, the appropriate formula of the TS-PU modified binder is determined via a series of laboratory tests. The comprehensive properties of asphalt binders containing various TS-PU contents are then investigated. Finally, a performance comparison is made between the TS-PU modified binder (with the optimum TS-PU content), styrene-butadienestyrene (SBS) modified binder and epoxy modified binder. Results show that, the addition of TS-PU improves the high temperature and mechanical properties while impairs the low temperature property of base binder. It is also demonstrated in this study that, the TS-PU modified binder is much better in high temperature rutting resistance and tensile strength than SBS modified binder; meanwhile, the TS-PU modified binder, on the whole, has an advantage over epoxy modified binder in flexibility and cost saving, showing a favorable application prospect in bridge deck pavements. (C) 2020 Elsevier Ltd. All rights reserved.

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第 146 篇

标　　题： Degradation Of Cast-In-Situ Concrete Subjected To Sulphate-Chloride Combined Attack

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The main aim of the present research is to determine the degradation mechanisms of

cast-in-situ concrete subjected to sulphate-chloride combined attack. Concrete specimens were prepared and then put into sulfate or sulfate-chloride mixed solutions. The sample dimension, mass, compressive strength, and sulfate concentration of the specimens were continuously monitored. The microstructures and the complex mineral composition of the concrete were analysed after 12 months of exposure to the corrosive environments. The results show that cast-in-situ concrete suffers more severe damage and greater strength loss when subjected to sulfate-chloride combined attack than when subjected to sulfate only. The diffusion and accumulation of sulfates are accelerated by the coexisting chlorides, especially in the early stages. The coexistence of chlorides in sulfate environments accelerates the degradation of cast-in-situ concrete induced by sulfate attack. The different performances against sulfate-chloride combined attack between cast-in-situ and precast concrete were mainly due to the degradation behaviour at the early stage. (C) 2020 Elsevier Ltd. All rights reserved.

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第 147 篇

标　　题： Influence Of Coarse-Aggregate Angularity On Asphalt Mixture Macroperformance: Skid Resistance, High-Temperature, And Compaction Performance

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： Macroperformance, i.e., skid resistance, high-temperature, and compaction performance, are related to the functional performance, safety, and durability of asphalt pavement. Currently, the research on such influencing factors focuses on the properties of asphalt, gradation composition, pavement structure, and so forth, whereas the geometrical characteristics of coarse aggregate, especially its angularity, has not gained due attention from researchers. This paper investigated the effects of coarse-aggregate angularity on the skid resistance, high-temperature performance, and compaction performance of asphalt mixtures. Three-dimensional angularity (3DA) computed by X-ray computed tomography (XCT) was employed to characterize coarse-aggregate angularity. Texture depth (TD) and British pendulum number (BPN) were evaluated through the sand patch test and the British pendulum test (BPT), respectively. The dynamic stability and rutting depth of mixtures with different coarse-aggregate angularities were examined with the wheel tracking test. The variation in height of the specimen with different angularity asphalt mixtures during the compaction process was tested through the Superpave gyratory compactor (SGC). The dynamic modulus (|E*|) of the asphalt mixtures was analyzed with the asphalt mixture performance tester

(AMPT) and the generation of master curves. The results showed that three-dimensional (3D) angularity is able to characterize the angularity of the coarse aggregate. A lower coarse-aggregate angularity leads to a smaller skid resistance of the asphalt mixture. The angularity greatly influences the high-temperature and compaction performance of asphalt mixtures. Higher angularity leads to better high-temperature stability but causes difficulty in compaction. The angularity has a significant influence on the |E*| values of SMA-16 asphalt mixture. The results revealed that the decrease in coarse-aggregate angularity translated into a decrease in |E*| values on average. This study provides support for further research into and application of macroscopic properties of asphalt mixtures. (c) 2020 American Society of Civil Engineers.

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第 148 篇

标　　题： Experimental And Simulation Study Of Flow Patterns In The Combined Flow Focusing And T-Junction Device

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期　　刊： JOURNAL OF MICROMECHANICS AND MICROENGINEERING

摘　　要： This paper presents a study of droplets generation, particularly examining different regimes or patterns of the flow by a novel device that combines two principles for droplets generation (flow focusing and T-junction (FF-TJ)) under different flow conditions, named combined FF-TJ. The study involves both experiment and simulation. From the experiment mineral oil and distilled water, three regimes (namely continuous regime, jetting regime, and squeezing regime) were found. This finding was subsequently confirmed by the simulation, which thus also gave a validation of the simulation system. The simulation was further employed to study the relationship among various parameters, including the velocities of the flows (i.e. sheath flow, middle flow, and crossflow) in the context the three regimes. We observed that the three regimes were determined by two critical values of the velocity of the middle flow, U-m1 and U-m2. Interestingly, it was further found that the two critical values remained the same, independent of the velocity of the sheath flow. We further investigated the effects of the velocity ratio (the middle flow to the sheath flow, R-m/s) and the capillary number of the crossflow on the microsphere diameter. Overall, this paper presents a comprehensive study of the FF-TJ device and the associated implications for microsphere or droplet generation.

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第 149 篇

标　　题：Structural Performance Of Super-Long-Span Cable-Stayed Bridges With Steel And Cfrp Hybrid Cables

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期　　刊：ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING

摘　　要：This paper presents an investigation of super-long-span cable-stayed bridges with hybrid cables, including steel and carbon fiber-reinforced polymer (CFRP) cables arranged in the short- and long-cable regions, respectively. Three 1600-m-span cable-stayed bridges with steel, CFRP and hybrid cables are first designed. Their static and dynamic structural performance was subsequently investigated by finite element analysis. Simulation results demonstrate that arranging CFRP cables in the long-cable regions can fully utilize the advantage of CFRP through examining their equivalent elastic modulus, load-carrying efficiency ratio and self-weight/stress ratio. The hybrid cable-stayed bridge exhibits the higher stiffness enhancement in comparison with the CFRP cable-stayed bridge. In comparison with the CFRP cables, the use of hybrid cables is able to increase the frequency for the first-order vertical mode, thus overcoming the weakness of the CFRP cable-stayed bridge in terms of stiffness. In addition, the natural frequencies of CFRP cables are much higher than the low-order vertical vibration frequencies of cable-stayed bridge, which is beneficial to reducing the probability of cable-deck coupling vibrations.

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第 150 篇

标　　题：Experimental Study On Solidifying Aeolian Sand Filled In The Narrow Space Of Distress Culverts

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期　　刊：ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING

摘　　要：A variety of distress have appeared in culvert structure in permafrost regions of China, which seriously affects safety of the structure in use. In view of the damage of reinforced concrete slab culvert structure along a highway in Qinghai Province, this paper presented a strengthening method for culvert structure. The corrugated steel pipe is placed in the reinforced concrete slab culvert, and the void between the original slab culvert and the corrugated steel pipe is filled with solidified aeolian sand, thus forming a whole and sharing the load. The method mainly depends on the solidifying effect of

aeolian sand. This paper mainly studied the solidifying and strengthening effect of three inorganic binders (cement, lime, lime and fly ash) on aeolian sand. By standard heavy compaction test and California Bearing Ratio (CBR) experiment, the influence of water and salt content on compactness characteristics and CBR value of solidified aeolian sand are studied, respectively. The test results show that the solidified aeolian sand can meet the requirements of relevant specifications of subgrade backfill and the culvert strengthening method in terms of compactness characteristics and mechanical properties.

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第 151 篇

标　　题： Low-Temperature Characteristic Evaluations Of Base And Hybrid Asphalt Binders

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期　　刊： JOURNAL OF TESTING AND EVALUATION

摘　　要： Polymerized asphalt is broadly being applied for producing durable asphalt pavement all over the performance characteristics of asphalt binders, especially their low-temperature behaviors. This research study used two base binders and four hybrid binders (including styrene-butadiene-styrene and crumb rubber) to explore the lowest potential temperatures of resisting the cracks. The results indicated that the time-temperature principle needed to be properly evaluated to determine the 60th second as the exact loading duration to finalize the thermal cracking temperatures for hybrid asphalt binders. In addition, Delta Tc, defined as the numerical difference between the critical low temperature determined from stiffness criteria (300 MPa) and the m value (0.300), which was used to characterize the crack potential of an aged binder, should be adjusted according to the characteristic demands of hybrid binders. Moreover, the conducted correlations between stiffness values at the low temperatures and phase angles at high temperatures were feasible to explore the viscous-elastic characteristics of base binders and hybrid binders.

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第 152 篇

标　　题： Study On Workability And Skid Resistance Of Bio-Oil-Modified Fog Seal With Sand

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期　　刊： JOURNAL OF TESTING AND EVALUATION

摘　　要： The objective of this study is to evaluate different fog seal materials, including Tianjin BEST - micro-seal bonding reductant (BEST-MBR), American MasterSeal, and a newly designed bio-oil-modified fog seal with sand (BFSS) using various sand contents. The workability of all materials was tested based on the fluidity test, seepage performance test, and the indoor skid resistance test. A new method to evaluate the surface texture of solidified fog seal with sand (FSS) material was performed based on the aggregate image measurement system II. The test results show that when the seepage flow evaluation index is set to a 1.5-mm seepage width, the seepage flow value should not be less than 0.2, whereas when the width is 2 mm, the flow value should not be less than 0.7. In addition, the surface texture evaluation indicates that some smaller grooves are formed around the sand particles after the BFSS is solidified and the structural depth of the material surface is increased. The BFSS material with 20 % sand content is slightly better than the BEST-MBR in terms of skid resistance, whereas it is still lower than MasterSeal. The addition of bio-oil lowers the need for asphalt binder, leading to energy savings. Thus, BFSS is a relatively desirable FSS material.

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第 153 篇

标　　题： Evaluation Of The Coordination Of Structural Layers In The Design Of Asphalt Pavement

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： The purpose of asphalt pavement structural design is to get a materially-coordinated and structurally-durable product, and a pavement structure with good road performance by combining the structural layer materials reasonably. However, due to lack of a rational evaluation index on the parameter combinations of structural layer materials, the structural layer materials are poor in terms of coordination, have low efficiency, and the actual use period is much lower than the designed working life. Therefore, it is very important to conduct research evaluating the coordination of the structural layer materials. In this study, the sensitivity of mechanical parameters and equivalent envelope area are proposed as new indexes to evaluate the coordination of material design of asphalt pavement structure layers. Software is developed to calculate the equivalent envelope area that can quantitatively evaluate the coordination among different layers and visualize the mechanical transfer behavior of each structural layer. Based on the equivalent envelope area index, this study incorporates two new steps in

the design of pavements, namely the structural form comparison and optimization, and proposes a new structural design process. Finally, the rationality and reliability of the equivalent envelope area index are verified by presenting fatigue life calculation and field verification in a test road. The results propose a clear evaluation index of the coordination of material design of each structural layer, which makes the structural design of the asphalt pavement more scientific and reasonable.

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第 154 篇

标　　题： Mechanical Performance Characterization Of Lignin-Modified Asphalt Mixture

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Lignin, as a bio-based waste, has been utilized in the asphalt industry due to various advantages. This study aimed to investigate the effects of two lignin products (lignin powder and lignin fiber) on the mechanical properties of asphalt mixtures. The raveling, rutting, thermal and fatigue cracking resistance, and moisture susceptibility of different asphalt mixtures were respectively evaluated by the Cantabro test, wheel loading tracking test, semicircular bending test, four-point beam bending test, and freezing-thaw cyclic test. Results show that asphalt mixture with lignin powder-modified asphalt improved the overall mechanical performance. However, lignin fiber showed contradictory effects on certain mechanical properties, i.e., improved rutting resistance and thermal cracking resistance of asphalt mixture, degraded abrasion resistance, fatigue performance, and moisture stability. Therefore, cautions need to be taken when incorporating lignin fiber into asphalt mixture.

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第 155 篇

标　　题： Experimental Study Of Non-Linear Fluid Flow Though Rough Fracture Based On Fractal Theory And 3D Printing Technique

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期　　刊： INTERNATIONAL JOURNAL OF ROCK MECHANICS AND MINING SCIENCES

摘　　要： In this note, the non-linear fluid flow through rough fracture is investigated experimentally. The rough surface of fracture is generated synthetically based on the fractal dimension (D) and standard deviation (sigma). 3D printing technique is used to produce the fracture specimen, in which, different components of the specimen are printed and assembled so that the fracture roughness and aperture can be easily controlled. After that, the self-designed apparatus is used to conduct the fluid flow test on the fractured specimens under various pressure gradients. It is found that, the surface roughness imposes an important impact on the nonlinear characteristics of fluid flow through fracture; and the root-mean-square of the first derivative of profile, Z(2), is found effective in characterizing the fracture roughness. Based on the test results and the derived parameters in Forchheimer equation, an empirical equation is proposed to relate the hydraulic aperture (e(h)) to Z(2) and mechanical aperture (e(m)). Furthermore, the correlation among the nonlinear coefficient beta, e(m) and Z(2) is established.

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第 156 篇

标　　题： Evaluation Of Organosolv Lignin As An Oxidation Inhibitor In Bitumen

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期　　刊： MOLECULES

摘　　要： Organosolv lignin, a natural polymer, has been used in this study as an oxidation inhibitor in bitumen. Particularly, the effect of oxidative aging on the chemical compositional changes and on the rheology of bituminous binders with organosolv lignin and the impact to inhibit oxidation in bitumen were evaluated. Firstly, after analyzing the microstructure and surface characteristics of utilized organosolv lignin, a high shear mixing procedure was followed to produce binders of different proportions of lignin in bitumen. Pressure aging vessel conditioning was applied to these binders to simulate in-field aging and a series of tests were performed. Fourier transform infrared spectroscopy was used to track the compositional changes of lignin-bitumen systems before and after aging respectively. The rheological changes due to oxidative aging in the different lignin-bitumen systems were studied by means of dynamic shear rheometer tests. Based on the spectroscopic laboratory analyses, certain proportions of organosolv lignin in bitumen have shown a potential oxidation retardation effect in

bitumen since a reduction of carbonyl and sulfoxide compounds was observed. However, the addition of lignin reduced the fatigue life of bitumen and potentially led to an increase in brittle fracture sensitivity at low and medium temperatures. Nevertheless, lignin improved the rutting resistance at high temperatures. Overall, it can be concluded that organosolv lignin can suppress the oxidation of sulfur and carbon compounds in bitumen either by direct deceleration of oxidation reaction or interaction with compounds that otherwise are oxidizable, without seriously degrading the mechanical properties.

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第 157 篇

标　　题： A Thermodynamically Consistent Framework For Visco-Elasto-Plastic Creep And Anisotropic Damage In Saturated Frozen Soils

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期　　刊： CONTINUUM MECHANICS AND THERMODYNAMICS

摘　　要： This paper presents a poro-visco-elastic-plastic damageable model for saturated frozen soils within a rigorous theoretical framework. The effective fluid pressure, obtained considering the interfacial energy, is combined with the total Cauchy stress in order to formulate the hydro-mechanical effective stress applied to a soil skeleton. On the other hand, a two-stress variable constitutive relationship is adopted for saturated frozen soils to describe the essential features of frozen and unfrozen behaviour. Based on the continuum damage theory, the cross-anisotropic damage variables for saturated frozen soils are deduced. The proposed damage criterion and the new nonlinear damage surface for saturated frozen soils are all governed by the second invariants of the double effective stress, which combines the damaged effective stress with the effective hydro-mechanical stress. The validity of the visco-elasto-plastic model with no damage is verified by comparing its modelling results with experimental results obtained from uniaxial creep tests.

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WOS 号： 000530290900001

第 158 篇

标　　题： Experiment On The Behavior Of A Self-Anchored Suspension And Cable-Stayed Hybrid Bridge During Structural Transformation

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期　　刊：KSCE JOURNAL OF CIVIL ENGINEERING

摘　　要：The Longgang Bridge in Shaanxi, China, is a complex continuous hybrid structure composed of two cable-stayed self-anchored suspension parts and one single-pylon cable-stayed part. A 1:20-scaled model was established due to the effect of multiple structural transformation, frequent internal force changes during the construction process, and differences between actual material parameters and theoretical calculation parameters. In this paper, the design, materials, counterweight, experimental instrumentation, and construction stages of the scaled model are introduced. Based on the experimental data, the nonlinear behavior of the self-anchored suspension and cable-stayed hybrid bridge during the structural transformation of the construction process is systematically and comprehensively studied. The evolutions of the hanger force and stayed cable force, the variation in the subcable and back-cable forces, the displacement characteristics of the suspension cable and the deflection of the stiffened girder are analyzed, and the relationships among these variables in different states of the structural system are discussed. This paper will serve as a technical reference for the construction of similar bridges in the future.

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第 159 篇

标　　题：Study Of Surface Microscopic Properties Of Asphalt Based On Atomic Force Microscopy

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：In this paper, atomic force microscopy (AFM) was utilized to investigate the surface microscopic morphology (SMM) and bee structure (BS) of several asphalts and quantitatively evaluate them via roughness theory. The effects of asphalt properties, aging, moisture and anti-stripping agents on the SMM and BS were studied comprehensively. Five types of asphalts were investigated, and each asphalt was prepared with four different conditions. The results showed that the oil source was the only factor among the asphalt properties that influenced the presence of BS, and the BS changed the SMM. The larger the asphalt grade was, the rougher the asphalt SMM, the larger the BS number and the smaller the BS size. The SMM of SBS-modified asphalt was flatter than that of the original asphalt. After aging, the SMM of matrix asphalt became smooth, while the SMM of SBS-modified asphalt became rough. Compared to the original asphalt, the BS number and size of the aged asphalt increased and decreased, respectively. After immersion in water, the phenomenon of water piercing

occurred on the asphalt surface, which further changed the SMM and BS; specifically, the roughness of the SMM increased, the BS size decreased, the BS peak increased, and the BS valley decreased. After being blended with the anti-stripping agent, the SMM of the matrix asphalts became smooth, and the SBS-modified asphalts became rough; the BS number increased, the BS size decreased, and both the BS peak and the maximum valley decreased. (C) 2020 Elsevier Ltd. All rights reserved.

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第 160 篇

标　　题： Correlate Aggregate Angularity Characteristics To The Skid Resistance Of Asphalt Pavement Based On Image Analysis Technology

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The impact of aggregate morphological characteristics plays a key role in the skid resistance of road surface due to driving safety and cost benefits. The 2nd generation of the Aggregate Imaging Measurement System (AIMS II) and X-ray Computed Tomography (CT) were utilized to evaluate the shape of particles and capture the change in their morphological characteristics. The Los Angeles Abrasion (LAA) Test was also conducted in this paper to investigate the influence of variations in aggregate angularity on the resistant performance of asphalt mixtures. Before and after 100, 300, 500, and 1000 rotations of LAA polishing process, 48 particles from each different size were adopted and measured using AIMS II and XCT to obtain the value of their morphological properties. The parameter gradient angularity (GA) with AIMS II and three-dimensional angularity (3DA) with XCT of aggregate surface area were proposed from these tests. Analysis of Variance (ANOVA) was employed to compare these two image analysis systems. Conventional experiments including the sand patch test and British pendulum test, were applied using the prepared aggregates to establish a correlation between the morphological properties of grains and the parameters related to the skid resistance of asphalt mixtures. It was found that the resistance performance of asphalt mixtures can be well described with a function using the value of morphological properties through regression analysis. The efficacy of the X-ray CT analyzing system was verified to evaluate the performance of asphalt mixture pavement precisely. The changes in morphological characteristics of particles are the main causes for degradation in the skid resistance of asphalt pavement. (C) 2020 Published by Elsevier Ltd.

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第 161 篇

标　　题： Cerium-Bismuth Solid Solution Material Prepared And Application In Automobile Exhaust Purification

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期　　刊： SEPARATION AND PURIFICATION TECHNOLOGY

摘　　要： Due to the effect of human beings, the ecosystem of earth in which people can only live is encountering increasingly severe pollution. Environment pollution, especially the air pollution, has become a problem that cannot be ignored today. Therefore, this work is dedicated to make full use of light energy and combined with photocatalysis technology, to convert harmful pollutants to humans into clean substances, so as to achieve the purpose of purifying the air. This work prepared the cerium-bismuth solid solution material, which had a good effect on the purification of exhaust gas. The optimum ratio of cerium-bismuth in the solid solution material was obtained through the exhaust gas purification experiment. Moreover, the microscopic characterization tests of XRD, UV-Vis, FT-IR, SEM, EDS were conducted. The results obtained are that the molar ratio of cerium and bismuth is 0.5. In addition, under ultraviolet light conditions, the purification efficiency of cerium-bismuth solid solution material for HC, CO, CO2 and NOX were 3.6%, 22.22%, 13.56%, 26%. Under natural light conditions, the purification efficiencies for HC, CO, CO2 and NOX were 17.57%, 23.1%, 17.3% and 39.1%, respectively. The optical domain can be extended from ultraviolet light to visible light.

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WOS 号： 000514748000008

第 162 篇

标　　题： The Effect Of Nano-Caco3/Styrene-Butadiene Rubber (Sbr) On Fundamental Characteristic Of Hot Mix Asphalt

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： This study investigates the performance characteristics of nano-CaCO3/SBR-modified asphalt mixture. SBR-modified asphalt was mixed with nano-CaCO3 particles at a concentration of 3%, 4%, 5%, 6% and 7% by weight of asphalt binder. Wheel track test was used to determine the proper dosage of nano-compound modifiers which are comparable to SBS-modified asphalt mixture in terms of deformation performance at

high temperature. Asphalt mixture performance tests such as static creep test, overlay test and three-point beam bending test were conducted for nano-modified asphalt mixture and SBS-modified asphalt mixture. The micro topography and micromechanical property of modified bitumen are evaluated by atomic force microscopy (AFM) to study the modification mechanism of nano modifiers. Results show that 5%CaCO3/4%SBR-modified asphalt mixture has superior rutting resistance and creep characteristics at high temperature in terms of wheel track test and static creep test. However, reflection cracking resistance and flexural deformation stability of 5%CaCO3/SBR-modified asphalt mixture at low temperature are slightly worse than SBS-modified asphalt mixture. Despite this, ANOVA result indicates that the difference between the two kinds of asphalt mixture is not significant. AFM test result reveals that 5%CaCO3/SBR modifier can well be dispersed in bitumen and evidently increase the micromechanical properties of bitumen such as adhesion and dissipated energy while it has a negative effect on Derjaguin-Muller-Toporov (DMT) modulus. In general, 5%nano-CaCO3/4%SBR modifier has the desirable potential to comprehensively improve the performance of hot mix asphalt and is promised to be applied in the warm area.

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第 163 篇

标　　题： Rheological Properties And Modification Mechanism Of Polyphosphoric Acid-Modified Asphalt

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： In this study, rheological properties and modification mechanism of polyphosphoric acid (PPA)-modified asphalt were investigated by engineering and chemical tests. Different asphalt source, PPA level, and PPA dosage were applied to produce binders. Rheological behaviour of binders was described by experimental and theoretical methods including conventional tests, temperature sweep test and Burgers model based on the bending beam rheometer test. Chemical characterisation was explored through SARAs, functional groups and molecular size using thin-layer chromatography-flame ionisation detector, nuclear magnetic resonance, and gel permeation chromatography. Relationship between chemical and physical properties of binders was established. The results showed that PPA dosage and asphalt source had a significant effect on penetration, softening point and ductility. PPA level could have little impact. Rutting deformation resistance was enhanced by adding PPA. Burgers model fitting parameters showed that PPA-modified asphalt may have a better creep behaviour at low temperature, and stress relaxation was accelerated as well. PPA addition transferred colloidal system of binders from sol type to gel type. Chemical structures were altered where oxhydryl groups in PPA chemical structures reacted with polar groups in asphalt,

possibly producing aethers or esters. The cyclisation and grafting between carbon chains may happen and further make asphalt more complex and large-weight molecular structures. Colloidal index (CI) and percent of large molecular size could be used to indicate the change in physical properties and predict modification degree of binders.

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第 164 篇

标　　题： Investigating The Effect Of Physic-Chemical And Thermodynamic Impact On Cohesive Performance Of Asphalt

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期　　刊： PETROLEUM SCIENCE AND TECHNOLOGY

摘　　要： To investigate the effect of bitumen physicochemical and thermodynamic parameters on its cohesive properties, 9 asphalt binders from different refineries were used. Chemical constituents, molecular weight distribution as well as thermodynamic parameters of asphalt were obtained. Peel test was applied to evaluate the cohesive properties within bitumen. The relationship between these parameters was investigated using regression analysis. Large molecule size shows weak negative correlation with cohesion properties of bitumen. Surface free energy especially nonpolar component shows significantly positive correlation with cohesion fracture energy. Surface free energy is applicable to screen asphalt binder in terms of cohesive properties.

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第 165 篇

标　　题： Determination Of Thermal Conductivity Of Asphalt Paving Mixtures Using Finite Element Method

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Thermal conductivity k is an important input parameter to the study of pavement thermal behaviors in a number of practical engineering problems. Laboratory determination of k requires special-purpose devices which are commonly not available in a standard pavement engineering laboratory. Another complication is that the k of an asphalt mixture changes as its air voids content reduces with time under traffic loading. This makes laboratory determination of k impractical for analyzing problems related to pavement thermal behavior. To overcome the mentioned difficulties, this study develops a computer-aided procedure to determine by means of a numerical model the k of

asphalt mixtures with known volume proportions of mix constituents. The asphalt mixture analyzed is first represented by a two-dimensional row-column structure with a unit thickness, with each constituent randomly assigned to occupy the number of cells based on its volume proportion in the mix. Next, based on the row-column structure, a computer simulation model of heat conduction in an asphalt mixture is developed to derive the k of the mixture studied. In cases where the k values of asphalt binder and aggregate are unknown, the model can be calibrated using genetic-algorithm to obtain all the needed k values. Once calibrated, the numerical model can be repeatedly applied to determine the k of the asphalt mixture with different air voids contents, with no further requirements for laboratory testing. Examples are presented to demonstrate that the proposed model is able to estimate k of asphalt mixtures with accuracy within practically acceptable limits.

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第 166 篇

标　　题： Investigation On Aggregate Particles Migration Characteristics Of Porous Asphalt Concrete (Pac) During Vibration Compaction Process

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Porous asphalt concrete (PAC) has been widely used in the pavement for excellent performance in noise reduction and drainage. As a typical mixture with a skeleton-void structure, the performance of PAC is greatly affected by the compaction mechanism and internal structure of asphalt mixtures. This study tries to investigate compaction characteristics and migration trends of aggregate particles in porous asphalt mixtures prepared by a vertical vibration compaction method (VVCM) with different compaction parameters. The principal axis orientation and interlayer distance as evaluation indicators obtained by digital image processing (DIP) and Image-pro plus (IPP) software are used to evaluate the migration characteristics of aggregate particles in asphalt mixtures. The results show that the self-organization and immigration of aggregate particles in PAC are unified and the migration data of particles present statistical regularity. The aggregate particles are gradually deflected toward the horizontal direction to form a stable aggregate skeleton during the vibration compaction. Besides, the compaction degree of asphalt mixture in the middle and upper parts is significantly improved by the increase of the vibration frequency, while prolonging the vibration time is conducive to improve the compaction degree of asphalt mixture in the middle and lower parts.

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第 167 篇

标　　题：Study On Impact Of Variables To Pavement Preheating Operation In Hir By Using Fem

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Hot In-place Recycling (HIR) is an innovative pavement maintenance and rehabilitation technology that can reuse up to 100% of the material from an existing pavement as Reclaimed Asphalt Pavement (RAP). Pre-heating the pavement is the first step in the HIR process and uniformly heating distressed pavement is crucial to the quality of the recycled mixture in terms of rejuvenator diffusion, required adhesion between virgin and old material, and achieving an efficient asphalt ratio in RAP materials. The low thermal conductivity of asphalt concrete makes the transmission of heat from the top of the pavement to the scarification depth difficult. This study analyzed the impact of seven different operational parameters of recycling heating equipment on the heating efficacy by using the finite element method (FEM). The parameters include the height of heating board, equipment speed, output power, construction temperature, heating repetition, gap distance between two heaters, and area of heating board. The impact of variations in each parameter was statistically analyzed through fractional factorial experiment design. The heating board's area and heating repetitions were found to be the two dominant factors affecting pavement surface preheating, and construction temperature is the most significant factor for pavement heating at a depth of 4 cm. Finally, three reasonable combinations of equipment operational parameters were provided to guide field construction practices. (C) 2020 Elsevier Ltd. All rights reserved.

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第 168 篇

标　　题：Purification Of Automobile Exhaust Gas By Activated Carbon Supported Fe3+ Modified Nano-Tio2 And Its Application On Asphalt Pavement

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期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：Automobile exhaust gas discharged into the air not only pollutes the environment but also seriously harms human health. Although pure nano-TiO2 has a purified effect on exhaust gas, it has a wide band-gap, a narrow response range of visible light, and is prone to agglomerate, leading to the lower catalytic efficiency. In this study, Fe3+

doping and activated carbon loading were used to compositely modify TiO2 to extend the spectral response range and dispersion performance of TiO2. Firstly, activated carbon supported Fe3+ modified nano-TiO2 (Fe-TiO2/AC) composite catalysts were prepared by sol-gel method. Then the specimens were characterised by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and ultraviolet-visible spectrophotometer (UV-Vis). The micro-structures were observed by scanning electron microscopy (SEM). Based on the self-developed exhaust gas test system, the effects of the activated carbon dosage, light source, temperature, catalyst dosage and other factors on the catalytic performance were investigated. Finally, the application method and effect of the catalyst in the asphalt pavement was explored. The results showed that with the increase of Fe3+ content, the grain size of nano-TiO2 decreases gradually, the band-gap narrows gradually, and the response range to visible light broadens gradually. The activated carbon loading not only increases the dispersibility of the nano-TiO2 but also increases the absorption of the exhaust gas. The Fe-TiO2/AC composite catalyst has the best degradation effect on CO, NO and HC exhaust gas, which is better than pure nano-TiO2 and Fe3+ modified TiO2. By using the spraying method, the catalytic performance of Fe-TiO2/AC photocatalyst combined with OGFC asphalt mixture reaches the maximum. With the increase of wear times, the degradation effect of the test specimen on the exhaust gas was reduced, the rate of decrease was fast, then slowly, and finally the degradation performance gradually tends to be stable.

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第 169 篇

标　　题： Propagation Laws Of Blasting Seismic Waves In Weak Rock Mass: A Case Study Of Muzhailing Tunnel

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In order to study the propagation laws of blasting vibration waves in weak rock tunnels, the longitudinal and circumferential blasting vibration tests in Muzhailing Tunnel were carried out, and the measured data were analyzed and studied using the methods of Sadov's nonlinear regression, Fourier transform, and Hilbert-Huang transform (HHT) to provide a reference for the optimization of blasting design of Muzhailing Tunnel or similar weak rock tunnels. The results showed that the tangential main frequency decreases rapidly and the radial main frequency decreases slowly with the increase of proportionate charge quantity. Under a certain charge quantity, as the distance from the explosion source increases, the spectrum width of the blasting vibration frequency

becomes narrower, the overall energy is more concentrated, and the vibration frequency tends to be closer to the low frequency. At a certain distance from the explosive source, the frequency of blasting vibration decreases gradually, and the amplitude of low-frequency region increases with the increase of charge quantity. The vibration velocity on the left side of the tunnel is larger than that on the right side, and the vibration velocity at the vault and the arch foot of lower bench decreases rapidly, while the vibration velocity at the arch feet of upper bench and middle bench decreases slowly. The vibration frequencies of the left arch foot of the middle bench and the right arch foot of the upper bench are higher than those of other positions, while the frequencies of the left arch foot of the upper bench are the lowest. During tunnel blasting, the energy input to the strata media is mainly concentrated in the stage of the blasting of the cut hole. The blasting has more energy input to the left arch foot of the upper bench and the tunnel vault, which is consistent with the conclusion of frequency analysis.

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第 170 篇

标　　题： Influence Of Fluid Viscous Damper On The Dynamic Response Of Suspension Bridge Under Random Traffic Load

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Fluid viscous dampers (FVDs) are widely used in long-span suspension bridges for earthquake resistance. To analyze efficiently the influences of FVDs on the dynamic response of a suspension bridge under high-intensity traffic flow, a bridge-vehicle coupling method optimized by isoparametric mapping and improved binary search in this work was first developed and validated. Afterwards, the traffic flow was simulated on the basis of monitored weigh-in-motion data. The dynamic responses of bridge were analyzed by the proposed method under different FVD parameters. Results showed that FVDs could positively affect bridge dynamic response under traffic flow. The maximum accumulative longitudinal girder displacement, longitudinal girder displacement, and longitudinal pylon acceleration decreased substantially, whereas the midspan girder bending moment, pylon bending moment, longitudinal pylon displacement, and suspender force were less affected. The control efficiency of maximum longitudinal girder displacement and accumulative girder displacement reached 33.67% and 57.71%, longitudinal pylon acceleration and girder bending moment reached 31.51% and 7.14%, and the pylon longitudinal displacement, pylon bending moment, and suspender force were less than 3%. The increased damping

coefficient and decreased velocity exponent can reduce the bridge dynamic response. However, when the velocity exponent was 0.1, an excessive damping coefficient brought little improvement and may lead to high-intensity work under traffic flow, which will adversely affect component durability. The benefits of low velocity exponent also reduced when the damping coefficient was high enough, so if the velocity exponent has to be increased, the damping coefficient can be enlarged to fit with the velocity exponent. The installation of FVDs influences dynamic responses of bridge structures in daily operations and this issue warrants investigation. Thus, traffic load should be considered in FVD design because structural responses are perceptibly influenced by FVD parameters.

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第 171 篇

标　　题： Experimental Study On The Effect Of Water Gushing On Loess Metro Tunnel

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： In the construction of metro tunnels, water gushing accidents caused by the rupture of underground pipeline often occur, and in loess area, the collapsibility of loess makes this problem more complex and difficult. To investigate the damage of metro tunnel caused by collapsible loess under the action of local dynamic water (gushing water), a model experiment was conducted based on the pipeline water gushing accident happened in the construction of metro tunnel located in loess area. Through the study of similar materials of loess and tunnel lining, the test materials and apparatus were prepared according to similarity criterion. By simulating water gushing environment in the loess stratum, this paper analyzed mechanical characteristics of tunnel (water pressure of surrounding rock, contact pressure and internal force of tunnel lining) and deformation of surrounding rock and tunnel. Furthermore, combining with the process of local collapse of loess in the model experiment, it is concluded that the formation of water transport channel is the main reason for the difference of tunnel structural response when water gushing occurs at different locations. Finally, a three-dimensional spatial model of water transport channel in loess stratum under the environment of local water gushing was established to study the rule of water transport.

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第 172 篇

标　　题： Crop Classification In Cloudy And Rainy Areas Based On The Optical-Synthetic

Aperture Radar Response Mechanism

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期　　刊：JOURNAL OF APPLIED REMOTE SENSING

摘　　要：In the agricultural field, optical remote sensing technology plays an important role in crop monitoring or production estimation. However, the widespread distribution of clouds and rain limits the application of optical remote sensing. Synthetic aperture radar (SAR) has been widely used for studies of oceans, atmosphere, land, and space exploration, as well as by the military due to its all-weather nature, penetration to surface and cloud layers, and diversity of information carriers. However, it is difficult to classify ground objects with high accuracy based on SAR data. Considering the features of these two datasets, we proposed a framework to improve crop classifications in cloudy and rainy areas based on the optical-SAR response mechanism. Specifically, this method is designed to train a parametric analytic model in the area using both kinds of datasets and applied in the area with only SAR data to obtain the optical time-series features. Then crops from the second area were classified by the long-short-term memory network. As an example, the parametric analytic model in Lixian County was studied and was applied to Xifeng County to classify the crops with the OA of 61%, which had proved the robustness of the method. (C) 2020 Society of Photo-Optical Instrumentation Engineers (SPIE).

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WOS 号：000615581900001

第 173 篇

标　　题：Study On The Effect Of Hydrated Lime Content And Fineness On Asphalt Properties

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Hydrated lime is known to be an effective moisture damage additive, and it can also reduce the chemical ageing of the bitumen and stiffen the mastic. However, the optimum content and fineness of hydrated lime used in asphalt have been rarely studied. In order to determine the effect of lime content and fineness on hydrated lime modified asphalt and select the optimum lime content and fineness, XD90 asphalt, granite and 200 mesh, 300 mesh and 400 mesh lime with different lime content were

chosen as experimental materials. At first, according to surface free energy method, the adhesion work W-a was chosen as the main index to evaluate the adhesion between asphalt and granite, and the asphalt surface free energy components after hydrated lime modification were tested. After that, basic technical properties of hydrated lime modified asphalt were studied to refine lime content and fineness. Finally, multiple stress creep and recovery and linear amplitude sweep tests were carried out respectively to study rheological properties of hydrated lime modified asphalt. The results showed that the asphalt adhesiveness increased with the increase of lime fineness, and the optimum lime content for asphalt adhesiveness was around 10%. Moreover, hydrated lime could raise the asphalt viscosity and stiffen asphalt. To make ductility meet the specification requirements, the lime content should be controlled below 10%. When lime content was around 3%-10%, hydrated lime modified asphalt had relatively good rheological properties compared with base asphalt. Meanwhile, the high temperature performance together with the ability to resist permanent deformation was improved apparently. In conclusion, taking into account the adhesion, rheology and basic properties of hydrated lime modified asphalt, the optimum lime content and fineness could be finally determined. (C) 2020 Elsevier Ltd. All rights reserved.

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第 174 篇

标　　题： Temperature Responses Of Asphalt Pavement Structure Constructed With Phase Change Material By Applying Finite Element Method

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Phase change material, PCM, which is a new type of additive for pavement engineering, has been studied for regulating the working temperature of pavement structure. By storing and releasing thermal energy via phase change, PCM is able to maintain the temperature of pavement structure in a relatively narrow range. Current researches on PCM mainly focus on its preparation, mechanism, and testing, while few researches have been conducted on the evaluation of PCM's temperature regulation effect. This research however, established an asphalt pavement model with and without PCM respectively by applying finite element method (FEM), and compared the two patterns' thermal regulation ability in a detailed way. Influence factors of asphalt

pavement temperature field were classified into external and internal factors. The boundary conditions were determined based on in-situ meteorological data. The effects of PCM on temperature of asphalt pavement were evaluated. Latent heat accumulated temperature value (LHATV) and latent heat thermoregulation index (LHTI) were selected to evaluate the latent heat effect. Results showed that different layers of surface course constructed with PCM had different thermal regulation ability. Other factors like temperature difference in a day and whether to add PCM can also make a difference. The proposed LHATV and LHTI were good indices and assessment for PCM's function. The results of the present study can lay the foundation for calculating the temperature field of pavement structure constructed with PCM and for investigating the application of PCM in pavement engineering. (C) 2020 Elsevier Ltd. All rights reserved.

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第 175 篇

标　　题： The Analysis Of The Factors Affecting The Macrotexture Of Bauxite Clinker Aggregate Gradation

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In this research, influencing factors on the macrotexture of bauxite clinker aggregate gradation were analyzed and the role of aggregate in the anti-skid performance of asphalt pavement was determined. AMES road texture laser scanner was used to conduct macrotexture tests. It was found that the macrotextures of single grain size aggregates were enlarged as grain size was increased, the macrotextures of mixed grain size aggregates were enlarged as the proportion of small grain size particles was decreased and both fine aggregates and mineral powder extended aggregate structure. Meanwhile, the effect of aggregate size on the macro-structure of the pavement was greater than that of percent voids in coarse mineral aggregate in the dry rodded condition (VCA). In addition, mean texture depth (MTD) was first decreased and then increased with the increase of compaction work. Under the action of traffic load, macrostructure was fluctuated. The results of this paper provide some references for road designers to consider macrotexture in gradation design. (C) 2020 Published by Elsevier Ltd.

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第 176 篇

标　　题： Development Of Environmentally Friendly Flame Retardant To Achieve Low Flammability For Asphalt Binder Used In Tunnel Pavements

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： This paper reports the development of an environmentally friendly flame retardant, referred to as FRC-Si, to improve the fire resistance of asphalt binder without compromising mixture performance. This flame-retardant composite (FRC) contains four halogen-free flame-retardant components: expandable graphite (EG), magnesium hydroxide (MH), calcium hydroxide (CH), and ammonium polyphosphate (APP). These four components have different ranges of thermal reaction temperature so they can effectively absorb heat throughout the entire process of binder combustion. An orthogonal experiment with six binder properties as the influential factors was designed for this study. Then, a multi-criteria decision analysis method was employed to find the optimal proportion of the combined EG, MH, CH, and APP to be 5:5:4:9, respectively. A silane coupling agent was added to modify the surface properties and improve stability of the asphalt binder, thereby transforming the preliminary FRC to FRC-Si. Based on activation index values and oil absorption of the binder, the optimum content of the silane coupling agent was determined to be 1.2% by mass of FRC. In addition, the rheological properties and flammability of styrene-butadiene-styrene (SBS) binder with various dosages of FRC-Si were obtained and the optimum content of FRC-Si was determined to be 8% by mass of binder. Finally, cone calorimeter tests were performed to evaluate the flame retardancy of asphalt mixtures with SBS, FRC, and FRC-Si binders. Results indicate that FRC-Si not only reduced the amounts of heat and carbon monoxide (CO) released, but also delayed the release of CO, thereby supporting the application of FRC-Si as a flame retardant for asphalt pavements in tunnels. (C) 2020 Elsevier Ltd. All rights reserved.

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第 177 篇

标　　题： Automobile Exhaust Gas Purification Material Based On Physical Adsorption Of Tourmaline Powder And Visible Light Catalytic Decomposition Of G-C3N4/Bivo4

作　　者： [Li, Yang; Xing, Xiangyang; Pei, Jianzhong; Li, Rui; Wen, Yong; Cui, Shengchao; Liu, Tao] Changan Univ, Sch Highway, Xian 710064, Peoples R China

通讯作者： Pei, JZ (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： CERAMICS INTERNATIONAL

摘　　要： Pure g-C3N4, g-C3N4/BiVO4, and g-C3N4/BiVO4/tourmaline powder composite photocatalytic materials were prepared via the methods of one-step calcination and bi-dispersion direct mixing, and their automobile exhaust gas purification efficiencies were tested. Four types of samples (g-C3N4, BiVO4, g-C3N4/BiVO4, and g-C3N4/

BiVO4/tourmaline powder) were characterized using various methods, such as X-ray diffraction, scanning electron microscopy, Brunauer-Emmett-Teller analysis, Fourier transform infrared spectroscopy, ultraviolet-visible light-near infrared spectroscopy, and X-ray photoelectron spectroscopy (XPS). The test results showed that the photocatalysis composite exhibited the highest purification efficiency when the mass ratio of gC3N4/BiVO4 was 2 and the load of tourmaline powder was 25 wt%. The hydrocarbon, CO, and NO purification rates of the g-C3N4/BiVO4/tourmaline powder were 1.73, 1.74, and 2.52 times higher than those of pure g-C3N4, respectively. It was concluded from the XPS patterns that the heterojunction formed by g-C3N4 and BiVO4 promoted the separation of electron-hole pairs and charge migration, which enhanced the photocatalytic degradation of exhaust gas under visible light. Moreover, tourmaline powder increased the physical adsorption capacities of the composite materials for automobile exhaust by releasing several negative ions, thus considerably increasing their decomposition efficiencies. This study is of immense significance to the management of urban automobile exhaust pollution.

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WOS 号： 000528483600139

第 178 篇

标　　题： Nested Logit Joint Model Of Travel Mode And Travel Time Choice For Urban Commuting Trips In Xi'An, China

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期　　刊： JOURNAL OF URBAN PLANNING AND DEVELOPMENT

摘　　要： Commuter trips are an important part of urban travel, and studying the influencing factors, changing rules, and choice behaviors of urban commuting trips is of great significance for optimizing the urban trip structure. This paper utilizes a nested logit model to investigate commuters' joint choice behavior of commuting time and mode by considering factors including socioeconomic, household, and trip characteristics. Two possible decision-making model structures are proposed: the commuting time-mode structure (time choice is the upper level) and the commuting mode-time structure (mode choice is the upper level). A model specification is conducted in SPSS based on the data of Xi'an urban commuters, and the commuting time-mode structure is demonstrated as the appropriate one by judging the inclusive value of each nest. It indicates that commuters often choose a commuting mode based on commuting time, and the commuting time-mode model is more suitable for fitting commuters' travel choice. The higher the household income, the greater the probability of commuting by taxi or driving alone. Commuting distance strongly and negatively influences mode choice, including walking, bicycling, bus, and taxi. Civil servants, medical staff, teachers, and technical staff are more sensitive to commuting time than are other commuters. Commuters who usually go to work by driving alone may turn to a bus when a car is not available. Increasing total household bicycle ownership will bring competition

between bicycle and bus and enhance commuters' willingness to bike to work, especially when the cycling time is above 30 min.

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WOS 号： 000530381600010

第 179 篇

标　　题： Automobile Exhaust Purification Over G-C3N4 Catalyst Material

作　　者： [Cui, Shengchao; Li, Rui; Pei, Jianzhong; Wen, Yong; Li, Yang; Xing, Xiangyang] Changan Univ, Highway Sch, Xian 710064, Peoples R China

通讯作者： Li, R (corresponding author), Changan Univ, Highway Sch, Xian 710064, Peoples R China.

期　　刊： MATERIALS CHEMISTRY AND PHYSICS

摘　　要： In this work, graphite phase carbon nitride (g-C3N4) photocatalyst was prepared by thermal decomposition of dicyandiamide. By controlling the calcination temperature (450 degrees C, 500 degrees C, 550 degrees C and 600 degrees C), g-C3N4 materials with different structure types were obtained. The prepared samples were used to test the degradation of automobile exhaust. The optimum preparation temperature could be obtained by measuring the purification efficiency for the automobile exhaust. Moreover, XRD, SEM, FT-IR, UV-vis, PL, AND TG-DSC tests were conducted to characterize the microstructures and properties of the samples. The results obtained are that when the calcination temperature was 600 degrees C, the obtained g-C3N4 material has the highest purification efficiency for the exhaust gas. Then the degradation rates for the four components of exhaust gas HC, CO, CO2, NOx were 0.16%, 0.42%, 0.29% and 15.41% respectively under ultraviolet irradiation (UV irradiation) in 60 min, and 9.7%, 4.77%, 6.86%, 35.45% respectively under visible light irradiation (Vis irradiation). It could provide a potential utilization for future exhaust gas treatment.

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WOS 号： 000530647200004

第 180 篇

标　　题： Identifying Hazardous Road Sections Using A Fuzzy Expert System

作　　者： [Zhang, Chi; Ma, Xiongying; Yan, Xiaomin; Meng, Liang; Qi, Chen; Zhang, Min] Changan Univ, Sch Highways, Xian, Shaanxi, Peoples R China

通讯作者： Meng, L (corresponding author), Changan Univ, Sch Highways, Xian, Shaanxi, Peoples R China.

期　　刊： PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS-TRANSPORT

摘　　要： To identify hazardous sections of newly built mountainous highways, decision-makers require assistance to determine the sections that may pose risks to road users, thereby enhancing the level of road safety management and capital utilisation efficiency. In this research, traffic accident economic losses were used as evaluation indices to characterise 30 horizontally curved sections of roadways. These highway sections were divided into five levels based on their evaluated level of risk. With the effects of multiple factors and the characteristics of uncertainty, mathematical statistics and fuzzy expert systems (FESs) were used to determine the factors contributing to hazardous

sections of mountainous highways. The membership functions and fuzzy rule base were decided according to accident data and expert experience and a method for identifying hazardous sections based on the expert systems was established. The risk values of another 35 horizontally curved sections were obtained by this method and good results were achieved using the method to identify hazardous sections. The results showed that hazardous section classification is greatly affected by the horizontal radius, grade and declination angle of the horizontal curve. The results obtained from the FESs agreed overall with actual accident data.

DOI： 10.1680/jtran.16.00119

WOS 号： 000534583800002

第 181 篇

标　　题： Quantitative Risk Analysis Of A Rainfall-Induced Complex Landslide In Wanzhou County, Three Gorges Reservoir, China

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通讯作者： Wang, JJ (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.; Wang, JJ (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian 710064, Peoples R China.

期　　刊： INTERNATIONAL JOURNAL OF DISASTER RISK SCIENCE

摘　　要： On 4 April 2013, a 1.5 million cubic meter landslide occurred in Sunjia Town, Wanzhou County, Three Gorges Reservoir, China. After initiation, the Sunjia landslide traveled about 30 m toward the northeast and destroyed most of the infrastructure in its path. The landslide was triggered by heavy rainfall and previous slope excavations, but this slope also displayed a complicated failure process: the overlying earth slope first deformed and then induced sliding along underlying rock surfaces. Surface displacements that resulted from continuous creeping of the post-event slope were observed by an emergency monitoring system that revealed the disequilibrium state of the slope. To discuss the stability and future movements of the remaining unstable debris deposits, we developed a geotechnical model of the post-slide slope, calculated how it can slide again in an extreme rainfall scenario, and estimated the potential runout distance using the Tsunami Squares method. We then estimated the number of people and the value of the infrastructure threatened by this potential landslide. Lastly, we analyzed the vulnerability of elements at risk and quantitatively evaluated the hazard risk associated with the most dangerous scenario. This quantitative risk analysis provides a better understanding of, and technical routes for, hazard mitigation of rainfall-induced complex landslides.

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WOS 号： 000540555100008

第 182 篇

标　　题： Stability Evaluation Of Reinforced Concrete Structure Of Large Coastal Buildings

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通讯作者：Liu, LJ (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊：JOURNAL OF COASTAL RESEARCH

摘　　要：In view of the poor accuracy of the evaluation results of the original coastal building reinforced concrete structure stability evaluation method, the stability evaluation method of large coastal building reinforced concrete structure is designed. According to the designed design process, the parameters affecting the stability of reinforced concrete structure of coastal buildings are obtained, which are: corrosion time of reinforcement, cracking time of protective layer and expansion value of reinforcement. Determine the stability evaluation coefficient and fuzzy evaluation method to get the influence parameter weight. Combining the weight calculation results with the influencing factors, using the Coriolis evaluation model, the stability evaluation model of reinforced concrete structure of large coastal buildings is constructed, and the evaluation grade is set. So far, the design of stability evaluation method for reinforced concrete structure of large coastal buildings has been completed. Compared with the original method, the accuracy of this method is better than the original method, and the similarity between this method and the experimental data is higher. In conclusion, the evaluation effect of this method is better than the original method.

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第 183 篇

标　　题：A Numerical Method For Evaluating Fire Performance Of Prestressed Concrete T Bridge Girders

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期　　刊：COMPUTERS AND CONCRETE

摘　　要：This paper presents a numerical method for evaluating fire performance of prestressed concrete (PC) T shaped bridge girders under combined effect of structural loading and hydrocarbon fire exposure conditions. A numerical model, developed using the computer program ANSYS, is employed to investigate fire response of PC T shaped bridge girders by taking into consideration structural inherent parameters, namely; arrangement of prestressing strands with in the girder section, thickness of concrete cover over prestressing strands, effective degree of prestress and content of prestressing strands. Then, a sequential thermo-mechanical analysis is performed to predict cross sectional temperature followed by mechanical response of T shaped bridge girders. The validity of the numerical model is established by comparing temperatures, deflections and failure time generated from fire tests. Through numerical studies, it is shown that

thickness of concrete cover and arrangement of prestressing strands in girder section have significant influence on the fire resistance of PC T shaped bridge girders. Increase in effective degree of prestress in strands with triangular shaped layout and content in prestressing strands can slow down the progression of deflections in PC T shaped bridge girder towards the final stages of fire exposure, to thereby preventing sudden collapse of the girder. Rate of deflection based failure criterion governs failure in PC T shaped bridge girders under most hydrocarbon fire exposure conditions. Structural inherent parameters incorporated into sectional configuration can significantly enhance fire resistance of PC bridge girders; thus mitigating fire induced collapse of these bridge girders.

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第 184 篇

标　　题： Multi-Cross-Reference Method For Highway-Bridge Damage Identification Based On Long-Gauge Fiber Bragg-Grating Sensors

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期　　刊： JOURNAL OF BRIDGE ENGINEERING

摘　　要： Highway bridges are vital infrastructure engineering whose safety severely influences the safety and stability of society. Damage identification, as the core part of structural health monitoring, plays an essential role in highway-bridge maintenance to help detect potential damage. There have been many studies conducted, with various damage identification methods proposed. However, there are still several problems with the durability of sensors and the reliability of methods, such as the issue of false alarm. Under this background, this paper proposed a multi-cross-reference method for highway-bridge damage identification method utilizing long-gauge fiber Bragg-grating (FBG) sensors. Through several numerical simulations and on-site testing, its feasibility under various conditions was verified. The results demonstrated that through this method the location of damage can be accurately identified with error of less than 5% in identified damage extent.

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WOS 号： 000575687700001

第 185 篇

标　　题： Determination Of Safe Vehicle Speeds On Wet Horizontal Pavement Curves

作　　者： [Peng, J.; Chu, L.; Fwa, T. F.] Changan Univ, Sch Highway, Xian, Peoples R China; [Fwa, T. F.] Natl Univ Singapore, Singapore, Singapore

通讯作者： Chu, L (corresponding author), Changan Univ, Sch Highway, Xian, Peoples R China.

期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：Knowing the maximum safe driving speed on a pavement curve under wet condition is crucial in achieving safe driving in wet weather. This information is valuable for pavement engineers in paving materials selection, mix design, drainage design and pavement maintenance treatment design to meet the skid resistance requirements for the safe driving speed. Unfortunately, due to the complex variables involved (including pavement surface material properties, tire properties and water film thickness), currently there is no practical working procedure that allows pavement engineers to determine the maximum safe driving speed of a vehicle on a horizontal curve under wet weather condition. To bridge this gap, this paper presents a finite element simulation model that predicts the maximum safe driving speed for a vehicle on a horizontal pavement curve (with known pavement material properties) in wet weather when there is a layer of water on the pavement surface. The maximum safe driving speed was derived by first calculating the available tire-pavement frictional resistance using the finite element simulation model, followed by a tire skidding potential analysis considering the available tire-pavement frictional resistance and the centrifugal force acting on the tires. The development and validation of the simulation model are described in this paper, and numerical examples are presented to illustrate its application in the determination of maximum safe vehicle speed. The procedure and input data (including pavement material properties and drainage data) required for calculating the maximum safe vehicle speeds on actual in-service pavement curves are presented and explained.

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WOS 号：000542890800001

第 186 篇

标　　题：Mathematical And Mechanical Analysis Of The Effect Of Detonator Location And Its Improvement In Bench Blasting

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：The outcome of bench blasting significantly affects the downstream operations in mining. In bench blasting, the explosives charged in blastholes are generally cylindrically shaped and fired by the in-hole detonator. As the detonator determines the propagation of the detonation wave in the cylindrical charge, the effect of detonator location can never be ignored. In this paper, the mathematics and mechanics of the effect of detonator location was analyzed from the view of the distribution of explosion

energy and blast stress field of a cylindrical charge. Then, a field blasting experiment and two numerical simulations were conducted to further display its effect on blasting outcomes. At last, the appearance of oversize boulders and rock toes in bench blasting was discussed, and an improved scheme of the detonator location was proposed to cope with these problems. Results indicate that the in-hole detonator has the capacity of adjusting the spatial distribution of explosion energy and blast stress field in the surrounding rock mass. The traditional recommendation of the bottom detonator is not always right. The optimized detonator location in bench blasting is available by properly combining the merits of traditional detonator locations. This study is of interest to improve the efficiency and reduce the cost of mining.

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WOS 号： 000542630100001

第 187 篇

标　　题： Research On Random Fatigue Load Model Of Highway Bridge By Vehicle Traffic Based On Gmm

作　　者： [Qu, Hao; Huang, Pingming] Changan Univ, Sch Highway, Xian 710064, Shaanxi, Peoples R China; [Niu, Zhihua] Power China Northwest Engn Corp Ltd, Xian 710065, Shaanxi, Peoples R China

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期　　刊： TEHNICKI VJESNIK-TECHNICAL GAZETTE

摘　　要： Highway bridges have often suffered accidents due to fatigue damage. This paper studies the influence of vehicle operating state on the fatigue performance of bridges. Based on GMM method and K-S test in information statistics, this paper proposes an improved Gaussian hybrid modelling method, and studies the various parameters of vehicle operating state on beam bridge fatigue, such as the impact of the damage and its fatigue life assessment. On this basis, the fatigue cumulative damage formula of multi-vehicle upper bridge is proposed. The traffic load of Shandong JiNan-QingDao expressway has been GMMly analysed by GMM. The Gaussian mixture model is used to fit the vehicle load probability function by standard fatigue vehicle model. Based on the expressway, the vehicle fatigue has been established to facilitate the fatigue load and evaluate the fatigue life. Gradually this paper helps to improve the accuracy and convenience of the probability model, which is conducive to the establishment of a scientific and efficient load probability model for road vehicles.

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第 188 篇

标　　题： Karst Geology And Mitigation Measures For Hazards During Metro System Construction In Wuhan, China

作　　者： [Wang, Xiuling; Lai, Jinxing; He, Siyue] Changan Univ, Sch Highway, Middle South 2rd Ring Rd, Xian 710064, Shaanxi, Peoples R China; [Garnes, Rodney Sheldon] Univ West Indies, Sch Grad Studies, Cave Hill Campus,Cave Hill, St Micheal, Barbados;

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期　　刊： NATURAL HAZARDS

摘　　要： Karst geology is widely distributed in China; the great differences in natural conditions bring it an array of characteristics in different regions. There is a huge area of the buried karst in Wuhan, exhibiting a unique, but complicated engineering geological environment. This paper summarizes the geological conditions in Wuhan, with special focus on its karst geology. At present, a total of six karst belts have been detected, and they were divided into five structure types. For shield tunnelling in karst region, some problems such as water ingress or mud inrush, partial ground collapse, damage or failure of shield machine, and metro operation and management issues may be raised as a result of the activity of the karst geology. To prevent occurrence of possible hazards, a series of countermeasures suggested for hazard and risk mitigation were discussed in this paper. A case history, where the study section belongs to the Wuhan metro line 6, is referred to evaluate effectiveness of the adopted treatment measures. The feedbacks demonstrated that water ingress was successfully avoided, and ground deformation was effectively controlled in the study section throughout the construction phase. This study can provide significant reference information and experience for metro tunnel constructed in karst region.

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第 189 篇

标　　题： Modelling Carbon Emissions Of Diesel Trucks On Longitudinal Slope Sections In China

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期　　刊： PLOS ONE

摘　　要： Carbon emissions are the primary reason that contributes to global warming. The gradient has a significant impact on the carbon dioxide (CO2) emissions produced by trucks. The aim of the current paper is to propose a carbon emission quantification model for diesel trucks on longitudinal slope sections and investigate the influence of gradient on the carbon emissions of trucks for use in the low-carbon highway design. The law of conservation of mechanical energy, the first law of thermodynamics, and the vehicle longitudinal dynamics theory were adopted for deriving the carbon emission model of the trucks on the flat, uphill, downhill and round-trip longitudinal slope segments. Three kinds of common trucks were chosen to conduct the field test. Following the test data, the model demonstrates a high accuracy. The minimum gradient which is expected to impact carbon emissions of trucks on the round-trip longitudinal slope sections was the balance gradient as revealed. The gradient of the longitudinal slope is required to be avoided to be greater in comparison with the balance gradient for

the achievement of the two-way traffic low carbon operation on a highway. The results of this study are valuable to researchers interested in low carbon road design and low carbon transportation control.

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第 190 篇

标　　题： Improved Boundary Conditions For A 3D Dem Simple Shear Model

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In this study, a 3D simple shear model using DEM is built based on the boundary condition of an NGI-type bidirectional simple shear apparatus. Stack of rings used as lateral constraints in a bidirectional simple shear test is modelled by layers of clumps which is possible to be moved by particles; different contact types and parameters are used to model the sand-loading caps, sand-latex membrane, and sand-sand contacts. A simple shear test using the bidirectional simple shear apparatus is performed for the calibration of the 3D DEM simple shear model. By analyzing the simulation results, the following can be concluded. (1) Rings generated by clumps can provide an accurate boundary condition, effective in computation since no contact force is needed for a clump. (2) In the simulation, the orientation of average contact force changed dramatically during shear. It is in the vertical direction (90 degrees) before shear and changes to 45 degrees at 40% shear strain. No shear band is observed which is consistent with the test, and particles move uniformly. (3) In the simulation, the degree of noncoaxiality is the greatest at the beginning of shear, and it is decreased during shear. However, the degree of noncoaxiality is still large at 20% shear strain where there is a 10 degrees difference between the rotation angle of principal stress and principal strain increment.

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第 191 篇

标　　题： Properties And Applications Of A New Chemical Grouting Material

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The study investigates a new chemical grout by mixing the main agent, auxiliary agent, catalyst, foam stabilizer, solvent, and water, to treat the distress of railway tunnel. The

orthogonal design was used to obtain 16 groups of grout proportion schemes, and reasonable proportion parameters were screened using laboratory and field tests. Additionally, this study included detailed research on the grout performance. The test results showed that the proportion schemes of groups 3, 4, and 15 grout were the most reasonable. In particular, for group 3, the viscosity is 663 MPa center dot s, the curing time is 119 s, the foaming capacity is 1589%, and the compressive strength is 20.16 MPa. For group 4, the viscosity is 663 MPa center dot s, the curing time is 137 s, the foaming capacity is 1809%, and the compressive strength is 17.76 MPa. For group 15, the viscosity is 281 MPa center dot s, the curing time is 98 s, the foaming capacity is 1173%, and the compressive strength is 26.79 MPa. Groups 4 and 15 grouts were used to treat the frost boiling and track bed subsidence in existed railway tunnels. Based on this, field monitoring showed that muddy water became clear water with an average depth of only 4 mm in the drainage ditch and that the irregular subsidence of the track bed was also solved after treatment. According to the aforementioned experimental research and analysis, it is proven that new grout not only exhibits a reasonable solidification time, high strength, and excellent waterproofing and impermeability with no pollution of the environment but also can be produced by a safe and convenient synthesis method. Group 4 is suitable for treating tunnel seepage, group 15 is suitable for structural reinforcement, and group 3 confers the advantages of seepage prevention, leakage stoppage, and reinforcement.

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第 192 篇

标　　题： Centrifuge Testing And Numerical Modeling Of Tunnel Face Stability Considering Longitudinal Slope Angle And Steady State Seepage In Soft Clay

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期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要： Understanding the failure mechanism of a tunnel excavation face under complex hydrogeological conditions is a key challenge for geotechnical engineering. In this study, we investigated the excavation face instability induced by the longitudinal slope angle of the tunnel and steady state seepage flow. First, a fiber Bragg grating (FBG) system suitable for centrifuge model tests was proposed. The test apparatus was enhanced to investigate the influence of longitudinal slope angle on the active limit support pressure. Subsequently, a series of centrifuge model tests and Abaqus numerical simulation analyses were conducted to investigate the progressive failure mechanism of the excavation face. The experimental and numerical simulation results showed that the proposed geotechnical centrifuge FBG test system is fully feasible for multi-parameter monitoring of the centrifuge model. Under the assumptions of homogeneous and

isotropic soil and steady state seepage flow, the seepage force in the limit support pressure is independent of the permeability coefficient. Moreover, the active and passive limit support pressures increase and decrease, respectively, with longitudinal slope angle, and the gap between them progressively decreases. Furthermore, under isotropic permeability, the soil internal friction angle, rather than soil cohesion, is responsible for the change in excavation face stability with longitudinal slope angle.

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第 193 篇

标　　题： Reduce Bus Bunching With A Real-Time Speed Control Algorithm Considering Heterogeneous Roadway Conditions And Intersection Delays

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期　　刊： JOURNAL OF TRANSPORTATION ENGINEERING PART A-SYSTEMS

摘　　要： This paper investigates bus bunching issues encountered with a single bus line. A real-time speed control model was proposed with the objective of minimizing variations in bus headway. Three cases of a typical road infrastructure for bus lines were studied. Two main factors that influence the stability of bus service-namely, signalized intersection delays and heterogeneous roadway conditions-were studied in the modeling process. In addition, other common variables were considered, including the time required for passengers to board a bus and alight from it. Compared with findings from prior literature, that frequently assumed homogeneous roadway infrastructure conditions and ignored intersection delays. The built model output the degree of speed adjustment required in accordance with different roadway configurations and the congestion level at each road section. A case study was designed to test the performance of the proposed model, based on the data collected from 40 bus stops, on Bus route No. 600 in Xi'an, China. Results showed that the proposed model could effectively restrain the problems posed by headway deviations and reduce travel time for the passengers.

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第 194 篇

标　　题： Excavation Damaged Zone Division And Time-Dependency Deformation Prediction: A Case Study Of Excavated Rock Mass At Xiaowan Hydropower Station

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期　　刊： ENGINEERING GEOLOGY

摘　　要： Rock mass excavation is accompanied by rock deformation during unloading, which degrades the quality of rock mass and significantly affects the safety and stability of rock mass engineering. Taking the excavated rock mass from the dam foundation of Xiaowan Hydropower Station as the study object, long-time single hole acoustic tests (SHAT) were conducted in the dam abutment rock mass, with the changes in the acoustic wave velocity recorded. Then, a new method quantifying the excavation damaged zone (EDZ) was proposed according to the cumulative degradation rate of acoustic wave velocity, and a time-dependency model for evaluating the evolution of the excavation heavily damaged zone (EHDZ) was established. The results indicated that the cumulative degradation rate curves of the wave velocity along the boreholes exhibited significant differences in time and space. The depth corresponding to the inflection point on the curve can be regarded as the bottom boundary of the EHDZ, which could be used to generate time-dependency curves, and demonstrate the spatiotemporal evolution process for the EHDZ. The time-dependency curves can be classified into three categories. The differences between the classified curves are related to the depth of the initial EHDZ (EHDZ(o)), rock mass elastic modulus (E), and unloading stress (sigma(u)). The time-dependency model for the EHDZ evolution process follows a negative exponential function. The EHDZ(o) depth, E, and sigma(u) can determine the coefficients of the model. The model provides an effective method to predict EHDZ depths at different times after rock mass excavation. The prediction results are of considerable significance for researches on the unloading failure and the selection of rock mass reinforcement, which would ensure the stability and safety of the rock mass engineering during construction and operation.

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第 195 篇

标　　题： An Analytical Solution For Frost Heave Force By The Multifactor Of Coupled Heat And Moisture Transfer In Cold-Region Tunnels

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期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY

摘　　要： Frost heave in cold-region tunnels is caused by complex water-ice phase changes with coupled heat and moisture transfer, which will lead to frost damage and thus threatens the structural stability and traffic safety. To describe the frost heave force, a new model is established for the coupled heat and moisture transfer in the freezing surrounding rock, which consider the major influence factors of the three primary frozen theories for cold-region tunnels simultaneously. An analytical solution for the coupled multifactor is proposed, in which the calculated parameters could be classified into three categories:

1) the frost heave ratios(alpha(fr),alpha(mr),alpha(i)); 2) the geometric parameters(R, T-mr, T-i); and 3) the confinement strength(K-r, K-fr, K-mr, K-l, K-i). All parameters are studied, in which frost depth is deduced by comprehensively considering the ice content, thermal coefficient and freezing index, and a new method based on a difference value method for the equivalent elasticity coefficient of the lining or ice is also proposed. Furthermore, the method is validated in the Daban Mountain tunnel, and the results have indicated that the proposed analytical solution can accurately reflect frost heave force.

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WOS 号： 000538772100005

第 196 篇

标　　题： Fatigue Life Evaluation Of Web Butt Welding Structure On Boom Of Excavator By Hot Spot Stress Approach

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期　　刊： ENGINEERING FAILURE ANALYSIS

摘　　要： The working load of excavator is complex and the working environment is bad. As the main part of excavator, the boom bears a large complex load and is prone to fatigue damage. A large hydraulic excavating boom is taken as the research object in this paper, aiming at the damaged position in the platform fatigue test, that is, the web butt weld on the root of the boom, and the fatigue life of this part is evaluated by means of hot spot stress and load spectrum. The result shows that the theoretical lifetime of this part is 4148 h, which is completely agree with the equivalent life 4278 h when the cracks appeared in bench fatigue tests. Accordingly, the hot spot stress approach is suitable for the fatigue life evaluation of the boom, and its accuracy is high.

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第 197 篇

标　　题： Field Measurements And Wind Tunnel Investigation Of Wind Characteristics At A Bridge Site In A Y-Shaped Valley

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期　　刊： JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS

摘　　要： It is essential in a bridge design to study the wind parameters at the bridge site, particularly in a complex mountain area where the wind characteristics vary from location to location. The aim of this paper is to study the wind characteristics in a

Y-shaped valley in mountainous terrain, the site of a proposed long-span bridge. Data recorded continuously for almost two years by a Doppler Sodar observation system installed at the bridge site was analysed. The results show that the terrain-induced effect plays a significant role in the wind direction variation and there are regular changes in characteristics depending on the direction. To supplement the full-scale measurements, wind tunnel tests were also carried out using a high-precision terrain model at a scale of 1:1500. Vertical profiles of velocity and turbulence at key points along the bridge, and the lateral profile along the bridge axis were studied. The results from the different test directions showed the influence of the incoming flow field particularly shielding and channelling effects which contribute to wind deceleration and acceleration at the bridge location respectively. Furthermore, the speed-up of the valley and mountaintop is evident and there is greater acceleration at the mountaintop.

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第 198 篇

标　　题： Low Embankment Dynamic Response Under Vehicle Traffic Loads In Arid-Oasis Areas

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期　　刊： JOURNAL OF MOUNTAIN SCIENCE

摘　　要： The use of low embankments is of significant concern for ecological protection in arid-oasis areas. Based on the project of Sansha Expressway located in Kashgar City, Xinjiang, China, physical model tests were conducted in this study to investigate the dynamic response of the low embankment as per the effects of road structure, load amplitude, load frequency, load cycle, and moisture content. The dynamic stress is shown to increase with load amplitude while the dynamic elastic modulus decreases with load amplitude under short-term loading. The load frequency slightly influences the soil's dynamic behavior; higher frequencies can improve the dynamic elastic modulus of the subgrade soil. The moisture content has greater influence on the mechanical properties of the subsoil than that of subgrade layer. The subgrade bears the majority of the traffic load as the stress dissipates to 37% of the whole value on its surface. The number of load cycles has the greatest effect on the dynamic response among the influencing factors tested. The dynamic elastic modulus with the type of long-term dynamic loading is only 40%-52% of that with static loading across the entire depth range. The dynamic stress shows significant accumulation with load cycles over the long-term dynamic loading test and becomes stable after 8 x 10(4)cycles of loading. An equation is established to quantify the cumulative dynamic stress in the low embankment under long-term dynamic loading conditions.

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第 199 篇

标　　题：High-Temperature Performance And Workability Of Crumb Rubber-Modified Warm-Mix Asphalt

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期　　刊：JOURNAL OF TESTING AND EVALUATION

摘　　要：Crumb rubber produced from scrap tires has been widely applied in asphalt mixtures to improve the pavement performance. Warm-mix technology has also been employed to lower the production temperature of asphalt mixtures. The objective of this article is to investigate the effects of warm-mix additive types and crumb rubber concentration on the resistance to deformation of crumb rubber-modified (CRM) binders through the repeated creep and recovery test (RCRT), dynamic shear rheometer (DSR), and rotational viscosity test. The CRM binders with crumb rubber concentrations of 10 %, 15 %, 20 %, and 25 % were prepared first as the control binders. Then, three types of warm-mix additives, Sasobit, RH, and Advera, were added into the CRM asphalt to produce CRM warm-mix asphalt (WMA) binder. Generally, the workability of CRM asphalt can be improved with the addition of warm-mix additives. The effect of warm-mix additive on the high-temperature performance is highly dependent on the crumb rubber dosage. The RCRT results overall showed that the warm-mix additives can improve the high-temperature performance of asphalt when the crumb rubber concentration is low. However, according to the DSR test, Sasobit improved the rutting resistance of CRM asphalt, while the RH and Advera sacrificed the rutting resistance. The inconsistency between the RCRT and DSR results suggests that it may be necessary to conduct both the tests when investigating the high-temperature performance of CRM asphalt with warm-mix additives.

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第 200 篇

标　　题：Mechanical Properties And Crack Resistances Of Cement-Stabilized Crushed Pebbles Produced Via Vibration Compaction Method

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期　　刊：JOURNAL OF TESTING AND EVALUATION

摘　　要：The objective of this study is to investigate the mechanical behavior and shrinkage resistance of cement-stabilized crushed pebble (CSCP) produced via vibration compaction method (VCM). Ten kinds of CSCP5 with two different gradations and five cement contents were produced via VCM. The mechanical properties of the CSCP5, including unconfined compressive strength (UCS), splitting strength (SPS), and resilient modulus (RM), were evaluated. Subsequently, the effects of cement contents, curing time, gradation types, and degrees of compaction on the mechanical behavior were investigated. The dry shrinkage and temperature shrinkage and their influencing factors were also studied. Furthermore, the mechanical properties of CSCP5 were compared with those of cement-stabilized limestone and granite. The results show that the mechanical properties of the CSCP5 increased linearly with the increase in cement contents and nonlinearly with the increase in the curing period and could be improved by using skeleton-dense gradation and increasing the degree of compaction. A good linear relationship was observed between the UCS and SPS and between the UCS and RM. The dry shrinkage and temperature shrinkage resistance of CSCP5 could also be improved by using skeleton-dense gradation. The mechanical properties of the CSCP5 were lower than those of cement-stabilized limestone, but slightly higher than those of cement-stabilized granite.

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第 201 篇

标　　题：New Method Of Monitoring Tunnel Feet-Lock Pipe (Tfp) Mechanics Using Fiber Bragg Grating (Fbg)

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期　　刊：JOURNAL OF TESTING AND EVALUATION

摘　　要：Tunnel feet-lock pipe (TFP) is one of the most effective measures used to control tunnel settlement and is widely used in tunneling with soft ground or weak rock mass. Mechanical analysis is an important method to optimize TFP design and construction, and its results can be used to evaluate the structural stability of the tunnel. Although the traditional direct resistance method (DRM) can measure the mechanics of TFP, it is not suitable for harsh environments (humid environments, chemical etching, and electromagnetic field noise) or long-term monitoring. In this article, a method to measure the mechanics of TFP by using Fiber Bragg grating (FBG) is proposed. The strain and bending of TFP monitored by FBG is used to analyze the mechanics of TFP.

In order to verify the feasibility and accuracy of the FBG method to measure the mechanics of TFP, an experimental scheme was designed to compare DRM and theoretical analysis. A supporting device and loading device were developed for the experimental scheme. Compared with the theoretical value, the error of strain and bending measured by FBG was stable within 5 mu epsilon, the error of strain measured by DRM was approximately 15 mu epsilon or even 20-30 mu epsilon, and the error of bending measured by DRM was 10-15 mu epsilon or even 25 mu epsilon. Therefore, the precision of measuring the mechanics of TFP by using FBG is higher than by using DRM.

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WOS 号： 000546025200037

第 202 篇

标　　题： Study On Shear Strength Characteristics Of Loess Dam Materials Under Saturated Conditions

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： A loess accumulation dam in Ansai Area, Yan'an, Shaanxi province is selected as the research object, and the remolded soil of the dam body is taken as the test material to conduct the saturated loess indoor triaxial test. The test shows that the peak stress of saturated remolded loess increases with the enhancement of confining pressure and dry density, and the pore water pressure rises rapidly in the shear of the samples with a dry density of 1.4-1.6 g/cm(3)and gradually flattens out. When the samples with a dry density of 1.7 g/cm(3)in the process of shearing, the pore pressure rises rapidly and then decreases as the volume increases. The total internal friction angle and effective internal friction angle increase with the augment of dry density, and the total cohesion and effective cohesion show a changing trend of first rising, then falling and then rising due to the different development of original cohesion, sliding friction and rolling friction. Meanwhile, combined with field monitoring, it can be determined that the dam a total of three times more obvious damage. According to the comparison of field test and laboratory test, the concept and calculation method of inspection threshold are put forward.

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WOS 号： 000546918900002

第 203 篇

标　　题： Comparative Study Of Damage Detection Methods Based On Long-Gauge Fbg For

Highway Bridges

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期　　刊：SENSORS

摘　　要：Damage detection of highway bridges is a significant part of structural heath monitoring. Conventional accelerometers or strain gauges utilized for damage detection have many shortcomings, especially their monitoring gauge length being too short, which would result in poor damage detection results. Under this circumstance, long-gauge FBG sensors as a novel optical sensor were developed to measure the macro-strain response of the structure. Based on this sensor, many derived damage detection methods were proposed. These methods exhibit various characteristics and have not been systematically compared. As a result, it is difficult to evaluate the state of the art and also leads to confusion for users to select. Therefore, a strict comparative study on three representative methods using long-gauge FBG was carried out. First, these methods' theoretical backgrounds and formats were reformulated and unified for better comparison. Then, based on validated vehicle-bridge coupling simulation, these methods' performances were tested through a series of parametric studies including various damage scenarios, vehicle types, speeds, road roughness and noise levels. The precision and reliability of three methods have been thoroughly studied and compared.

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WOS 号：000553158900001

第 204 篇

标　　题：Degradation Mechanism Of Concrete Subjected To External Sulfate Attack: Comparison Of Different Curing Conditions

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期　　刊：MATERIALS

摘　　要：Sulfate induced degradation of concrete brings great damage to concrete structures in saline or offshore areas. The degradation mechanism of cast-in-situ concrete still remains unclear. This paper investigates the degradation process and corresponding mechanism of cast-in-situ concrete when immersed in sulfate-rich corrosive environments. Concrete samples with different curing conditions were prepared and immersed in sulfate solutions for 12 months to simulate the corrosion of precast and

cast-in-situ concrete structures, respectively. Tests regarding the changes of physical, chemical, and mechanical properties of concrete samples were conducted and recorded continuously during the immersion. Micro-structural and mineral methods were performed to analyze the changes of concrete samples after immersion. Results indicate that the corrosion process of cast-in-situ concrete is much faster than the degradation of precast concrete. Chemical attack is the main cause of degradation for both precast and cast-in-situ concrete. Concrete in the environment with higher sulfate concentration suffers more severe degradation. The water/cement ratio has a significant influence on the durability of concrete. A lower water/cement ratio results in obviously better resistance against sulfate attack for both precast and cast-in-situ concrete.

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WOS 号： 000554220600001

第 205 篇

标　　题： Settlement Characteristics Of Bridge Approach Embankment Based On Scale Model Test

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期　　刊： JOURNAL OF CENTRAL SOUTH UNIVERSITY

摘　　要： In order to analyze the effects of backfill materials, geometries and slab setting on the settlement of bridge approach embankment, scale model was built based on the structural characteristics of bridge approach embankment, and scale model tests were carried out under different conditions. The results show that when graded gravels were selected as the backfill materials, the effect of setting approach slab to reduce the differential settlement is more prominent. When lime soils were selected as the backfill material, approach slab can moderate the longitudinal settlement slope. When using different backfill materials, the ultimate settlement of the positive trapezoidal backfill geometries is less than that of the inverted trapezoid, and the backfill geometries have little effect on the settlement slope.

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WOS 号： 000557377300005

第 206 篇

标　　题： Isothermal Diffusion Of Water Vapor In Unsaturated Soils Based On Fick'S Second Law

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期　　刊： JOURNAL OF CENTRAL SOUTH UNIVERSITY

摘　　要： In arid regions, water vapor diffusion predominates the total water migration in unsaturated soil, which significantly influences agriculture and engineering applications. With the aim of revealing the diffusion mechanism of water vapor in unsaturated soil, a water vapor migration test device was developed to conduct the water vapor migration indoor test. The test results demonstrate that the characteristics of water vapor diffusion in unsaturated soil conformed to Fick's second law. A mathematical model for water vapor diffusion under isothermal conditions in unsaturated soil was established based on Fick's law. Factors including the initial moisture content gradient, initial moisture content distribution, soil type and temperature that affect the water vapor diffusion coefficient were analyzed. The results show that there was good agreement between the moisture content calculated by the mathematical model and obtained by the indoor experiment. The vapor diffusion coefficient increased with increasing initial moisture content gradient and temperature. When the initial moisture content gradient is constant, the vapor diffusion coefficient increases with the increase of matrix suction ratio in dry and wet soil section. The effect of soil type on the water vapor diffusion coefficient was complex, as both the moisture content and soil particle sizes affected the water vapor diffusion.

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WOS 号： 000557377300010

第 207 篇

标　　题： Research On Low Temperature Performance Of Emulsified Asphalt Cold Recycled Mixture And Improvement Measures Based On Fracture Energy

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期　　刊： MATERIALS

摘　　要： At present, there are no specific indicators and requirements for the low-temperature crack resistance of emulsified asphalt cold recycled mixture (CRME) in the Chinese road mixture specifications. In order to expand the application of this technology in the asphalt surface layer in cold areas, this paper studied the influence of 10 influencing factors on the low-temperature anti-cracking performance of CRME through the semicircular bending test (SCB) with fracture energy as the evaluation index. The research results show that the fracture energy index of the SCB test can be used to evaluate the low temperature crack resistance of CRME. After 10 kinds of influencing factors were analyzed, it was found that the biggest factor affecting the low-temperature cracking resistance of the mixture was the recycling agent, which had an effect on the fracture energy index of over 60%. Followed by cement, fiber and compaction work, the degree of influence exceeded 30%. Finally, combined with engineering application experience, some specific measures to improve the low-temperature anti-cracking

performance of CRME were proposed.

DOI： 10.3390/ma13143176

WOS 号： 000557841000001

第 208 篇

标　　题： Fracture Properties Of Concrete In Dry Environments With Different Curing Temperatures

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： This paper investigated the fracture properties of concrete in dry environments with different curing temperatures (5, 20, 40, and 60 degrees C). For each curing condition, the key fracture parameters of concrete were tested using wedge splitting specimens at five different ages (3, 7, 14, 28, and 60 d). The results show that in dry environments, the effective fracture toughness and fracture energy of concrete exposed to elevated temperatures increased at a relatively high growth rate at an early age. Nevertheless, the growth speed of effective fracture toughness and fracture energy decreased more quickly at elevated temperatures in the later stages. As a result, the concrete cured at higher temperature exhibited lower ultimate values of fracture parameters, and vice-versa. Namely, a temperature crossover effect was found in the effective fracture toughness and fracture energy of concrete under dry environments. Considering the early growth rate and ultimate values of fracture parameters, the optimum temperature suitable for concrete fracture properties development under dry condition was around 40 degrees C.

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WOS 号： 000558049000001

第 209 篇

标　　题： Fractal Dimension Of Basalt Fiber Reinforced Concrete (Bfrc) And Its Correlations To Pore Structure, Strength And Shrinkage

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期　　刊： MATERIALS

摘　　要： In this study, we focused on exploring the correlations between the pore surface fractal dimensions and the pore structure parameters, strength and shrinkage properties of basalt fiber-reinforced concrete (BFRC). The pore structure of BFRCs with various fiber contents and fiber lengths was investigated using mercury intrusion porosimetry (MIP) measurements. Through Zhang's model, the fractal characteristics of BFRCs in

the whole pore size range and in different pore size ranges were calculated from the MIP test data. The results showed that the addition of BF increased the total porosity, total pore volume and pore area but decreased the average pore diameter, indicating that BFs refined the pore structure of the concrete. BFRC presented obvious fractal characteristics in the entire pore-size range and individual pore-size ranges; generally, the fractal dimension increased with increasing fiber content. Moreover, correlation analysis suggested that the fractal dimension of BFRC in the whole pore-size range (FD) was closely related to the fractal dimension in the macropore region (D-m) and average pore diameter (APD). The influence of pore structure factors on mechanical strength and shrinkage was studied by grey correlation theory, and the results showed that D(m)showed positive correlations with strength and fracture energy, with increasing D(m)tending to strengthen and toughen the concrete. An increase in fiber content and length was detrimental to reducing the drying shrinkage strain. In the transition pore region, the fractal dimension (D-t) at diameters ranging from 20 to 50 nm and shrinkage strain exhibited a highly linear relation. These results merit careful consideration in macro-property evaluation by using the pore surface fractal dimension in a specific region instead of the whole region. Finally, grey target theory was applied to evaluate the rank of the mechanical strength and shrinkage of concrete, and the results showed that the overall properties of concrete with a BF length of 18 mm and a BF content of 0.06% ranked the best.

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第 210 篇

标　　题： Evaluation Of Highway Construction Impact On Ecological Environment Of Qinghai-Tibet Plateau

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期　　刊： ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL

摘　　要： This study is designed in order to determine the impact of Zhadao highway construction on ecological environment of Qinghai-Tibet Plateau, by comparing the quality of ecological environment before and after highway implementation. An index system of ecological environment impact evaluation of highway area is established, including terrain slope, vegetation coverage, desertification index and land use type. With the help of data mining and grey correlation degree theory, an ecological environment comprehensive evaluation model of multi index is proposed. This study analyzes the scale score of each evaluation index, and establishes a quantitative ecological environment evaluation model for highway areas in the Qinghai-Tibet Plateau. Taking Zhadao Highway in study area as an example, the state before and during the construction of the highway in 2014 and 2017 is selected for comparing and analyzing. The results show that the ecological environment in study area is obviously affected by

highway construction. Significantly changed sections are concentrated in construction areas and urban residents densely populated area along the highway. Affected by factors such as highway earthwork and human activities, soil erosion has intensified, vegetation coverage has decreased, desertification has become more severe, and the overall quality of the ecological environment changed from superior to inferior.

WOS 号： 000562935900008

第 211 篇

标　　题： Testing For Low-Speed Skid Resistance Of Road Pavements

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： Low-speed skid resistance tests provide useful information not available from the normal high-speed skid resistance testing of road pavements. There are known limitations of the two commonly used measuring devices of low-speed skid resistance, i.e. British Pendulum Tester (BPT) and Dynamic Friction Tester (DFT). This study develops a Walking Friction Tester (WFT) to offer a practical alternative to measure low-speed pavement skid resistance. This paper compares WFT with BPT and DFT measurements in the following three aspects: correlation relationship, measurement variability, and speed comparison of field tests. Tests were also performed to examine the variability of WFT test results with respect to walking speed and water film thickness, respectively. The study showed that there was a good correlation coefficient of 0.80 between BPT and WFT measured data, and 0.70 between DFT and WFT friction coefficients. WFT measured data were found to have smaller variability than those of BPT and DFT. In field tests performed over a length of pavement section, WFT generated continuous friction data in much shorter times compared with the spot measurement mode of either BPT or DFT. The results also showed that WFT tests were independent of changes in walking speeds of operators and variations of water film thickness applied.

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第 212 篇

标　　题： Investigation Of The Fatigue Properties Of Asphalt Mixture Designed Using Vertical Vibration Method

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： In this work, the flexural tensile fatigue behaviours of AC-20 asphalt mixtures were studied using beams, which were designed by the vertical vibration method (VVTM)

and Marshall method. Then an analysis of variance (ANOVA) was used to examine the differences in fatigue lives, and the Weibull distribution was used to analyze the fatigue lives and establish the fatigue equations of the mixtures. Subsequently, the fatigue lives were compared and analyzed under the same stress level and repeated load force. The results showed that the test accuracy of specimens produced using the vertical vibration compaction method (VVCM) exceeds 92%. Compared to the Marshall design, the asphalt mixture fabricated with the VVTM design improved crack resistance and rutting resistance by at least 40% and 30%, respectively. The ratio of the slopes (the values of the regression coefficientb) of fatigue equations of asphalt mixtures designed by the VVTM to that of Marshall method ranges from 0.883 to 0.965, and the ratio of the intercepts (the values of the regression coefficienta) ranges from 1.278 to 1.284. The results also showed that compared to the Marshall design, asphalt mixtures fabricated with VVTM design exhibited improved fatigue lives by at least 61% (at a stress level of 0.45) and 356% (with a repeated load force of 0.378 kN).

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WOS 号： 000544423100016

第 213 篇

标　　题： A New Method For Assessing Slope Unloading Zones Based On Unloading Strain

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： Unloading zones are formed in shallow slopes after rock mass relaxation and crack extension. Generally, slope unloading assessment depends on the traditional methods mainly related to the phenomena. However, unloading is a process of energy release. Based on the fracture mechanics and the statistical theory of rock mass structure, a theoretical analysis was performed to establish the relationship between the accumulative opening displacement of unloading cracks and unloading strain, and a new method was proposed to quantify the extent and damage degree of unloading zones according to unloading strain. The new method was applied to assess the slope unloading zones at a hydropower station dam site in Northwest China. Results showed that the accumulative opening displacement curve of unloading cracks regularly varied, and could be easily divided into three parts. The strong and weak unloading zones could be recognized from the slope of the first two parts, while their extent was limited by the two inflexions on each curve. By comparison with the traditional method, the new method confirmed the reasonability in the slope unloading zone assessment. However, with an increase in the unloading degree, the difference in the zonation results obtained

from the two methods may increase.

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WOS 号： 000545104000001

第 214 篇

标　　题： Effect Of Fiber Length And Surface Treatment On The Performance Of Fiber-Modified Binder

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通讯作者： Pei, JZ (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In this study, the effects of fiber lengths and surface treatments of aramid fibers on the performance of aramid fiber-modified asphalt (AFMA) binders were examined. The surface treatment effects of aramid fibers with the silane coupling agent 3-methacryloxypropyltrimethoxysilane (KH-570) were investigated using scanning electron microscopy, a static contact angle method, and Fourier transform infrared spectroscopy. The length effects of the aramid fibers on the asphalt performance were studied using a dynamic shear rheometer, viscometer, and bending beam rheometer, and the improvement mechanisms were analyzed. The results show that an increase in fiber length can improve the viscosity of AFMA, and a reinforcement effect from short fibers with high content can be achieved by using long fibers with low content. It also indicated the silane coupling agent can enhance the bonding effect of fiber and asphalt. The results of this study can provide a reference for the application of fibers in asphalt binders and asphalt mixtures.

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第 215 篇

标　　题： Degradation Mechanisms Of Cast-In-Situ Concrete Subjected To Internal-External Combined Sulfate Attack

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In this paper, an experimental study was conducted to reveal the degradation mechanisms of cast-in-situ concrete induced by internal-external combined sulfate attack. The internal sulfate attack of concrete was conducted by adding extra sodium

sulfate in concrete mixtures. Meanwhile, the external sulfate attack of concrete was investigated by immersing samples in the sodium sulfate solutions. The dimensions, mass, compressive strength and the sulfate concentration in the tested specimens were continuously monitored. The microstructure and mineral phases of tested concrete were identified after the immersion. Results illustrate that chemical attack is the main cause of degradation for fully immersed concrete in sulfate-rich environments. Cast-in-situ concrete suffers a fast and severe degradation when subjected to internal-external combined sulfate attack. Internal sulfate attack significantly retards the strength development of concrete in the early corrosion stage. Development of crack system is remarkably accelerated by internal sulfate attack hence inducing a relatively faster penetration of external sulfate ions. (C) 2020 Elsevier Ltd. All rights reserved.

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第 216 篇

标　　题： Utilization Of Steel Slags To Produce Thermal Conductive Asphalt Concretes For Snow Melting Pavements

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： This study focuses on the thermal conductivity of steel slag asphalt mixtures. The initial aim of this study was to verify the feasibility of adding steel slag to asphalt mixtures as a thermal aggregate to increase the thermal conductivity for electrical-thermal snow melting. The thermal conductivity of different rock aggregates and steel slags were firstly tested, before the surface temperatures of different-sized particles of the target steel slag was measured. In addition, the thermal conductivity and engineering performances of asphalt mixtures with different steel slags contents were measured. Experiment results indicate that diabase and hot-stuffy steel slag possesses higher thermal conductivity, and that particles of sizes 9.5-13.2, 1.18-2.36 and 0.3-0.6 mm are the most effective sizes. The thermal conductivities of the asphalt mixtures firstly increased, before decreasing with increasing steel slag replacement, and the thermal conductivity reached a peak for a steel slag volume replacement of 6%. All of the steel slag asphalt mixtures meet the required engineering performance, and the steel slag asphalt mixtures played a positive role in the snow melting process on an electrical-thermal pavement system, compared with ordinary asphalt mixtures. (C) 2020 Elsevier Ltd. All rights reserved.

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第 217 篇

标　　题：A Three-Dimensional Hoek-Brown Failure Criterion Based On An Elliptical Lode Dependence

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期　　刊：INTERNATIONAL JOURNAL FOR NUMERICAL AND ANALYTICAL METHODS IN GEOMECHANICS

摘　　要：A new three-dimensional (3D) Hoek-Brown (HB) failure criterion based on an elliptical Lode dependence is proposed to describe failure of rocks and concrete under multiaxial stress states. This criterion not only inherits all benefits of the classical HB criterion that is developed for the triaxial compression (TXC) of rocks but also accounts for the effect of the intermediate principal stress. It is capable of representing the strength difference between the triaxial extension (TXE) and TXC with the introduction of an additional coefficientk(0.5 <= k <= 1.0), which can be derived from TXE tests or taken as 0.53 for rocks in cases where the TXE test data is unavailable. Other two material constants (m(i)and sigma(ci)) involved in this criterion can be obtained from TXC tests. Additionally, the failure surface of this criterion is smooth and convex on the deviatoric stress plane when 0.5 <k <= 1.0. The new criterion achieves very good fit to the test data of TXC/TXE, biaxial compression, and polyaxial compression (PXC) on a wide variety of rock materials and concrete, reported in the literature. Comparison of the new criterion with an existing 3D HB criterion based on the same Lode dependence has demonstrated that the new criterion performs better than the latter for test data of rock and concrete under multiaxial stress states except for PXC test data of one rock type. Finally, the influence of values ofkon the accuracy of the new criterion is discussed.

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第 218 篇

标　　题：Study On Water Absorption And Thermal Conductivity Of Tunnel Insulation Materials In A Cold Region Under Freeze-Thaw Conditions

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：A thermal insulation layer is often deposited on the lining structure of tunnels in cold regions to solve the problem of frost damage. When the air humidity in the tunnel becomes excessively high, the thermal insulation material tends to absorb water, leading to significant changes in thermal conductivity. Moreover, the temperature differences between the day and night cycles have been observed to be significant in portal sections of cold region tunnels, which facilitate the freeze-thaw cycle and, consequently,

deteriorate the performance of the thermal insulation material. Therefore, the purpose of this study is to determine the changes in the water absorption, thermal conductivity, and microstructure of polyurethane and polyphenolic insulation boards under freeze-thaw conditions. To this end, an indoor water absorption test was conducted for both the insulation boards till they were saturated, which then underwent a freeze-thaw cycle test. It was determined that the water absorption and thermal conductivities of these boards increased linearly with the number of freeze-thaw cycles. In order to explore the change of thermal conductivity of thermal insulation materials after moisture absorption, this study provides insights into the relationship between the thermal conductivities and water contents of tunnel insulation materials under normal and freezing temperatures.

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第 219 篇

标　　题： Performance Evaluation Of Waterborne Epoxy Resin Modified Hydrophobic Emulsified Asphalt Micro-Surfacing Mixture

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to overcome the shortcomings of the durability of hydrophobic emulsified asphalt coating due to attenuation of skid resistance performance and insufficient wear resistance, Waterborne epoxy resin (WER) was used as a modifier to prepare WER modified hydrophobic emulsified asphalt (WERHEA), which was used for the micro-surfacing mixture. The wet track abrasion test and load wheel test were used to determine the optimal asphalt dosage range of the micro-surfacing mixture of the two kinds of aggregates. The hydrophobic and anti-icing properties of the WERHEA micro-surfacing mixture were verified. In addition, the wear resistance performance, interlayer bonding performance, skid resistance performance and the attenuation of skid resistance performance after accelerated wear test was considered. The results show that when the content of WER is 12%, the oil stone ratio of granite micro-surfacing mixture is 7.5-8.6%, and that of basalt micro-surfacing mixture is 7.4-8.4%; the wear resistance of the micro-surfacing mixture is significantly improved, and the wear resistance of basalt is better than that of granite; 46% increase in shear strength and 105.7% increase in pull strength; The British pendulum number (BPN) and the Texture depth (TD) reached the peak, and then there was a downward trend. Considering that the increase in WER content may cause the mixture to segregate and reduce the skid resistance performance. After the accelerated abrasion test, its skid resistance performance is still the best with 12% WER. Therefore, the optimal amount of WER is 12%. (C) 2020

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第 220 篇

标　　题： Study On The Multiscale Adhesive Properties Between Asphalt And Aggregate

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Adhesion between aggregate and asphalt is an important factor affecting the road performance of the asphalt mixture. It can be mainly attributed to the microscopic forces between the contacting interfaces, including the physical and chemical interactions between interfaces, which are subject to the surface micromorphology (SMM) and chemical composition of the materials, respectively. In this study, the SMM parameters and surface energies of the aggregate and asphalt were investigated using confocal microscopy and atomic force microscopy (AFM), respectively. The macroscopic adhesion strength between aggregate and asphalt was tested via pull-off tests, and the influences of the SMMs and surface energies of the materials on the macroscopic adhesion strength were investigated. Finally, the multiscale adhesion mechanisms between aggregate and asphalt were explored. Results indicated that adhesion between aggregate and asphalt binder was mainly attributed to the chemical interaction that was dominated by asphalt surface energy. The physical interaction was related to the SMMs of asphalt and aggregate. The roughness of the aggregate SMM was beneficial for improving the adhesion, whereas the roughness of the asphalt SMM was unfavorable. Among the four fractions of asphalt, the asphaltenes and resins had a significant influence on the surface energy of asphalt, which increased with an increase in the resin content, and conversely decreased with an increase in the asphaltenes content. The aggregate surface energy was mainly affected by the SiO2 and CaO content, and decreased with an increase in the SiO2 content, and increased with an increase in the CaO content. (C) 2020 Elsevier Ltd. All rights reserved.

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第 221 篇

标　　题： Environmental Effects And Enhancement Mechanism Of Graphene/Tourmaline Composites

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： .Through releasing negative ions and infrared radiation, tourmaline can absorb dust and hazardous substances to purify air. The purpose is to improve the air purification efficiency of tourmaline through the remarkable electrical properties of graphene. The efficient preparation method of graphene/tourmaline composite was proposed. The environmental properties of the graphene/tourmaline composites, such as infrared radiation and negative ion release, were systematically analyzed. The Hall effect was used to reveal the enhancement mechanism of graphene on tourmaline. This laid a solid foundation for the application of composites in the air purification fields. The results demonstrated that graphene could significantly enhance the environmental effect of tourmaline. The ball milling method was the optimum preparation method, and the parameters were determined as follows: ball milling speed = 200 rpm and ball milling time = 2 h. The optimum graphene content was 0.5% of the mass of tourmaline. The negative-ion release performance of graphene/tourmaline composites was higher than that of tourmaline by over 11.9%. The infrared emissivity and negative-ion release of graphene/tourmaline composites were observed to be significantly correlated with the band gap. The main reason for the enhancement in the environmental properties of tourmaline by graphene was that the band gap of tourmaline was reduced when graphene was compounded with tourmaline. (c) 2020 Elsevier Ltd. All rights reserved.

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第 222 篇

标　　题： Taxi Demand Prediction Based On A Combination Forecasting Model In Hotspots

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Accurate taxi demand prediction can solve the congestion problem caused by the supply-demand imbalance. However, most taxi demand studies are based on historical taxi trajectory data. In this study, we detected hotspots and proposed three methods to predict the taxi demand in hotspots. Next, we compared the predictive effect of the random forest model (RFM), ridge regression model (RRM), and combination forecasting model (CFM). Thereafter, we considered environmental and meteorological factors to predict the taxi demand in hotspots. Finally, the importance of indicators was analyzed, and the essential elements were the time, temperature, and weather factors.

The results indicate that the prediction effect of CFM is better than those of RFM and RRM. The experiment obtains the relationship between taxi demand and environment and is helpful for taxi dispatching by considering additional factors, such as temperature and weather.

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第 223 篇

标　　题： Study Of Deformation Behaviors And Mechanical Properties Of Central Diaphragm In A Large-Span Loess Tunnel By The Upper Bench Cd Method

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The central diaphragm is often used to reduce the span to maintain the stability and safety of structure in the construction of large-span loess tunnel due to the structure complexities. In this paper, relying on the field monitoring and measurement for Wangcun tunnel in Huangling-Yan'an expressway expansion project, the crown settlement and horizontal convergence of primary support steel rib and central diaphragm steel rib during the construction are analyzed by the upper bench CD method. According to the internal force transfer, deformation coordination, and arch foot displacement between the two structures, the support system is regarded as the arch-beam fixed structure with three times of statically indeterminate and movable abutment under the loads, and the mechanical calculation model of sidewall steel rib and the central diaphragm structure bearing loads and deformation together is established. Finally, through the mechanical model mentioned above, the deformation characteristics of central diaphragm structure and the horizontal convergence in the upper bench of tunnel are calculated and analyzed. The research shows the following: (1) the accumulated settlement of sidewall steel rib in Part I is greater than that of the sidewall steel rib in Part II, and the accumulated settlement of each part at the support structure during the tunnel excavation is less than the reserved deformation of 150 mm specified in the tunnel excavation; (2) the settlement located at the waist and maximum excavation line position of central diaphragm is mainly affected by the excavation of Parts I and II in upper bench; (3) during the whole excavation process, the excavation of Part I and Part II has the greatest influence on the convergence at arch waist and the maximum excavation line position in Part I, and the convergence at the above two positions all experienced four stages of convergence-expansion-convergence-gradual stability; and (4) the errors between the horizontal convergence and the deformation of central diaphragm obtained by the mechanical model and the field monitoring data are between 12.7% and 27.5%. The calculated results are in good agreement with the actual situation. The research can provide a theoretical basis for the study of deformation and mechanical properties for support structure in the construction of large-span loess tunnel by the upper bench CD method.

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第 224 篇
标　　题： Flexural Capacity And Behavior Of Rc Hollow Bridge Beams After A Time Service Of 24 Years
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期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： The residual bearing capacity of existing bridges has been a controversial topic for engineers and technicians. In order to accurately evaluate the actual bearing capacity of a 24-year-old RC hollow beam bridge, its components with different thickness concrete leveling layer were removed and transported back to the laboratory. The representative static and dynamic responses of the two beams were monitored during the whole procedure. A quick assessment of loading capacity of bridge using crack height and a parameter correction method for the crack width prediction formula in the code were proposed. In addition, comparison of measured and current design codes GB 50010 and ACI 318 predicted behaviour of existing beams was also presented. The results showed that the bending process of the RC hollow beam went through the elastic phase to the elastic-plastic phase and to the final failure. The actual flexural capacity of two beams was 10% larger than the calculated values. The natural vibration frequencies of the beam changed slightly before plastic stage, but the modal amplitude increased with the increase of degree of damage, once the beam entered plastic stage. The predicted deflections according to GB50010 were consistent with the experimental values at about 200 kN; for the code ACI, as the loading force increased, the difference between the two gradually decreased.
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WOS 号： 000559124300002

第 225 篇
标　　题： Experimental Investigation Of Ground And Air Temperature Fields Of A Cold-Region Road Tunnel In Nw China
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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要：To fully understand the temperature distribution of cold regions and the variation law of temperature fields in cold-region tunnels, this paper presents a case-history study on a tunnel located on the eastern Qinghai-Tibet Plateau, China. The conclusion is as follows: the temperature outside the tunnel and the ambient temperature are affected by wind speed and light. The law of the temperature field in the tunnel is greatly affected by wind speed and wind direction. According to the field test, the wind speed in the tunnel is about 2.8 m/s in winter, and the daily average temperature at the exit of the tunnel is basically lower than that at the entrance. From the central to the entrance, the temperature in the tunnel decreases by 0.11 degrees C every 10 meters along the longitudinal direction; from the central to the exit, the temperature in the tunnel increases by 0.07 degrees C every 10 meters. In this regard, for the problems of lining frost damage and central drainage pipe freezing, it is suggested to adopt the way of heating and drainage, but heating the freezing area outside the drainage pipe should be avoided. The test results can provide references for the design, construction, and research of the temperature field of the tunnel antifreezing system in the cold region. It is hoped that the test results can be useful in the design and construction of frost damage prevention systems and the investigation of temperature fields in cold-region tunnels.

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第 226 篇

标　　题：Steel Bridge Construction Of Hong Kong-Zhuhai-Macao Bridge

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期　　刊：INTERNATIONAL JOURNAL OF STEEL STRUCTURES

摘　　要：The 55-km-long Hong Kong-Zhuhai-Macao Bridge (HZMB) is the world's longest sea-crossing bridge, connecting Hong Kong with Zhuhai and Macao at the mouth of the Pearl River Estuary in China, comprising 22.9-km-long steel bridges. HZMB is the leading steel bridge in China, with top-level manufacturing and installation technology. This paper outlines the steel bridge construction experiences of HZMB to provide comparisons for the construction of other long sea-crossing steel bridges at home or abroad. The main considerations of construction constraints, scheme selection, structural and aesthetic design of HZMB are presented, and the following points related to new strategies in the steel bridge construction of HZMB are elaborated: (1) construction quality assurance, (2) automatic manufacturing technology, (3) large segment offshore installation, (4) eco-friendly paint (content limitation of volatile organic compounds) and new multifunctional inspection gantry, and (5) Guss Mastic

Asphalt steel deck pavement system. The successful implementation of those strategies shows that the steel bridge construction of HZMB promotes improvement in the overall construction and management level of the Chinese bridge industry. The advanced experience of HZMB has opened up broad prospects for the design and construction of offshore bridge engineering in China.

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第 227 篇

标　　题： Application Of The Upper-Bench Cd Method In Super Large-Span And Shallow Tunnel: A Case Study Of Letuan Tunnel

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In order to keep pace with fast urbanization and explosive growth of highway traffic volume in China, more and more super large-span tunnels are constructed or will be constructed in the coming years. It is of great significance to employ a suitable construction method for ensuring construction safety when tunnelling in a complicated geological environment. Based on the reconstruction and expansion project of Binlai in China, this paper aims at studying deformation behaviors and mechanical properties of super large-span and shallow tunnel constructed using the upper-bench CD method. The study results showed that the crown settlement of the pilot tunnel was larger than that of the rear guide tunnel, and the deformation of rock mass tended to be stable after 60 days of excavation. The structural stress changed greatly in the construction stage, the stress distribution of steel rib was mainly under compression, and the maximum compressive stress of shotcrete appeared at the tunnel vault. The supporting structure was always kept in a safe state, and its safety factor was higher than 1.5. However, the upper-bench CD method has poor performance in controlling surface subsidence and horizontal convergence. The study of this paper provides a new construction method and useful reference for similar super large-span tunnels.

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第 228 篇

标　　题： Numerical Simulation Of Internal Stress In Pavement Concrete Under Rolling Fatigue Load

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通讯作者： Guo, YC (corresponding author), Changan Univ, Minist Educ, Key Lab Special Reg Highway Engn, Xian, Peoples R China.

期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：This study explores the development law of concrete internal stress and strain under rolling wheel loads. To do this, strain gauges are embedded in different positions inside concrete, and the stress and strain values at different positions inside the concrete are measured using the rolling fatigue test. A numerical model is established using COMSOL Multiphysics software, and the concrete internal stress and strain values are simulated. A comparison between the calculated and measured values shows that the numerical model can simulate the actual stress state inside the concrete. The numerical model can predict the internal stress and strain variation of concrete specimens under more complicated load conditions. The prediction results show that under the same fatigue load conditions, the concrete stress peak is hardly affected by the fatigue loading times, but there is a marked increase in the strain value inside the specimen. When the stress peak of concrete does not reach its design strength, an excessive increase of the internal strain will cause hidden damage to the concrete. By investigating the internal stress and strain of the concrete, a theoretical basis can be determined for the deterioration mechanism of concrete microstructure and the durability design of concrete.

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第 229 篇

标　　题：Study On The Parameter Optimization And Strength Mechanism Of Coal Gangue Emulsified Asphalt Mixture

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：Emulsified asphalt mixture has the characteristics of convenient construction and durable performance, but its poor early strength and demulsification seriously restrict the popularization and application of this material. At present, the coal gangue produced by coal-fired power plants is generally discarded, resulting in serious environmental pollution. The combination of coal gangue and emulsified asphalt can explore an efficient utilization way for more and more coal gangue and also solve the curing problem of asphalt. In order to give full play to the advantages of existing materials and make rational use of resources, this paper studies the factors affecting the performance of coal gangue emulsified asphalt mixture based on orthogonal experimental design and optimizes its material composition parameters by considering the coupling effect of two factors. The water stability of coal gangue emulsified asphalt mixture is evaluated by the immersion Marshall test. Finally, the strength formation mechanism of coal gangue

emulsified asphalt mixture is analyzed from the microscopic point of view. The results determined 7.5% as the optimum amount of emulsified asphalt in coal gangue emulsified asphalt mixture and recommended the best parameter combination of 7.5% emulsified asphalt, 6% coal gangue, and 5% water consumption. With the increase of coal gangue content, the water loss resistance of emulsified asphalt mixture increases gradually, and the water stability of emulsified asphalt mixture can be improved by adding coal gangue. According to the microscopic analysis, the strength of the mixture is formed by the joint action of emulsified asphalt and coal gangue, in which the hydration products of coal gangue and asphalt play the role of cementation and strength together. The ordinary emulsified asphalt mortar mainly contains CaCO3, which mainly plays the role of physical filling.

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第 230 篇

标　　题： Effect Of Contact Slip Behaviour Of Particle On Compaction Characteristics Of The Asphalt Mixture

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： To evaluate the contact slip behaviour of particle on compaction characteristics of the asphalt mixture, the relation between contact slip behaviour and compaction characteristic was analyzed. The specimen was molded by Superpave Gyratory Compactor, and the densification curve average slopes and densification energy index were adopted to evaluate the compaction characteristics of asphalt mixture. Based on the self-developed mineral contact tester and interface contact slip tester, the maximum slip force and the maximum slip shear stress were proposed to respectively evaluate the contact slip behaviours of the loose asphalt mixture and the formed asphalt mixture. The results show that the contact slip behaviour is well correlated with compaction characteristics. The maximum slip force of loose asphalt and the maximum slip shear stress can effectively evaluate the compaction characteristics of different compaction stages. The more the coarse aggregates, the stronger the contact effect among the particles, and the more difficult the asphalt mixture is to be compacted. AC-13 asphalt mixture has better workability than SMA-13 asphalt mixture and OGFC-13 asphalt mixture. The larger the nominal maximum aggregate size, the more energy the asphalt mixture needs to attach the target degree of compaction, and the better the anti-slipping deformation ability.

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第 231 篇

标　　题：Experimental Evaluation Of The Influence Of Early Disturbance On The Performance Of Basalt Fiber Concrete

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：By applying early disturbance to the concrete, the influence of the disturbance on the macroscopic mechanical properties of basalt fiber concrete during the period from the initial setting to the final setting is explored, and the influence mechanism is revealed. Also, the influence of this disturbance on the process of sulfate erosion of concrete is evaluated by the sulfate erosion test and by the ultrasonic data acquisition of its damage process. The experimental results show that the flexural strength of basalt fiber concrete is increased after the concrete has been disturbed in the early stage of condensation but is decreased in the middle stage of condensation and is not affected in the later stage. When the condensation and hardening processes are disturbed, damage is caused inside the concrete, which is greater with the increase in the condensation degree until the penetration resistance reaches about 15 MPa, which then is more and more reduced. The durability of basalt fiber concrete is reduced by disturbance, which has a significant effect on it when the penetration resistance is between 7 MPa and 16 MPa.

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第 232 篇

标　　题：Effects Of Cement Content, Curing Period, Gradation, And Compaction Degree On Mechanical Behavior Of Cement-Stabilized Crushed Gravel Produced Via Vertical Vibration Test Method

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通讯作者：Tian, T (corresponding author), Changan Univ, South Erhuan Middle Sect, Key Lab Special Area Highway Engn, Minist Educ, Xian 710064, Peoples R China.

期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：In this paper, the reliability of vertical vibration test method (VVTM) was evaluated by comparing the changes in moisture content and gradation before and after forming the test piece by VVTM and static pressure method and the mechanical strength correlation between the laboratory compaction sample and the core sample in the field. The effects of cement content, curing period, gradation, and compaction degree on the unconfined compressive strength, splitting strength, and compressive rebound modulus of VVTM-compacted cement-stabilized crushed gravel (CSCG) were studied, and a mechanical strength prediction equation for VVTM-compacted CSCG was formulated. The results show that the correlation between the strength of the VVTM specimen and the field core sample can reach 92%; the mechanical strength of CSCG will increase with increase in the cement content, and when the cement content reaches

approximately 4%, the increase in its mechanical strength will slow down; the mechanical strength of VVTM-compacted CSCG with different cement dosages and gradation types increased fast at 14 days of curing period and began to level off after 90 days. Compared with XM gradation, using GM gradation can improve the mechanical strength. Under different gradations and curing periods, the mechanical strength linearly increases with increase in the degree of compaction. The mechanical strength prediction equation has a high reliability; therefore, it can accurately predict the strength growth rules. Moreover, the degree of compaction increases by 1%, and the mechanical strength increases by approximately 10%.

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第 233 篇

标　　题： Mechanical And Deformation Characteristics And Optimization Of Support Parameters For Superlarge-Span Tunnel: A Case Study From Laohushan Tunnel

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In the new construction or reconstruction of expressway projects, the number of highway twin tunnels with eight lanes is increasing. However, there are no corresponding design support parameters and measures in the current technical specifications for tunnel design and construction in China. In Laohushan superlarge-span highway tunnel with single hole and four lanes, the deformation behavior and mechanical characteristics of support structures are measured and analyzed. The monitoring results indicated that the deformation of tunnel structure mainly experienced three stages: rapid deformation, slow deformation, and stable deformation, and finally reached a relatively stable state; the structure stress of primary support and secondary lining increases sharply at first and then tends to be stable gradually with the gradual construction of each excavation part in the tunnel; the stress of each measuring point at the steel rib is less than the yield limit of steel rib (235 MPa), and the support structure is safe and stable in the process of tunnel construction. Then, the structure safety of primary support under different support parameters is simulated and calculated by numerical simulation with Grade IV rock mass, and the reasonable support parameters for Laohushan highway tunnel are studied considering the structural safety and engineering economy. It is suggested to use the H175-type steel sets with a distance of 80 cm and C25 shotcrete with a thickness of 26 cm. The results could provide reference for similar tunnel projects and provide a basis for the design specification and construction standards for superlarge-span tunnels.

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第 234 篇

标　　题：Flexural Behavior Of Concrete-Filled Rectangular Steel Tubular Composite Truss Beams In The Negative Moment Region

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期　　刊：ENGINEERING STRUCTURES

摘　　要：Two concrete-filled rectangular steel tubular (CFRST) composite truss beams were tested to investigate the flexural behaviors in the negative bending moment region. The specimens were designed with different forms of concrete slab and shear connection as follows: one truss with slip-releasing shear studs and prestressed concrete slab and the other one with conventional shear studs and reinforced concrete slab. In the test, the load-deflection response, cracking development, ultimate bearing capacity, relative slip between concrete slab and steel truss, and strain distributions on steel truss, concrete slabs and reinforcement were measured. The test results indicated that the difference in concrete slabs and shear studs had negligible influences on the ultimate bearing capacity, but significant effects on failure modes and stresses redistributions. Using the prestressed concrete slab and slip-releasing shear studs can improve the degree of prestressing applied to the concrete slab, thus effectively delaying the cracking development. For the purpose of the practical design, the formulae were derived to predict the cracking moment, concrete crack width under the serviceability limit state and the flexural bearing capacity under the ultimate limit state. The validation against test results showed that the proposed formulae were reliable.

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第 235 篇

标　　题：Feasibility Of Rapid-Regeneration Utilization In Situ For Waste Cement-Stabilized Macadam

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期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：In traditional restoration and reconstruction of transportation, the long-term closed traffic and generation of solid waste in the road maintenance section exert a negative influence on the local society, economy, and environment. This study aims to determine the suitability of using the Early strength Anti-cracking Material (EAM) to achieve the reutilization of Milling-planing Materials (MM) reclaimed from broken Cement-Stabilized Macadam (CSM) bases and to reduce the maintenance time effectively. Thus, some tests of MM were conducted to evaluate its engineering properties. The mechanical, shrinkage, and fatigue tests were carried out to determine

the effects of cement dosage, MM and EAM. Results indicate that with the use of small quantities of cement, fine mechanical properties still exist in the structure after the total substitution of MM for Natural Aggregates (NA). The incorporation of EAM has little influence on long-term mechanical strength. Instead, it introduces the possibility of getting rid of vehicle-passing restrictions five days in advance of road maintenance. Additionally, it was confirmed that the cement-stabilized MM with EAM has acceptable shrinkage resistance and fatigue properties. These results demonstrated the possibility of using EAM to produce more rapid-recovering and sustainable pavements. (C) 2020 Elsevier Ltd. All rights reserved.

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第 236 篇

标　　题： Ecological Impact Assessment Method Of Highways In Tibetan Plateau: A Case Study Of Gonghe-Yushu Expressway

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期　　刊： JOURNAL OF MOUNTAIN SCIENCE

摘　　要： In recent years, the ecological environment along highways in Tibetan Plateau has been severely affected due to the rapid construction of highways. In order to solve the problems of multiple indicators and inconsistent criteria in the ecological impact assessment of highways, and to scientifically screen assessment indicators, the paper proposes a multi-round indicator screening method, which combines literature analysis, expert rating, and statistical analysis. Based on this screening method, normalized difference vegetation index, land surface temperature, elevation, and normalized difference soil index are screened out. Combined with multiple linear regression, an ecological impact assessment model is established and applied to ecological impact assessment of Gonghe-Yushu Expressway. The results show that the expressway construction is the first driving force for the deterioration of the ecological environment along the roadside, and its interference range on the desert grassland ecosystem is greater than that on the agroforestry system. The ecological environment within 150 m on both sides of the expressway should be protected.

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WOS 号： 000552203800008

第 237 篇

标　　题： Investigation On High Temperature Rheological Behaviors And Fatigue Performance Of Trans-Polyoctenamer-Activated Crumb Rubber Modified Asphalt Binder

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期　　刊： COATINGS

摘　　要： Asphalt binders have been modified with Crumb rubber (CR) as an effort to fulfil the demand for the development of eco-friendly and sustainable pavements. The objective of this study was to investigate the high temperature rheological behaviors and fatigue performance of crumb rubber modified asphalt (CRMA) binder activated using trans-polyoctenamer (TOR). Long-term and short-term aging tests were performed on samples by thin film oven test (TFOT) and pressure aging vessel (PAV). Rotational viscosity (RV), softening point, and dynamic shear rheometer (DSR) tests were conducted to characterize the rheological and physical performance. A linear amplitude sweep (LAS) test was employed to evaluate the fatigue performance. The results show that TOR-activated CRMA is more capable of hardening the matrix bitumen and improving its high-temperature viscoelastic properties after TFOT. The high temperature viscoelasticity is significantly better than styrene-butadiene-styrene block (SBS) modified asphalt (SBSMA) and CRMA. TOR-activated CRMA exhibits strong rutting resistance, but it is more likely to generate fatigue cracks under the violent advancement of complex modulus. Therefore, TOR active agent has a negative impact on the fatigue performance of CRMA. SBSMA exhibited superior fatigue resistance. The viscosity temperature index (VTS) of TOR-activated CRMA and CRMA was basically identical; the TOR did not significantly improve the temperature sensitivity of CRMA.

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第 238 篇

标　　题： Influence Of Temperature And Sodium Sulfate Content On The Compaction Characteristics Of Cement-Stabilized Macadam Base Materials

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期　　刊： MATERIALS

摘　　要： This paper describes an experimental investigation into the compaction characteristics of cement-stabilized macadam base materials (CSMBM) in a saline soil area. Through the field tests, the main causes of arch expansion in an existing road were analyzed. Based on this, the compaction tests and microscopic tests were designed to analyze the impacts of temperature, sodium sulfate content and cement content on the compaction characteristics of CSMBM. Then, the orthogonal test was designed to analyze the effects of the degree of the temperature, the cement content, and the sodium sulfate content on the compaction results of the CSMBM. Feld tests results show that the temperature, sodium sulfate content and cement content may be the main causes of arch

expansion. The compaction tests show that with the temperature increasing, the optimal water content (OWC) decreases, but the maximum dry density (MDD) increases; with the sodium sulfate content increasing, the OWC increases, but the MDD decreases; with the cement content increasing, both MDD and OWC increase. The microscopic tests show that the increase of temperature and cement content is beneficial to the compactness between cementitious materials and aggregates, while the increase of sodium sulfate content makes the whole structure of cementitious materials and aggregates increasingly rough. The orthogonal test shows that the temperature has the greatest influence on the MMD, and the sodium sulfate content has the greatest influence on the OWC. Thus, in a sulfate saline soil area, the construction temperature, the sodium sulfate content and the cement content should be controlled to ensure the compaction quality of CSMBM.

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第 239 篇

标　　题： Numerical Analysis Of The Flow Around Two Square Cylinders In A Tandem Arrangement With Different Spacing Ratios Based On Pod And Dmd Methods

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期　　刊： PROCESSES

摘　　要： To more clearly understand the changes in flow characteristics around two square cylinders with different spacing ratios, the main mode of the flow field was extracted by using the Proper Orthogonal Decomposition (POD) and Dynamic Mode Decomposition (DMD) methods. The changes in the main mode of the flow field at different spacing ratios and the difference of the time series were analyzed and compared. This processing can separate the mixed information in the flow field and obtain the dominant modes in the flow field. These main modes can clearly reflect the dominant flow characteristics in the flow field. The analysis results show that when L/D = 2, the flow field structure is consistent with the flow field around a single square cylinder. When L/D = 2.5-3.5, the vortex shedding from upstream cylinders combines with the vortex near the downstream cylinders. This mutual coupling causes a significant change in the drag coefficient value of the downstream cylinder. When L/D = 4, the main vortex from the upstream cylinder can be completely shed, which means that the upstream and downstream square cylinder vortices start to become independent. The main focus of this paper is to use the advantages of POD and DMD to obtain several modes with higher energy in the flow field. Furthermore, it can be considered that these main modes can fully reflect the flow characteristics of the flow field.

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第 240 篇
标　　题： Real-Time Monitoring Method For Layered Compaction Quality Of Loess Subgrade Based On Hydraulic Compactor Reinforcement
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期　　刊： SENSORS
摘　　要： Hydraulic compactor is an efficient reinforcement machine for loess subgrade. However, it is difficult to control the layered compaction quality of the subgrade. This research presents a real-time layered compactness monitoring method for hydraulic compactor reinforcement of subgrade in loess areas. The hydraulic force coefficient is first introduced, and the dynamic response model of the hydraulic rammer and soil is established. The relationship between the acceleration of the hydraulic rammer and the compactness of subgrade is then obtained based on the collision theory in elastic half space. A full-scale test using a hydraulic compactor to reinforce loess subgrade was also carried out. Results show that the hydraulic compactor obtains the effective influence depth for the reinforcement of loess subgrade. Within the effective reinforcement depth, the relationship between the peak acceleration of the rammer and the layered compactness of subgrade can be well fitted by a quadratic function model. The layered compactness of the subgrade and the working state of the hydraulic compactor can then be remotely monitored at a mobile terminal in real time. Furthermore, the monitoring technology was applied to Huangling-Yan'an Expressway in China, significantly improving the accuracy and efficiency of real-time monitoring of the layered compactness of subgrade in the loess area.
DOI： 10.3390/s20154288
WOS 号： 000567351500001

第 241 篇
标　　题： Cement-Modified Loess Base For Intercity Railways: Mechanical Strength And Influencing Factors Based On The Vertical Vibration Compaction Method
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通讯作者： Li, QL; Yi, Y; Yuan, KJ (corresponding author), Changan Univ, Minist Educ, Key Lab Special Area Highway Engn, Xian 710064, Peoples R China.
期　　刊： MATERIALS
摘　　要： Cement-modified loess has been used in the recent construction of an intercity high-speed railway in Xi'an, China. This paper studies the mechanical strength of cement-modified loess (CML) compacted by the vertical vibration compaction method

(VVCM). First, the reliability of VVCM in compacting CML is evaluated, and then the effects of cement content, compaction coefficient, and curing time on the mechanical strength of CML are analyzed, establishing a strength prediction model. The results show that the correlation of mechanical strength between the CML specimens prepared by VVCM in the laboratory and the core specimens collected on site is as high as 83.8%. The mechanical strength of CML initially show linear growth with increasing cement content and compaction coefficient. The initial growth in CML mechanical strength is followed by a later period, with mechanical strength growth slowing after 28 days. The mechanical strength growth properties of the CML can be accurately predicted via established strength growth equations. The results of this study can guide the design and construction of CML subgrade.

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第 242 篇

标　　题： Time-Variant Probabilistic Random Degradation Model On Flexural Capacity Of Road Tunnel Linings

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期　　刊： STRUCTURE AND INFRASTRUCTURE ENGINEERING

摘　　要： A time-variant random degradation model for assessing the flexural capacity of tunnel lining is proposed. By using the double reinforced beam model, the governing equation of moment capacity for tunnel lining is established with the consideration of the reduction of the steel area and the concrete-steel bond strength. Moreover, both carbonation penetration and chloride corrosion of lining are incorporated in this model. Then the theoretical formulations are used to obtain the probabilistic time-dependent flexural capacity responses of tunnel lining. To further optimise the target model, the global sensitivity analysis approach is employed to search the critical parameters. Additionally, applicability, accuracy, and efficiency of the proposed approach are rigorously investigated by comparing the probabilistic information of the capacity degradation model with that of Monte-Carlo simulation method from practically motivated examples. Finally, time-variant probabilistic features of lining flexural capacity are systematically studied, and the numerical results showed that the tension bars are hard to reach its yield strength when considering the deformation incompatibility caused by rust formation. The moment capacity follows the normal distribution for both normal and lognormal distributed lining thickness during all its life cycle.

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第 243 篇

标　　题：Signal Timing Optimization Algorithm For An Intersection Connected With An Urban Expressway

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期　　刊：ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING

摘　　要：The off-ramps of urban expressways can assume various forms. Compared with other countries, many off-ramps in China have special Chinese characteristics; for example, the off-ramps are extremely short and connected to urban roads and intersections within a short distance. Thus, many foreign control methods may not be suitable for use in China. This paper provides a dual-phase signal timing optimization model for an intersection connected to the off-ramp of an urban expressway that has special Chinese characteristics. This model is solved by an improved genetic algorithm. To better evaluate traffic conditions, this paper also establishes methods by which stranded vehicles can be identified and the traffic flow at intersections can be predicted. The performance of the optimized signal timing is tested with PTV Vissim software, and the timing plan is calculated by MATLAB using an actual scenario in Xi'an, China. The optimized effect of the proposed model is tested under different flow conditions by changing the input traffic flow of the intersection. The results show that at the peak time, the stops, delays and queue lengths of the whole intersection are reduced by 29.0%, 27.8% and 23.7%, respectively, compared with the original plan and by 7.7%, 14.5% and 11.9%, respectively, compared with the plan from the single-phase model. This dual-phase model can prevent congestion from spillback onto urban expressways as well as reduce delays and stop times at intersections, especially in a supersaturated state. In general, this model can be used to address signal timing in ordinary urban intersections.

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第 244 篇

标　　题：Effect Of Dry-Wet And Freeze-Thaw Repeated Cycles On Water Resistance Of Steel Slag Asphalt Mixture

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期　　刊：IRANIAN JOURNAL OF SCIENCE AND TECHNOLOGY-TRANSACTIONS OF CIVIL ENGINEERING

摘　　要：As an attractive substitute of natural aggregate for asphalt mixture, steel slag raises many concerns on the water resistance of steel slag asphalt mixture in frozen and wet areas, due to the special interaction between steel slag and asphalt. This study aims to

investigate the deterioration process of water resistance for asphalt mixture with different steel slag contents in dry-wet and freeze-thaw cycles environments. The Marshall immersion test and indirect tensile test were conducted, and the residual stability and tensile strength ratio (TSR) were measured to characterize the water resistance of the steel slag asphalt mixture. Furthermore, dry-wet and freeze-thaw repeated cycling conditions were designed to simulate the effect of actual environments on the long-term water resistance of asphalt pavement. Finally, the microstructures of the aggregate-asphalt interface area were observed, and the enhancement mechanism of the steel slag replacement in asphalt mixture was revealed. Results show that steel slag asphalt mixture exhibits significant resistance to water damage. With the increase in dry-wet or freeze-thaw repeated cycles, the water resistance of steel slag asphalt mixture rapidly deteriorates first and then tends to be stable, and there is a limit state of water damage. In dry-wet repeated cycles condition, the asphalt mixture with 50% steel slag content has a better water resistance, while the asphalt mixture with 100% steel slag content has a better water resistance under freeze-thaw repeated cycles condition. The interface phase structure of steel slag asphalt mixture is stable and dense, where the asphalt mortar evenly and tightly wraps the steel slag and forms a certain penetration depth. The enhancement mechanism of steel slag with asphalt mainly includes the physical anchoring effect and the chemical adhesion effect.

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第 245 篇

标　　题： Mechanical Properties Of Vertical Vibration Compacted Lime-Fly Ash-Stabilized Macadam Material

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通讯作者： Jiang, YJ (corresponding author), Changan Univ, Key Lab Special Area Highway Engn, Minist Educ, Xian 710064, Shaanxi, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： This paper studies the mechanical properties of the lime-fly ash-stabilized macadam (LFASM) fabricated via the vertical vibration compaction method (VVCM). First, the reliability of VVCM with respect to the production of LFASMs was evaluated, and their mechanical properties, including unconfined compressive strengths, splitting strengths, and resilient moduli, were studied. Then, the influences of the lime-fly ash (LFA) content, curing time, and gradation type on the mechanical properties of the LFASMs fabricated via the VVCM were discussed. Furthermore, mechanical strength growth equations and relation models were established among the mechanical indexes of the VVCM-fabricated LFASMs. Results reveal that the ratios of the mechanical strength between the laboratory-VVCM-fabricated LFASMs and on-site cores were above 90%. With an increase in LFA contents, the unconfined compressive strength and resilient modulus of the LFASMs increased at first and then gradually decreased, while the splitting strength increased drastically at first and then gently. The aforementioned

mechanical properties of the LFASMs increased non-linearly with an increase in the curing times, with potential for improvement via skeleton-dense gradation. The mechanical strength growth properties of the LFASMs can be accurately predicted via the established strength growth equations. Furthermore, the relation models established between the aforementioned mechanical parameters are useful for evaluating the remaining mechanical parameters under the limited test conditions. This study provides a novel alternative for designing and constructing the LFASM base. (C) 2020 Elsevier Ltd. All rights reserved.

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第 246 篇

标　　题： Preparation And Performance Of Conductive Tack Coat On Asphalt Pavement

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The purpose is to solve the problems of inadequate snow melting uniformity, difficult construction, and large heat storage in existing energy conversion pavements for deicing and snow melting. The conductive layers of different adhesive materials were prepared with emulsified asphalt modified by waterborne epoxy resin (MEAWER) and modified waterborne epoxy resin (MWER) as matrix. According to the surface resistivity and temperature change, the conductivities and heat conduction effects of the two types of conductive adhesive layers were compared and evaluated, respectively, and the road performance is determined based on multiple conditions. The results showed that when the amount of carbon fiber was 120 g/m(2), compared to MEAWER, the surface resistivity of MWER was 18.7% lower, the surface temperature was 3.6 degrees higher, and the bonding strength was 46.1% higher. The thermogenesis and heat dissipation efficiency of MWER could reach 6.9 and 2.76 degrees C/h at -5 degrees, respectively. Moreover, its minimum shear and drawing strengths exceeded 1.3 and 0.5 MPa, respectively. Based on the temperature change and road performance of the conductive adhesive layer, it was recommended that 120 and 100 g/m(2) of carbon fiber be distributed in the MEAWER and MWER conductive tack coats, respectively. (C) 2020 Elsevier Ltd. All rights reserved.

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第 247 篇

标　　题： The Influence Of Multiple Combined Chemical Attack On Cast-In-Situ Concrete: Deformation, Mechanical Development And Mechanisms

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In this paper, a laboratory program was performed to investigate the influence of combined internal chloride and external sulfate/magnesium simulated exposure on cast-in-situ OPC concrete samples. Specimens of cylinder shape were prepared and then stored in distilled water or aggressive solutions, which were sulfate or sulfate-magnesium solutions. The specimen parameters, such as diameter increments, mass increments, unconfined compression strength together with sulfate concentration, were determined continuously during the immersion. Mineral and microstructural changes of tested samples were analyzed to determine the attack products after 12-months immersion. Results illustrate that the development of concrete strength was limited by sulfate, chloride, magnesium, or multiple combined chemical attack at the early stage and resulted in a low strength in the long-term. Internal chlorides accelerated the degradation induced by external sulfate attack, subsequently enhancing the accumulation rate of sulfates in concrete in both sulfate and sulfate-magnesium solutions. Coexisting magnesium helps to restrain the degradation and decrease the diffusion speed of sulfates. Magnesium weakens the acceleration effect of internal chlorides on the degradation induced by sulfate attack. While the internal chlorides restrains the protection effect on internal concrete by Magnesium. Degradation layer-by-layer is the proposed mechanism when concrete subjected to magnesium involved chemical attack.

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第 248 篇

标　　题： Variation Of Rock Mass Pressure During Tunnel Construction In Phyllite Stratum

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： In this paper, the field monitoring method is used to study the variation of rock mass pressure during the construction of a tunnel in phyllite stratum, and three functions are used to fit and analyze the variation of rock mass pressure with deformation, excavation time, and space. The results show the following (1) When the deformation increases significantly, the rock mass pressure decreases firstly and then increases. This is caused by the insufficient bearing capacity of the rock mass in the arch foot of the supporting structure after the excavation of the upper bench, which leads to a settlement of

supporting structure and surrounding rock. (2) Compared with other kinds of fitting functions, the logistic function can better characterize the variation of the pressure of surrounding rock with deformation, excavation time, and distance from the face. This paper provides a reliable reference for the design and construction of the tunnel in phyllite stratum. The logistic function can be used to present and predict the change of rock mass pressure with deformation, excavation time, and space in similar rock mass conditions.

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第 249 篇

标　　题： A Quick Assessment And Optimization Method For A Flutter Aerodynamic Measure Of A Typical Flat Box Girder

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期　　刊： SHOCK AND VIBRATION

摘　　要： Flutter is one of the most serious wind-induced vibration phenomena for long-span bridges and may cause the collapse of a bridge (e.g., the Old Tacoma Bridge, 1940). The selection and optimization of flutter aerodynamic measures are difficult in wind tunnel tests. It usually takes a long time and consumes more experimental materials. This paper presents a quick assessment and design optimization method for the flutter stability of a typical flat box girder of the long-span bridges. Numerical analysis could provide a reference for wind tunnel tests and improve the efficiency of the test process. Based on the modal energy exchange in the flutter microvibration process, the global energy input and local energy input are analyzed to investigate the vibration suppression mechanism of a flat steel box girder with an upper central stabilizer. Based on the comparison between the experimental and numerical data, a quick assessment method for the optimization work is proposed. It is practical to predict the effects of flutter suppression measures by numerical analysis. Thus, a wind tunnel test procedure for flutter aerodynamic measures is proposed which could save time and experimental materials.

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WOS 号： 000565234300003

第 250 篇

标　　题： High-Temperature Rutting Resistance Of Inverted Asphalt Pavement Structure

作　　者： [Jiang, Yingjun; Zhang, Yu; Deng, Changqing; Yi, Yong; Tian, Tian; Yuan, Kejia] Changan Univ, Minist Educ, Key Lab Special Area Highway Engn, Xian 710064, Shaanxi, Peoples R China

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：To improve the high-temperature rutting resistance of asphalt pavements, an inverted asphalt pavement structure (IAPS), 4 cm AC-13 mixture + 8 cm AC-25 mixture + 6 cm AC-20 mixture + 54 cm cement-stabilized macadam, was proposed herein by considering engineering practice, theoretical calculation, and analysis. A rutting prediction equation of asphalt pavements was then proposed via rut-development trends found by laboratory 18 cm thick rutting test. Subsequently, the rutting resistance of the IAPS was evaluated. The results show that, compared with the traditional asphalt pavement structure (TAPS), 4 cm AC-13 mixture + 6 cm AC-20 mixture + 8 cm AC-25 mixture + 54 cm cement-stabilized macadam, the maximum shear stress of the IAPS can be reduced by similar to 1.7% along with improvements in rutting resistance by similar to 16% and similar to 12% under wheel loads of 0.7 and 1.2 MPa, respectively. Wheel-load increase affects the rutting resistance of both structures in a similar manner: when the wheel load increases from 0.7 MPa to 1.2 MPa, the rut depths of both pavement structures increase by at least 63%. The IAPS clearly has better rutting resistance than the TAPS and is thus the better choice for asphalt pavement structure design.

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第 251 篇

标　　题：Analysis Of Land Surface Temperature Evolution Based On Regional Road Scope

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：To balance sustainable road construction and environmental impact, intrinsic relationships between regional road networks and land surface temperature (LST) along the roads must be examined. In this study, we hypothesize that expanding road networks can affect the LST within a given region. Thus, we determined the influence of varying road grades on the surrounding LST. Using an improved single-window algorithm with reasonably adjusted water vapor parameters, LST data for the relevant areas were extracted from Landsat 8 data. Analyzing these data revealed that, in the improved single-window algorithm, the MOD05 L2 water vapor parameter could obtain results, indicating that road grades are positively correlated with LST changes when road network mileage is increased. In addition, we found that LST was increased by highways and low-grade roads over distances of 180 m and 150 m compared with the surrounding area, respectively. Furthermore, LST was affected by road interchanges over a distance of 300 m and by intersections formed by low-grade roads over 150 m; both have a linear nonuniform influence on the propagation models. Finally, we determined that different highways in the LST radiation range can interact to form an LST concentration zone, resulting in further LST increases.

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WOS 号： 000566234700004

第 252 篇
标　　题： Theoretical Solutions For The Vertical Compressive Stress Of Shallow Neighbourhood Loess Tunnel Foundation
作　　者： [Lei, Ping; Han, Xingbo; Xia, Yongxu; Chai, Lunlei; Liang, Xing] Changan Univ, Sch Highway Engn, Xian, Peoples R China; [Tang, Jia] China Resources Land Ltd, Dept Dev Strategy Determining, Shenzhen, Peoples R China
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期　　刊： JOURNAL OF ASIAN ARCHITECTURE AND BUILDING ENGINEERING
摘　　要： Vertical compressive stress of the foundation is a vital parameter for determining the coefficient of self-weight collapsibility of loess tunnels. This paper aims to provide a theoretical solution for the vertical compressive stress of shallow neighbourhood loess tunnel foundation. Firstly, the formula of boundary depth for deep- and shallow-buried neighbourhood loess tunnels with the consideration of the construction order of two holes is derived. In addition, solutions for surrounding rock pressure of the first and rear holes are established. Then, calculation of foundation vertical compressive stress of shallow neighbourhood loess tunnel is deduced by basing on the Flamant's elasticity solution. Finally, the Xi'an metro line NO. 2 is taken as a case study to examine and verify the applicability of the proposed theoretical method. The case study results show that the variation between the proposed formula and numerical simulation is less than 15%, which proves the reliability of our proposed formula and its potential application in the construction of shallow neighbourhood loess tunnels.
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WOS 号： 000561463600001

第 253 篇
标　　题： Performance Of Super-Large-Span Tunnel Portal Excavated By Upper Bench Cd Method Based On Field Monitoring And Numerical Modeling
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期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： The number of super-large-span tunnels is increasing in both new construction and reconstruction projects in China recently. In super-large-span tunneling engineering, the deformation properties and mechanical behaviors of tunnel portal structure are more complex than those of common tunnel due to the flatter shape and larger construction span. The mechanical behaviors of rock mass change in response to different sequential excavation methods and supporting parameters. The upper bench CD method has been gradually applied in the construction of super-large-span tunnels in China. In this paper,

the design parameters for the supporting structure of super-large-span tunnel were studied by the field monitoring and numerical modeling in a case study of Laohushan tunnel. It was found that the crown settlement was larger than the clearance convergence, and the stress of arch was greater than that of the side wall in tunnel portal section. The invert structure was flat with small curvature. Therefore, the shotcrete was mainly subjected to tensile stress. The use of H200 x 200 steel rib with spacing of 60 cm and C25 shotcrete with thickness of 30 cm is recommended. The results of this paper provide basis for the development of design specifications and construction standards for super-large-span tunnels and provide reference for similar projects in the future.

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第 254 篇

标　　题： Comparison Of Fracture Test Methods For Evaluating The Crack Resistance Of Asphalt Mixture

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期　　刊： ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING

摘　　要： For the better understanding of fracture test method to evaluate the crack resistance of asphalt mixtures, the current test methods and evaluation indexes were theoretically and experimentally compared, including the indirect tensile test, single edge notch beam test, semicircular bending test (SCB) and disk-shaped compact tension test. The stress intensity factors for different tests were compared, and the appropriate range of notch depth was determined. The SCB was finally selected as the test method for evaluating the crack resistance of the asphalt mixtures. According to the relationship between the fracture energy and notch depths, the essential fracture energy of asphalt mixtures was calculated, and it was recommended as the evaluation index of asphalt mixtures for crack resistance. Furthermore, the failure process of the SCB was analyzed, and the contraflexure point on the load-displacement curve was found and defined. The fracture energy at the contraflexure point could be used to evaluate the ultimate crack resistance of the asphalt mixtures. The application of the essential fracture energy and the contraflexure point can correspond to the actuality of the asphalt pavement, which provides a reference for the crack resistance research of asphalt mixtures in the future.

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WOS 号： 000559677300001

第 255 篇

标　　题： Laboratory Performances Of Nano-Particles/Polymer Modified Asphalt Mixtures Developed For The Region With Hot Summer And Cold Winter And Field Evaluation

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期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：In some regions with hot summer and cold winter, most modified asphalt mixtures cannot meet the requirement of high-temperature stability and low-temperature cracking resistance simultaneously very well, so rutting or cracking often occurs in these regions. This paper tries to use nano-CaCO3/SBR (Styrene butadiene rubber) and nano-ZnO/TiO2/SBS (Styrene-butadiene-styrene) composite modified asphalt mixtures to solve this problem. The properties of these two asphalt mixtures were compared with those of base, SBR modified and SBS modified asphalt mixtures through rutting, beam bending, immersion Marshall, freeze-thaw splitting, three-point bending fatigue and splitting tests. Results show that the high-temperature stability of nano-CaCO3/SBR composite modified asphalt mixture is better than that of SBR modified asphalt mixture, and their low-temperature cracking resistances are close. In addition, the water stability, fatigue performance, performance after ageing, and splitting strength of SBR modified asphalt mixture can be improved by the addition of nano-CaCO3. All of the performances mentioned above of nano-ZnO/TiO2/SBS composite modified asphalt mixture are better than those of base or SBS modified asphalt mixture. In summary, nano-CaCO3/SBR or nano-ZnO/TiO2/SBS composite modified asphalt mixture has good high-temperature stability and low-temperature cracking resistance and can be used in the regions with hot summer and cold winter.

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第 256 篇

标　　题：Numerical Simulation Of Dynamic Repetitive Load Test Of Unbound Aggregate Using Precision Unbound Material Analyzer

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期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：This study developed discrete element models to simulate the dynamic repetitive load test using precision unbound material analyzer (PUMA). The simulated aggregate was created with the clump method simulating real particle shape. The parameters of the real particle shape were determined by the smoothness degree of particle shape and the required time-steps, which balanced the accuracy of particle shape and computational efficiency. The rubber ball layer (RBL) was adopted as the boundary conditions of repeated load test according to the features of the PUMA apparatus. Through the

comparisons of results between numerical simulation and laboratory tests, the thickness of RBL was found close to the median size of particles resulting in the better simulation. Moreover, the numerical simulation results were verified with the conducted laboratory tests. The predicted permanent deformation was consistent with the laboratory measurement, which showed that discrete element based simulation can obtain the reliable results for the dynamic repetitive load test. The predicted permanent deformation using the real particle model was found much closer to the experimental results, which was greater than the one obtained using the ball model. The analytical results of volumetric-axial strains, directions of displacements, and contact forces indicated that the real particle method can better represent the migration movements of aggregates in the laboratory conditions. The simulation results indicate the importance of considering real aggregate shape in discrete element modelling of unbound material behaviour.

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第 257 篇

标　　题： Analysis Of Support Reaction Curves Considering Time-Varying Effect Of Shotcrete

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The core content of the convergence constraint method is to determine the reasonable support time and support stiffness. The stiffness of shotcrete in supporting structure is dynamic. The support stiffness of shotcrete is roughly calculated in engineering, which results in a waste of materials and increases the risk of construction. Therefore, in this study, considering the time-varying characteristics of shotcrete, combined with the elastic-plastic theory and the space effect of excavation surface, the calculation equation describing the support reaction curve is given. An example is given to show that the stiffness of shotcrete considering time-varying effect is lower than that of shotcrete without time-varying effect, and the difference is the most obvious in the age of 0-3 days. However, in the later stage, the stiffness growth rate of shotcrete considering time-varying effect is higher than that of shotcrete without time-varying effect. This study can predict the whole process of the support reaction curve, which can make the application of the convergence constraint method in tunnel support design more accurate, and provide a theoretical basis for the design of supporting structure in the process of tunnel construction.

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第 258 篇

标　　题： A Novel Two-Degree-Of-Freedom Model Of Nonlinear Self-Excited Force For Coupled

Flutter Instability Of Bridge Decks

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期　　刊：JOURNAL OF SOUND AND VIBRATION

摘　　要：This paper aims to propose a novel model for predicting the nonlinear heave-torsion coupled flutter instability of flat bridge decks. The nonlinear oscillatory system during coupled post-flutter instabilities was modeled as a weak perturbation of the classical linear flutter theory. A novel nonlinear self-excited force model was then proposed by introducing extra nonlinear terms in classical linear model to consider the effects of nonlinear aerodynamic damping, amplitude-dependent vibration mode and the coupling of aerostatic deformation. An efficient algorithm for parameters identification and solving of the nonlinear coupled oscillator was also developed. The effectiveness of the proposed analytical framework was validated through an elastically-supported sectional model test in estimating the self-sustained vibrations during post-critical states of a typical closed-box bridge deck.

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第 259 篇

标　　题：Coupling Of Electroche Mical-Temperature-Mechanical Processes In Marine Clay During Electro-Osmotic Consolidation

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期　　刊：SCIENTIFIC REPORTS

摘　　要：Electro-osmotic consolidation has been applied in several geotechnical engineering applications that contain a series of complex processes, including electrochemical processes, temperature changes, and mechanical evolution. To explore the combination of electrochemical-temperature-mechanical processes in marine clay, electro-osmotic consolidation experiments were conducted using a self-made electro-osmotic consolidation system under various durations and voltages. The following findings was obtained: (1) the change in the pH value increased during electro-osmotic consolidation and as the voltage rise; (2) the temperature increased with a rise in voltage in the initial

stage of the experiments, which was induced by Joule heating; (3) the temperature rise promoted the electro-osmotic consolidation process, which included a rise in the coefficient of consolidation and a reduction in water content; (4) horizontal shrinkage occurred when the horizontal stress increment was greater than the critical stress condition. In addition, the volume difference reached a constant value, and was proportional to the voltage rise. After the discussion, a coupling analysis was conducted, which can help to better understand the mechanism of electro-osmotic consolidation and can provide reference for engineering applications.

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第 260 篇

标　　题： Investigating The Interaction Behavior Between Asphalt Binder And Rubber In Rubber Asphalt By Molecular Dynamics Simulation

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to clear the interaction mechanism between rubber and asphalt binder in rubber asphalt, radial distribution function was selected to investigate the variation of the agglomeration of rubber asphalt with rubber and asphalt binder types, where molecular models of rubber asphalt were built firstly, molecular dynamics simulations were performed afterwards and the variation of agglomeration behavior and adsorption effect were analyzed finally based on Materials Studio 8.0. The results show that the agglomeration of asphalt binder is changed significantly with the addition of rubber. The agglomerations of rubber-naphthene aromatic and rubber-saturate is more clustered than that of asphaltene-naphthene aromatic and asphaltene-saturate, and the agglomeration of rubber-naphthene aromatic is more clustered than that of rubber-saturate. The adsorption of different rubber types to light fractions of asphalt binder follows this order: cis-polybutadiene rubber (BR) > styrene butadiene rubber (SBR) > natural rubber (NR). In addition, the more clustered agglomeration structure of rubber-asphalt will be formed with the higher proportion of naphthene aromatic and saturate in asphalt binder.

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第 261 篇

标　　题： Numerical Analysis Of Temperature Influence On Transverse Cracks In Concrete Box-Girder Bridges

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Concrete box-girder bridges are widely used in China. During several routine inspections of two-year-old highway bridges of this type in the China Central Plains region, we found that transverse cracks are widespread on the bottom flanges of those box girders, mainly distributed in the area of 1/4Lto 3/4Lof the span. Selected cracks were then monitored continuously for one year. Our results showed that there had been no change in the widths of the cracks, but their lengths had increased and new cracks had formed. Taking into consideration factors like hydration reaction, relative humidity difference, shrinkage and creep, sunlight thermal differential effect, sudden temperature change, vehicle load, and their combined efforts, we have developed spatial structural models and conducted stress analyses on the reinforced concrete and prestressed concrete box-girder bridges, respectively. Our numerical analysis results indicated that the hydration reaction is the main reason for the initial bottom flange crack and the temperature difference between the inside and the outside of the box girders caused the crack developments at the later stage.

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第 262 篇

标　　题：Experimental Study On Noncoaxial Characteristics Of Saturated Remolded Loess

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通讯作者：Niu, HS (corresponding author), Changan Univ, Key Lab Special Area Highway Engn, Minist Educ, Xian 710064, Peoples R China.

期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：In practical engineering, if the influence of noncoaxial stress and strain is not considered, part of soil deformation will be ignored, resulting in the structural design which is not safe enough. A series of undrained tests was performed on remolded loess specimens using a hollow cylinder apparatus to examine the coupling between principal stress magnitude and direction in these specimens. First, the elastic parameters of remolded loess were obtained, and these parameters were used as the basis for investigating the noncoaxiality of the soil body under principal stress axis rotation (PSAR). The effects of elastic strain, intermediate principal stress coefficient, and magnitude of the deviatoric stress on the noncoaxiality of remolded loess were also investigated. The results of these experiments show that remolded loess exhibits significant noncoaxial behavior during PSAR. The noncoaxiality angle of remolded loess cyclically fluctuates with increases in the principal stress angle. It was also observed that the noncoaxiality angle will be overestimated if the effects of elastic strain are overlooked. Reversals in the direction of PSAR cause dramatic changes in the

noncoaxiality angle. Increases in the intermediate principal stress coefficient are accompanied by increases in the noncoaxiality angle, up to a certain degree; however, these changes do not affect the development of the noncoaxiality angle. In coupled rotational tests with a range of deviatoric stress amplitudes, it was observed that changes in the deviatoric stress amplitude will affect the development of the noncoaxiality angle; increases in the deviatoric stress amplitude cause the noncoaxiality angle versus principle stress angle plot to shift to the left gradually, thus accelerating the trends of the noncoaxiality angle. Increases in the cycle number also increase the noncoaxiality of remolded loess.

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第 263 篇

标　　题： Stress State And Noncoaxiality Of Leighton Buzzard Sand In Ngi-Type Bi-Directional Simple Shear Tests

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期　　刊： MARINE GEORESOURCES & GEOTECHNOLOGY

摘　　要： In NGI-type simple shear apparatus, including recently developed NGI-type bi-directional simple shear apparatus, the complete stress state is unknown which limited the interpretation of test results. This study compares the stress state of NGI-type simple shear test obtained by two methods, the stress state determined by an empirical method using test data, and stress state determined by measured values in a corresponding DEM test. Results showed that (1) stress state obtained by the two methods shows good agreement, especially at simple initial stress conditions. (2) due to the underestimation of constant k, minor principle stress and horizontal stress interpreted by the empirical method are higher than that in DEM test, and noncoaxiality interpreted by the empirical method are lower than that in DEM test. It is recommended that before determining the stress state of NGI-type bi-directional drained simple shear tests, it is needed to perform a test and corresponding DEM test under simple stress condition. The empirical equations for horizontal stress, especially the constant k should be validated and corrected for the tested soil before interpreting the stress state.

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第 264 篇

标　　题： Estimation Of Vehicle Carbon Emissions In China Accounting For Vertical Curve Effects

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Predicting vehicle carbon emissions on vertical curve sections can provide guidance for low-carbon vertical profile designs. Given that the influence of vertical curve design indicators on the fuel consumption and CO(2)emissions of vehicles are underexplored, this study filled this research gap by establishing a theoretical carbon emission model of vehicles on vertical curve sections. The carbon emission model was established based on Xu's vehicle energy conversion model, the conversion model of energy, fuel consumption, and CO(2)emissions. The accuracy of the theoretical carbon emission model and the CO(2)emission rules on vertical curve sections were verified by field test results. Field tests were carried out on flat sections, longitudinal slope sections, and various types of vertical curve sections, with five common types of vehicles maintaining cruising speed. The carbon emission rate effects on the vertical curve are closely related to the gradient and irrelevant of the radius. On the vertical profile composed with downhill/asymmetric/symmetrical vertical curve with a gradient greater than the balance gradient, the carbon emission rate is determined by the gradient and radius. The influence of the gradient on carbon emissions of vehicle on these vertical profiles was more significant than the radius. The radius is irrelevant to the carbon emission rate on the other forms of vertical profile. These results may benefit highway designers and engineers by providing guidelines regarding the environmental effects of highway vertical curve indexes.

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WOS 号：000570924800004

第 265 篇

标　　题：Evaluation Of Particle Size Distribution And Mechanical Properties Of Mineral Waste Slag As Filling Material

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：The resource utilization of solid waste in civil engineering is an essential direction of environmental governance. This study systematically investigated the feasibility of mineral waste slag as subgrade filler. The optimal compaction parameters of the waste slag were determined. The effects of different factors on the particle size distribution and mechanical properties of mineral waste slag were evaluated, and the construction parameters of the waste slag were recommended. The results show that when the coarse grain content (CGC) increases from 20% to 80%, the optimal moisture content of the mineral waste slag reduces from 13.03% to 10.50%. The CGC and compactive effort have a greater effect on the particle size distribution and mechanical properties of waste slag. The unconfined compressive strength of the sample reaches a maximum of 0.687

MPa when CGC is 50%. The recommended CGC of waste slag is about 50% in practical engineering, and the moisture content should be strictly controlled. (C) 2020 Elsevier Ltd. All rights reserved.

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第 266 篇

标　　题： Effect Of Basalt Fiber On The Low-Temperature Performance Of An Asphalt Mixture In A Heavily Frozen Area

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In the present study, basalt fiber was used to enhance the low-temperature performance of asphalt mixtures in heavily frozen areas. By conducting three-point bending tests at various temperatures (-10 degrees C, -20 degrees C and -30 degrees C) and basalt fiber contents (0.2-0.5%), the changing trends of the bending stress, bending strain, and strain energy density were investigated and discussed. The fracture type of each asphalt mixture was distinguished based on the bending coefficient, and the micromorphology and microstructures of each basalt fiber-reinforced asphalt mixture were observed via scanning electron microscopy. The results show that basalt fiber effectively improves the low-temperature performance of an asphalt mixture and enhances its adaptability to a lower-temperature environment. The optimum fiber content of an AC-13 asphalt mixture is 0.4% based on its low-temperature performance, whereas that of an AC-20 mixture is 0.3%. Under the optimum fiber content, the low-temperature failure type of an asphalt mixture changes from brittle failure to flexible failure at -20 degrees C. The basalt fiber network enhances the integrity of the asphalt mixture and delays the extension of microcracks. (C) 2020 Elsevier Ltd. All rights reserved.

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第 267 篇

标　　题： Fabrication And Heat Conduction Performance Investigation Of A Heat Insulation Conductive Bonding Layer For Asphalt Pavements

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： To improve the efficiency of deicing and snow melting on road surfaces, three types of pavement conductive bonding layers with heat insulation effects were prepared, and the

conductive bonding layer snow-melt pavement structure with heat insulation effect was designed. The temperature increasing effect of the upper part and the cooling effect of the lower part of the insulating conductive bonding layer were studied under different electrifying times. The effects of different material compositions on the heat insulating effect of the conductive bonding layer for the road were analyzed, and the best heat insulating and conductive bonding layer was selected. Results indicate that the comprehensive performance of the modified waterborne epoxy resin conductive bonding layer is the best. Compared with the two other types of conductive bonding layers, the temperature increasing effect of the upper part of the modified waterborne epoxy resin conductive bonding layer is 21.11-127.78% higher, and the cooling effect of the lower part is 19.78-93.62% higher. The addition of a heat insulation filler effectively improves the effect of the heat insulation conductive bonding layer, and with the increase in carbon fiber spreading amount, the performance improvement range of the road heat insulating conductive bonding layer increases gradually. The use of 80 g/m(2) of modified waterborne epoxy resin/hollow glass bead as the conductive bonding layer is recommended.

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第 268 篇

标　　题： Sensitivity Analysis In The Estimation Of Mechanical Parameters Of Engineering Rock Mass Based On The Hoek-Brown Criterion

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Geological strength index (GSI), disturbance factor (D), material constant (m i), and uniaxial compressive strength (sci) of the intact rock are essential input parameters (IPs) of the Hoek-Brown (H - B) criterion. Mechanical parameters (MPs) of the engineering rock mass, including elastic modulus (E), cohesion (c), and internal friction angle (f) estimated by the H-B criterion, and the predicted excavation response of surrounding rock, including the displacement and excavation damage zone (EDZ) based on the MPs, are of high relevance with the four IPs of the H-B criterion. In this paper, the deep and huge underground cavern excavated in basalt from a hydropower station under construction in the southwest of China is used to analyse the sensitivity of the IPs on the MPs, the displacement, and EDZ of the surrounding rock mass. Firstly, the H-B criterion is applied to estimate the MPs, among which the IPs are obtained from a series of in situ and laboratory tests, including borehole camera observation, wave velocity test, uniaxial and triaxial compression tests, and so on. Secondly, the sensitivity relationships between IPs, MPs, and prediction results of displacement and EDZ are

established and described quantitatively by the sensitivity factor (si). Results show that the MPs of the rock mass are more sensitive to GSI and D center dot GSI and sci are high-sensitivity parameters affecting the displacement and EDZ. Finally, the variations in the estimated MPs and associated prediction results concerning excavation response, which are caused by the uncertainties in the determination of the IPs, are further quantified.,is study provides a straightforward assessment for the variability of the rock mass parameters estimated by the H-B criterion. It also gives a valuable reference to similar geotechnical engineering for the determination of rock mass parameters in the preliminary design.

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WOS 号： 000572351100005

第 269 篇

标　　题： Investigation On The Time Factor Of Co-Based Emission Factors For Sustainable Development Of Urban Tunnels In China

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Environmental pollution problems and energy-saving issues of urban tunnels have increasingly been attracting people's attention. The paper aims at investigating a reasonable time factor for CO-based emission factors in the ventilation design of urban road tunnels. The study results show that the prediction curve of CO-based emission factor for passenger cars consists of two stages. The average reduction rates of Stage I (2004-2010) and Stage II (2010-2030) are 38% and 14% per year, respectively. The CO emission factor series of passenger cars conforms to exponential function distribution. The time factors of CO-based emission backcalculated from the measured data range from 4.9% to 12.6%, which are 2.4-6.3 times the specified value in the Chinese ventilation specification but slightly smaller than predicted ones. Based on four aspects of predicted results, back analysis results, related references, and engineering applications, it is indicated that the time factor of CO-based emission factor (2%) in the current ventilation specification is conservative. And when defining 2000 and 2010 as base years, respectively, 4% and 3% can be used as the time factors of CO-based emission factors respectively for the ventilation design of urban tunnels. This study can provide a reference for ventilation design of urban tunnels in other regions.

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WOS 号： 000572083500006

第 270 篇

标　　题： Process-Independent Construction Stage Analysis Of Self-Anchored Suspension Bridges

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期　　刊： AUTOMATION IN CONSTRUCTION

摘　　要： The construction process of self-anchored suspension (SAS) bridges undergoes frequent system transformations and loadings, accompanied by complex strong geometric and contact nonlinear behaviours. The accurate state assessment of such a process generally requires the nonlinear finite element analysis (FEA) to perform a stage-by-stage forward, cumulative calculation based on the principle of incremental superposition. This sort of calculation means that the structural equilibrium of any intermediate state of the process, referred to as a construction stage, must be accumulated from its previous construction loading history, which is susceptible to computational effort and divergence limitations. This paper overcomes these limitations by proposing a direct and fast method that is independent of the cumulative calculation in the analysis of any specified construction stage, in favour of the construction optimization design and uncertainty analysis. The unstrained assembly formats for the typical construction process of SAS bridges are established, and the elements with constant physical quantities as the characteristic parameters are used to describe the various structures, boundaries, loads and their changes during the construction. On this basis, an interactive analysis framework integrating the numerical iteration with the FEA is established to achieve an accurate equilibrium for the construction stages. An enhanced interval-genetic algorithm (IGA) is employed as the optimization engine to smoothly accelerate global convergence. The proposed framework is applied to an SAS bridge under construction, and the validity and performance of this approach are demonstrated by considering the in-field test data.

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WOS 号： 000539120500016

第 271 篇

标　　题： Flexural Behavior Of Reinforced Concrete Beams Strengthened With Near-Surface Mounted 7075 Aluminum Alloy Bars

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期　　刊： JOURNAL OF BUILDING ENGINEERING

摘　　要： Newly developed aluminum alloy (AA) bars with high strength, good ductility, and excellent corrosion resistance are gradually utilized for retrofitting or strengthening reinforced concrete (RC) structures. This paper investigates the potential application of 7075 aluminum alloy bars as the near-surface mounted (NSM) reinforcement in flexural strengthening of RC members. A total of five reinforced concrete beam specimens including one reference beam and four specimens strengthened with NSM 7075 AA bars were designed and loaded monotonically up to failure. The NSM reinforcement

ratio and anchorage of U-jacket were selected as the test variables to investigate the flexural behavior of strengthened beam specimens. It is observed from the test results that the flexural capacity of the strengthened beams increased by more than 35% in comparison with reference specimen owing to the application of the NSM AA system. Increasing NSM AA reinforcement ratio brought about a linear increase in the load bearing capacity of the strengthened beams. The anchorage of CFRP U-jacket can enhance the load-bearing capacity and displacement ductility for the strengthened beam specimens by preventing or delaying the premature failure which included interfacial debonding and concrete cover separation. Furthermore, analytical models were used to calculate the load versus mid-span deflection relationship and predict the debonding failure load of the strengthened beams. Good agreements were achieved between the predicted results and experimental results.

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WOS 号： 000541973600002

第 272 篇

标　　题： Deformation Properties Of Coarse-Grained Sulfate Saline Soil Under The Freeze -Thaw-Precipitation Cycle

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期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY

摘　　要： Salt expansion deformation is the main engineering hazard of saline soil, which restricts the application of coarse-grained sulfate or sulfite soil as roadbed filling. The main factors affecting salt expansion deformation are change of salt, water and temperature. The principal research objectives of this paper is to offer a basic data reference for the structural design of coarse-grained sulfate saline soil roadbed. To investigate the deformation properties of coarse-grained sulfate saline soil under the freeze-thaw-precipitation cycles, the large-scale sample experiments under the freeze-thaw-precipitation cycles and the freeze-thaw cycles were carried out with self -designed experiment equipment. The results showed that under the same freeze-thaw-precipitation cycles ex-periment conditions, the minimum temperatures of these samples with 1.5% and 3.0% soluble salt contents at a depth of 20 cm were 3.32 degrees C and 3.56 degrees C, respectively. In addition, it took less time for the lower salt content (1.5%) sample to reach the same low temperature compared to the higher salt content sample (3.0%). However, after seven freeze-thaw-precipitation cycles, it was shown that deformation of the sample with 1.5% soluble salt content was 32% higher than that with 3.0% soluble salt content. The maximum deformation amount of the coarse-grained sulfate saline soil after repeated freeze-thaw-precipitation cycles experiment was approximately 1.9-9.4 times larger than that after repeated freeze-thaw

cycles experiment, which indicated that precipitation had a serious impact on the deformation of the sample. However, there was almost no difference between the lower salt content and higher salt content samples in the residual deformation caused by the cumulative effect of salt expansion in each cycle. Furthermore, the results showed that under the influence of precipitation, a high-level soluble salt content did not necessarily promote expansion deformation of coarse-grained sulfate soil. Water, salt, and temperature have complex coupling effects.

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WOS 号： 000554882900001

第 273 篇

标　　题： Failure Behavior Investigation Of Loess Metro Tunnel Under Local-High-Pressure Water Environment

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期　　刊： ENGINEERING FAILURE ANALYSIS

摘　　要： With the acceleration of urban metro construction in the Midwest of China, the metro tunnel is inevitably crossing the collapsible loess site. For the metro tunnels in loess area, if the around potential water source is induced by external disturbance, the tunnel structure which is con-structed or being built will be influenced in the affected area of loess collapsibility. In view of this, model tests were designed according to the different water source positions and tunnel lining forms to study the collapsibility of loess and the failure behavior of metro tunnel under high-pressure water environment. And fluid-solid coupling calculation was conducted under different conditions of water source pressure, water source distance and water source location. Furthermore, the results were compared and perfected by numerical analysis, and the distribu-tion law of water pressure field, displacement field and the stress field of the tunnel were in-vestigated. Based on the calculated results, the safety distance between the water source and the tunnel was extracted, and the influence degree of water gushing on the tunnel was divided, which provides the safety evaluation index for the loess tunnel in local-high-pressure water environ-ment.

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WOS 号： 000554861200005

第 274 篇

标　　题： Excess Pore Water Pressure Caused By The Installation Of Jet Grouting Columns In Clay

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期　　刊： COMPUTERS AND GEOTECHNICS

摘　　要： The injection of large volumes of pressurized water and grout into the subsoil during jet grouting generates a sudden increase in excess pore water pressure. This study proposes a theoretical approach to evaluate the variation in excess pore water pressure caused by the installation of a jet grouting column in clay, accounting for the chronological sequence of construction. The jet grouting column installation is simulated through the undrained expansion of a series of spherical cavities. Partial dissipation during the construction process is considered due to the gradual installation of the grouting columns. The relationship between the ultimate cavity radius (a(u)) and the radius of the jet grouting column (r(c)) is established to represent the influences of both jetting parameters and soil properties on the generated excess pore water pressure. The proposed model is validated using two case studies, one conducted in Singapore marine clay and the other in Shanghai soft clay.

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WOS 号： 000556345000022

第 275 篇

标　　题： Shakedown Analysis Of Unsaturated Soils Considering The Variation Of Hydraulic States

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期　　刊： INTERNATIONAL JOURNAL OF GEOMECHANICS

摘　　要： Long-term stability evaluation of unsaturated earth structures has always been one of the most important issues in geotechnical engineering. Most available methods are appropriate for calculating the maximum loads that the structures can resist when the hydraulic state is fixed, and the external loads are monotonically increased. In practical engineering, however, the hydraulic condition is ever changing, and so are the matric suction and the shearing strength of unsaturated soils. In this situation, the obtained minimized collapse loads can no longer be used as reference for the design criterion, which may greatly overestimate the stability of the structures. Classical shakedown analysis is a more appropriate method, which can only consider the variation of the loads but not the variation of hydraulic states. This paper presents a novel formulation for shakedown analysis of unsaturated soils considering both the variation of external loads and the variation of the shearing strength caused by drying-wetting cycles. By using the suction stress-based effective stress of unsaturated soils, the three-phased mixture is dealt with as a single-phased material. The suction-stress equivalent forces are established, and the variation of the hydraulic state is dealt with as the variation of

equivalent forces. Numerical formulations are then developed by the combination of the finite-element method and the second-order cone programming. Some shakedown problems are solved, and the effect of hydraulic state variation on the shakedown limits of foundations, pavements, and slopes is studied in detail. It is shown that the neglection of moisture content variation would greatly overestimate the safety of earth structures, and the produced errors become more significant with the increase of the suction-stress increment and the decrease of the shearing strength. The shakedown limit reaches the smallest when both external loads and suction stress are varying. When the variation of equivalent forces is complicated, the loading domain can be approximated by a polyhedron using a uniform distribution of sampling points, and the shakedown factor of safety converges to the true value with the increase of the number of sampling points. Shakedown analysis is necessary in engineering designs when several wetting and drying cycles happen.

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WOS 号： 000556555300035

第 276 篇

标　　题： Investigating The Deformation Property Of Weathered Phyllite Filling Subgrade

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期　　刊： JOURNAL OF TESTING AND EVALUATION

摘　　要： To investigate the deformation property of weathered phyllite filling subgrade under the comprehensive effect of water and load, three weathered phyllite soil column models were filled and their deformations were tested through a laboratory test and numerical simulation in this article. The results show that the deformation of the weathered phyllite soil column models were greatly influenced by the water replenishment conditions and load conditions, and the deformation of models increased with the increase of the moisture content and load. Moreover, the larger the load, the longer the time required for the weathered phyllite soil column model to reach stability. In addition, the numerical simulation results were compared with the test results, and it was found that they were similar. Consequently, the numerical simulation can be used to reflect the deformation of weathered phyllite filling subgrade under the effect of water and load and provide some guidance for the design of the weathered phyllite filling subgrade.

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WOS 号： 000562137000023

第 277 篇

标　　题： Displacement Response Of Submerged Floating Tunnel With Flexible Boundary Under Explosion Load

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期　　刊：ADVANCES IN STRUCTURAL ENGINEERING

摘　　要：In this study, a single-span submerged floating tunnel (SFT) is simplified as an elastic supporting beam model with movable ends. This model is used to analyze the displacement response of the SFT subjected to an underwater explosion in an ocean environment. The effects of the shock wave pressure and bubble pressure are considered simultaneously. The dynamic equilibrium equation was established based on D'Alembert's principle. When the pipe segment of the SFT vibrates, the additional inertia force and the damping force of the surrounding water to the pipe are calculated using the Morison equation. The motion differential equation of an SFT under the load of an underwater explosion is obtained using the Galerkin method. The displacement analytical expressions of an SFT under four different stages of load are derived, and a comprehensive analysis is performed to assess the influence of key parameters, including the brace stiffness, damping, scaled distance, and bubble oscillation frequency, on the displacement of the SFT. It was observed that the key parameters mentioned above all significantly influence the displacement response of the SFT. Some reasonable suggestions for different parameters are proposed to provide a reference for the SFT design.

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第 278 篇

标　　题：Utilization Of Water-Quenching Blast Furnace Slag As Alternative Filler In Asphalt Mastic

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期　　刊：CANADIAN JOURNAL OF CIVIL ENGINEERING

摘　　要：Water-quenching blast furnace slag as a by-product of the iron production has caused serious environmental concerns. This paper tried to investigate the feasibility of the blast furnace slag filler (WBFSF) used as an alternative filler to replace the limestone filler (LF) in asphalt mixtures. Specifically, the chemical compositions, morphology characteristics, phase distributions, and thermal properties of two fillers were studied; then rheological properties of asphalt mastics in four filler-asphalt ratios were further studied by the rotational viscosity, temperature sweep, temperature-frequency-sweep (T-f-sweep), and multiple stress creep recovery (MSCR) test. The results show that WBFSF has a larger specific surface area and better-developed mesopores compared

with LF. WBFSF asphalt mastic presents a larger complex modulus and a smaller phase angle. Moreover, the MSCR results show that WBFSF improves the elastic recovery and rutting resistance of asphalt mastics. Therefore, WBFSF presents great potential to be used as an alternative filler in asphalt mixtures.

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第 279 篇

标　　题： Thermal-Insulation Effect And Evaluation Indices Of Asphalt Mixture Mixed With Phase-Change Materials

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期　　刊： MATERIALS

摘　　要： Under strong winds and at low temperatures, heat loss of hot-mix asphalt mixtures is likely to occur, which leads to temperature segregation. Temperature segregation affects the forming quality and the performance of asphalt pavements. In this study, a phase-change thermal-insulation agent (PCTIA) was prepared for reducing the temperature dissipation. A cooling simulation experiment was performed to test the temperature-dissipation process for an ordinary asphalt mixture and the asphalt mixture mixed with PCTIA (AM-PCTIA). The thermal-insulation effect was analyzed according to the temperature difference and the thermal-insulation extension time. Moreover, two indices-the thermal-insulation accumulated time difference value (IATDV) and thermal-insulation accumulated time difference index (IATDI)-were proposed for evaluating the thermal-insulation ability and efficiency. The results indicated that the temperature at the center of the AM-PATIA was 4 degrees C higher than that for the ordinary asphalt mixture. The insulation time was prolonged by 29.8 min at the ambient temperature of 15 degrees C. As the ambient temperature increased, the thermal-insulation effect of the PCTIA improved.

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WOS 号： 000569975100001

第 280 篇

标　　题： Cold Stiffening Of Orthotropic Steel Decks By A Composite Uhpfrc Layer

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期　　刊：JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要：Cold stiffening of the plate of Orthotropic Steel Deck (OSD) of bridges can be achieved by adding a layer of Ultra-High Performance Fiber Reinforced Cementitious Composite material (UHPFRC) on top of the deck plate by composite design, thus expecting to reduce stresses in fatigue critical details of OSD and avoid fatigue vulnerable welded details at composite interface. This paper focuses on experimental and analytical study for the bending behavior of UHPFRC - steel composite specimens in elastic domain, corresponding to the stress levels of deck plate for in-service steel bridge with OSD. In the total 11 UHPFRC - steel composite test specimens, it was considered UHPFRC with thicknesses ranging from 25 mm to 50 mm, loading configurations simulating sagging or hogging moment region, and different composite designs including materials natural bonding, epoxy-glued interface and epoxy-glued corrugated steel plate shear connector. Epoxy-glued interface was effective composite method leading to stiffness improvement for sagging moment region of OSD and thus decreased stresses in the OSD deck plate. The proposed corrugated steel plate shear connector turned out to be effective for stiffness improvement especially for specimens simulating hogging moment region, indicating that this mechanical connector acted as both shear connector and confined steel bar. The bending processes were analyzed for UHPFRC - steel composite specimens simulating sagging and hogging moment region respectively, especially for the loading stage before attaining 0.5 epsilon(sy) at mid-span section. Based on test and analytical results, design recommendations were given for OSD stiffening by means of UHPFRC. (C) 2020 Elsevier Ltd. All rights reserved.

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第 281 篇

标　　题：Development And Application Of Skid Resistance Fog Seal For Pavements

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期　　刊：COATINGS

摘　　要：The performance of a skid resistance fog seal is studied to develop a high bond performance road skid resistance fog seal. Accordingly, a fog seal is developed based on the bond strength, permeability, and aging resistance. To develop the skid resistance fog seal herein, the skid resistance particle types and dosages are optimized according to the skid and wear resistance properties. The fog seal performance is then verified. Furthermore, the road performance of the skid resistance fog seal is studied, and the optimal amount of the skid resistance fog seal is proposed. Finally, the influence of the construction process on the skid and wear resistance is investigated. The results show that the self-made skid resistance fog seal has better bond strength, permeability, and

aging resistance. The 0.6 kg/m(2) skid resistance fog seal exhibits the best skid and wear resistance and water penetration performance, while the skid resistance fog seal constructed by the premix process has the best skid and wear resistance properties.

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第 282 篇

标　　题： An Illumination Moving With The Vehicle Intelligent Control System Of Road Tunnel Lighting

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期　　刊： SUSTAINABILITY

摘　　要： To reduce the enormous waste of electric energy in tunnel lighting, an intelligent control system of road tunnel lighting which can realize the effect of illumination moving with the vehicle is proposed. In this system, the group control of LED lamps is realized based on Air Lamp lighting technology through the wide area fusion Internet of Things (WF-IoT). By the group control of LED lamps, the tunnel lighting is divided into several illumination segments. When the vehicle is detected by the surveillance camera, the corresponding LED group can be adjusted to the demand luminance according to the environmental conditions and traffic information. The other LED groups maintain 10% of the maximum luminance to reduce energy consumption. To realize the effect of illumination moving with the vehicle, the structure of the intelligent control system and hardware system is designed, and the length of the illumination segment is calculated. To evaluate the lighting effect of the intelligent control system, a simulation model of tunnel lighting is established. In addition, the energy-saving effect of the intelligent control system is evaluated. The results show that the intelligent control system can meet the requirements of illumination in a tunnel and have a notable energy-saving effect.

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WOS 号： 000584257500001

第 283 篇

标　　题： Preparation And Investigation Of Niti Alloy Phase-Change Heat Storage Asphalt Mixture

作　　者： [Ma, B.; Wei, K.; Shi, W. S.; Chen, S. S.; Hu, Y. P.; Shi, H. T.] Changan Univ, Key Lab, Minist Transportat Rd Struct & Mat, Xian 710064, Peoples R China; [Huang, X. F.] Guangxi Commun Design Grp Co Ltd, 153 Minzu Ave, Nanning 530000, Peoples R China

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：Adding phase-change material (PCM) into the asphalt mixture has the potential to solve the temperature-related problem of asphalt pavement. During the phase transformation, NiTi alloy is still solid with good physical and mechanical properties. Therefore, no leakage and volatilization would occur, which are common problems occurring in the application of other kinds of PCMs. Equal volumes of NiTi alloy phase-change energy-storage particles are used to replace fine aggregates with corresponding particle diameter to prepare NiTi alloy phase-change heat storage asphalt mixture in the research. The admixture of NiTi alloy phase-change energy-storage particles could reduce the water stability of the asphalt mixture, but the adverse effect was not significant. When the phase change of NiTi alloy energy-storage particles occurred because of an increase in environment temperature, the heating rate of asphalt mixture was reduced due to the phase-change heat storage effect of NiTi alloy phase-change energy-storage particles. If there was more admixture, then the rate at which the mixture heats up would be slower. The indoor stimulated thermoregulation test showed that when the substitution rate of NiTi alloy phase-change energy-storage particles was 12% by weight, the maximum temperature difference between NiTi alloy phase-change heat storage asphalt mixture and ordinary asphalt reached 4.3 degrees C. (c) 2020 American Society of Civil Engineers.

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WOS 号：000587481800003

第 284 篇

标　　题：Comparison Of Sbs-Modified Asphalt Rheological Properties During Simple-Aging Test

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：The objective of this paper is to evaluate the effect of different aging times on the performance of styrene-butadiene-styrene (SBS) copolymer-modified asphalt. Two kinds of SBS-modified asphalt with different SBS contents were selected, and a self-developed indoor aging equipment simple-aging test (SAT) was used to age the SBS asphalt binder for different times and different temperatures. The penetration, softening point, ductility, and Brookfield viscosity of the aged samples were tested, and the rheological properties of the aged samples were tested by dynamic shear rheometer (DSR). It was found that the rheological behaviors of the aged samples at high, medium, and low temperatures were closely related to the aging time and SBS contents. In addition, during certain aging temperatures and times, different physical and rheological indexes showed that the performances of SBS-modified asphalt after SAT was similar to that after rolling thin-film oven test (RTFOT) and pressurized aging vessel (PAV).

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第 285 篇

标　　题：Sensitivity Of Rigid Pavement Performance Predictions To Individual Climate Variables Using Pavement Me Design

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期　　刊：JOURNAL OF TRANSPORTATION ENGINEERING PART B-PAVEMENTS

摘　　要：Five individual climate variables are required as climatic inputs in a pavement design using Pavement ME Design (PMED, a pavement design tool). While it is believed that all five climatic variables affect the distress predictions in pavement design, the detailed effect of these factors on the design of jointed plain concrete pavement (JPCP) has not been well researched. This study aims to investigate the effect of the five individual climate variables on the performance predictions of JPCP using PMED. The one-at-a-time approach was used to change individual climate variables. Four weather stations located in different climate zones (cold, warm, humid hot, and dry hot) in the United States were selected for analysis. The effect of individual climatic variables on the JPCP distress predictions were analyzed first. Then a normalized sensitivity index was adopted to analyze the sensitivity of performance predictions to individual climate variables. The effect results showed that with a 10% increase in the values of the climatic variables, the average temperature and daily temperature range have a positive effect on the values of the transverse cracking prediction. The effect of temperature on the international roughness index and faulting may not be consistent in different climate zones, and wind speed has a negative effect on the values of all three distresses. The sunshine percent and relative humidity have a positive effect on the values of all three distresses, and the effect of precipitation is negligible. The occurrence of probability of the temperature gradient within the concrete slab after the change in variables was also obtained and plotted to help interpret the findings. The sensitivity analysis showed that sunshine percent is the most influential climatic variable, followed by temperature, wind speed, relative humidity, and precipitation. (C) 2020 American Society of Civil Engineers.

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第 286 篇

标　　题：Characterisation Of Arch Expansion Of Cement Stabilised Road Bases

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： The arch expansion of cement stabilised base materials has become increasingly serious due to the current design guideline, typical climate and geological environment in the west of China. This research systematically investigated the influence of different factors on temperature expansion and also salt expansion of the cement stabilised base course through laboratory-scale slab tests and microscopic tests. Optimised gradation type of aggregate and other design indexes were proposed. The radial basis function network (RBFN) was used to establish a predication model of the amount of arch expansion. The micro-mechanism of arch expansion was further detailed by scanning images. The test results showed that the temperature expansion occurred most significantly during 20 degrees C to 40 degrees C and the optimised gradation could alleviate the arch expansion effectively. In the range of 20 degrees C to 30 degrees C, the arch expansion of cement stabilised materials was dominated by temperature expansion, and the expansion was mainly salt expansion between -10 degrees C and 0 degrees C. It is suggested that reasonable prevention measures should be taken considering different environmental factors by the inhibition weight 1/d(i), and thus the most effective preventing methods of arch expansion would be taken.

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第 287 篇

标　　题： Study On The Annual Reduction Rate Of Vehicle Emission Factors For Carbon Monoxide: A Case Study Of Urban Road Tunnels In Shenzhen, China

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Environmental pollution and energy conservation in urban tunnels have become important issues that affect the scientific design and sustainable development of urban tunnels. The carbon monoxide (CO) concentration in urban road tunnels is regarded as a direct reflection and a useful tracer of the intensity of anthropogenic transportation activities. Previous studies in recent years have paid more attention to pollutant emission factors, but less to the calculation parameters of ventilation design for tunnels. This paper aims to study a reasonable annual reduction rate of CO base emission factors. Therefore, a detailed field measurement was carried out in the four typical urban road tunnels, Henglongshan Tunnel, Cejiexian Tunnel, Jiuweiling Tunnel, and Dameisha Tunnel in Shenzhen, China, from March 29 to September 16, 2014. Measurement results showed that the traffic flow of the four urban tunnels had been approaching the design value, or even beyond the limit. The average daily air velocities

in the four tunnels were all within 5 m/s, whereas the maximum air velocity had exceeded the limit of 10 m/s. The CO concentrations in Henglongshan Tunnel, Cejiexian Tunnel, Jiuweiling Tunnel, and Dameisha Tunnel were 17 ppm, 7 ppm, 39 ppm, and 8 ppm, respectively. Moreover, it was found that the average CO emission factors of Henglongshan Tunnel, Cejiexian Tunnel, Jiuweiling Tunnel, and Dameisha Tunnel were 1.075 g/(km.veh), 1.245 g/(km.veh), 4.154 g/(km.veh), and 1.739 g/(km.veh), respectively. Based on the statistical data, the CO emission factors of mixed traffic and passenger cars decrease by an average of 16.4% and 33.3%, respectively, per year through the regression method and by an average of 17.4% and 29.0%, respectively, per year through the extremum method. Finally, when considering the safety factor of 20%, it is more reasonable for the CO base emission to adopt 4% as an annual reduction rate for ventilation design in urban tunnels.

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第 288 篇

标　　题： The Driving Risk Analysis And Evaluation In Rightward Zone Of Expressway Reconstruction And Extension Engineering

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： In the expressway reconstruction and expansion engineering, the form of rightward zone is increasingly adopted, and its complicated traffic conditions can easily cause traffic accidents. In order to quickly and effectively grasp the traffic risk of the right diversion section, this study employs average speed, the coefficient of variation, the equivalent minimum safety distance, and the deceleration as evaluation indexes of driving risk, and then analyses the influence rules of traffic volume, the proportion of large vehicles, and the length of the transition section on each evaluation index by using Vissim simulation software. On the basis of this, we determine the weight of each evaluation index by the entropy method and establish the driving risk index evaluation model of the work zone with multiple linear regression. The results show that the partial regression coefficients of traffic volume, the proportion of large vehicles, and the length of the transition section to the driving risk index are 0.059, 0.317, and 0.15, respectively. Finally, in this paper, we analyze the traffic risk of example section based

on the driving risk evaluation model. The results of evaluation are consistent with the number of measured conflicts. This study proposes a new method for predicting the traffic risk of the expressway reconstruction and extension engineering, which can provide a reference for the development of safety management measures in the rightward zone.

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第 289 篇

标　　题： Evaluation Of Conventional Technical Properties And Self-Healing Ability Of Bitumen-Based Sealants Containing Sunflower-Oil Microcapsules For Pavement Cracks

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The bitumen-based sealants have been widely used to repair the pavement cracks, but the pavements always crack again at the healing patches due to the insufficient durability of sealants. In order to improve the technical properties and self-healing ability of bitumen-based sealants, the microcapsule technology was applied, and the sunflower-oil microcapsules were prepared by in-situ polymerization method. The sunflower-oil microcapsules were then added into the bitumen-based sealants, and the dispersion characteristic was observed by fluorescence microscopy, Then the cone penetration, softening point, resilience recovery, fluidity, tensile property sealants, self-healing ability as well as the two-stage loading dynamic shear rheological (DSR) tests were conducted to study conventional technical properties and the self-healing ability of bitumen-based sealants containing microcapsules with different contents. The results show that microcapsules could be well dispersed in the sealants state without agglomeration, and the conventional properties of bitumen-based sealants containing microcapsules meet the technical requirements, except for low-temperature tensile properties of the sealant with 4% microcapsules. The cone penetration and fluidity decrease with increasing microcapsule content, while the softening point and resilience recovery increase. Compared with the original sealants, the self-healing ability of the sealants with microcapsules was superiority obviously, and the optimum content of microcapsules was recommended as 2%, which was also suitable for the aged sealants. And the sunflower-oil microcapsules can improve the repeated self-healing ability and fatigue life of the sealants at the temperature as low as -20 degrees C. (C) 2020 Elsevier Ltd. All rights reserved.

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第 290 篇

标　　题： Laboratory Research On Road Performances Of Unsaturated Polyester Concrete At Medium-High Temperature

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Unsaturated polyester resin (UP) and aggregate can synthesize unsaturated polyester resin concrete (UPC) with high performance, which was often used to fill materials and wear layers. However, the UP contained in UPC was usually high, resulting in high engineering cost. At the same time, there is less researches on the direct use of UPC as a paving material. In this paper, the Marshall mix design procedure was used to design UPC, and the road performance of UPC at medium-high temperature were studied. The aging test, Marshall test, the water immersion Marshall test, and the rutting test were performed to observe the road indicators of the UPC. At the same time, the uniaxial creep test and the indirect tensile test at different temperatures were carried out to observe the performances change of UPC with temperature. Results showed that UPC had a better water-resistance ability than that of asphalt mixture (AC) under the coupling effects of high temperature and water. Besides, the dynamic stability (DS) values of UPC were higher than that of asphalt mixture. However, UPC had a lower residual strain rate and creep rate relative to the asphalt mixture. The bonding effect of the UPC was better than that of the asphalt mixture at high temperature from the indirect tensile test results. High-temperature aging had a visible deteriorating impact on the high-temperature performance of asphalt mixture. As the UP is a thermosetting resin, UPC had excellent high-temperature durability. With the aging time increasing, the mechanical properties of UPC gradually decreased, but its mechanical properties were still superior to asphalt mixtures under the same aging conditions. (C) 2020 Elsevier Ltd. All rights reserved.

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第 291 篇

标　　题： Experimental Investigations On The Flutter Derivatives Of The Pedestrian-Bridge Section Models

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期　　刊： KSCE JOURNAL OF CIVIL ENGINEERING

摘　　要： Based on a suspension footbridge, the pedestrian-bridge section models were first

proposed and designed. Then, the free vibration tests were carried out to study the influence of pedestrians on the flutter derivatives (H-1*,A(2)*,A(3)*,H-4*, andA(1)*xH(3)*) which significantly affect the flutter of suspension footbridges. It can be found that: 1) with an increase in the pedestrian density, theH(1)*,H-4*andA(1)*xH(3)*increase, which will lead to the decrease in the positive vertical aerodynamic damping, the positive vertical aerodynamic stiffness and the positive vertical and torsional aerodynamic damping, respectively. Meanwhile, with an increase in the pedestrian density, theA(2)*andA(3)*decrease, which will lead to a decrease in the negative torsional aerodynamic damping and the negative torsional aerodynamic stiffness, respectively. 2) The arrangement of walking side by side is advantageous to the positive vertical aerodynamic damping and disadvantageous to the negative torsional aerodynamic stiffness. The arrangements of random walking with low-medium pedestrian densities and walking in line with high-medium pedestrian densities are disadvantageous to the vertical aerodynamic stiffness and the positive vertical and torsional aerodynamic damping. Besides, all the pedestrian arrangements have a significant influence on the torsional aerodynamic damping.

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第 292 篇

标　　题： Comprehensive Analysis On Influences Of Aggregate, Asphalt And Moisture On Interfacial Adhesion Of Aggregate-Asphalt System

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期　　刊： JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY

摘　　要： This study aims to investigate the effects and contributions of different factors, including aggregate source and shape, asphalt type and aging, and moisture condition, on the interfacial adhesion of aggregate-asphalt system. Self-developed spherical aggregates were used to control the variable, and a quantifiable boiling test was proposed to conduct on various conditions. Properties and shape of mineral aggregates and surface free energies of asphalt binders were characterized and further correlated to the interfacial adhesion. In addition, the effect of moisture within aggregate on the adhesion was studied. By the multiple regression analysis, contributions of these factors to the adhesion were discussed. Results indicate that quantifiable boiling test was able to quantitatively evaluate the adhesion of aggregate-asphalt. Not only the aggregate source but also its shape had a significant influence on the interfacial adhesion. The more cubical the aggregate, the higher the value of the bonding ratio. Modified asphalt exhibited better adhesion with mineral aggregate owing to its high surface energy. Short-term aging was conducive to improving the adhesion of asphalt, whereas long-term aging had the opposite effect. Without regard to moisture condition, the aggregate source had a significant influence on the interfacial adhesion, followed by asphalt aging, aggregate shape and asphalt type.

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第 293 篇
标　　题： Mechanical Performance Of Concrete Made With Recycled Aggregates From Concrete Pavements
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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING
摘　　要： This research aims at analysing the mechanical performance of concrete with recycled aggregates from concrete pavements. First, the characteristics of various natural and recycled aggregates used in the concrete were thoroughly analysed. The composition of the recycled aggregates was determined and several physical and chemical tests of the aggregates were performed. In order to evaluate the mechanical performance of recycled concrete, cube compressive strength and flexural tensile strength tests were performed. The effect of recycled aggregates on the strength of recycled concrete is related to the strength of recycled aggregates, the strength of natural aggregates, and the strength of old concrete. The strength of recycled concrete decreases with increasing water-cement ratio. However, due to the water absorption of the recycled aggregate, it has a certain inhibitory effect on the strength reduction. As the replacement rate of recycled aggregates increases, the optimal sand ratio decreases. The sand ratio is controlled between 32% and 38%, which is ideal for recycled concrete. With the increase of fly ash content, the 7 d strength of recycled concrete has decreased to some extent, but the 28 d strength has been slightly improved. In addition, for compressive strength and flexural tensile strength, the optimal content of fly ash is different.
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第 294 篇
标　　题： Investigations Of Chloride Ions Permeability Of Pavement Concrete Under Coupled Effect Of Fatigue Loading And Hydrodynamic Pressure
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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：To investigate the combined effects of fatigue loading and hydrodynamic pressure on the chloride penetration and damage process of pavement concrete, a series of chloride penetrations tests, mercury intrusion porosimetry (MIP) tests and scanning electron microscopy (SEM) tests were carried out on specimens after experienced different conditions. Three exposure conditions (i.e. (i): fatigue loading, (ii): fatigue loading and hydrodynamic pressure, (iii): fatigue loading, hydrodynamic pressure and salt-freezing-thawing) were set, and two stress levels (0.5 and 0.7 f) and two pressure values (0.25 and 0.5 MPa) were applied to the specimens. The variation of pore and crack structures of the concrete under different conditions and loading stages was characterised. The results showed that the stress level had a prominent influence on the chloride ion diffusion coefficient (D-RCM) when the number of loading cycles ranged from 30 to 60 thousand times, while hydrodynamic pressure promoted the accumulation of damage and presented a distinct effect on D(RCM)at the latter loading stage. The total capillary pore volume, threshold pore diameter and fractal dimension showed a close positive correlation with D-RCM, suggesting that the diffusivity change of concrete accord well with microstructure evolution during the loading process.

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第 295 篇

标　　题：Rheology Measurements Of Recycling Oils And Their Aging Resistance In Asphalt Binders

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：Adding recycling oils (also called as 'recycling agents' or 'rejuvenators') into the asphalt mixtures with Reclaimed Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS) is a widely adopted strategy for improving potential resistance to cracking of recycled asphalt pavements. This study investigates the rheolgoical properties of two Bio-Oils and two Re-refined Engine Oil Bottoms (REOB) by using Dynamic Shear Rheometer (DSR) and Rotational Viscometer (RV) tests at various testing conditions, as well as their chemical properties by using the Fourier Transform-Infrared Spectroscopy (FTIR) measurement. The results are compared for the recycling oils after the Rolling Thin-Film Oven (RTFO), 20- and 40-hours Pressure Aging Vessel (PAV) aging. Furthermore, these four recycling oils were blended with a base binder at a high ratio (50%) and measured for their complex shear modulus and viscosity at various aging levels, as well as their infrared spectra. At the end, two recycling oils were selected to blend with a base binder at low ratios (2.9% and 5.7%) and measured for the standard Performance Grade (PG) properties and PG plus characteristics. The results of oil-asphalt low ratio blends indicate that recycling oil's content plays an important role

in aging behaviour of the binders, not only the type of recycling oils.

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第 296 篇

标　　题： Automated Pavement Crack Detection And Segmentation Based On Two-Step Convolutional Neural Network

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期　　刊： COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING

摘　　要： Cracking is a common pavement distress that would cause further severe problems if not repaired timely, which means that it is important to accurately extract the information of pavement cracks through detection and segmentation. Automated pavement crack detection and segmentation using deep learning are more efficient and accurate than conventional methods, which could be further improved. While many existing studies have utilized deep learning in pavement crack segmentation, which segments cracks from non-crack regions, few studies have taken the exact pavement crack detection into account, which identifies cracks in the images from other objects. A two-step pavement crack detection and segmentation method based on convolutional neural network was proposed in this paper. An automated pavement crack detection algorithm was developed using the modified You Only Look Once 3rd version in the first step. The proposed crack segmentation method in the second step was based on the modified U-Net, whose encoder was replaced with a pre-trained ResNet-34 and the up-sample part was added with spatial and channel squeeze and excitation (SCSE) modules. Proposed method combines pavement crack detection and segmentation together, so that the detected cracks from the first step are segmented in the second step to improve the accuracy. A dataset of pavement crack images in different circumstances were also built for the study. The F1 score of proposed crack detection and segmentation methods are 90.58% and 95.75%, respectively, which are higher than other state-of-the-art methods. Compared with existing one-step pavement crack detection or segmentation methods, proposed two-step method showed advantages of accuracy.

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第 297 篇

标　　题：Approaches For Local Calibration Of Mechanistic-Empirical Pavement Design Guide Joint Faulting Model: A Case Study Of Ontario

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：The Mechanistic-Empirical Pavement Design Guide (MEPDG) has been employed by agencies as an innovative method for pavement design since the National Cooperative Highway Research Program (NCHRP) Project 1-37A was implemented in 2004. Over the years, the MEPDG has evolved into the AASHTOWare Pavement ME Design software (AASHTOWare (R)). Local calibration of the performance models in the AASHTOWare (R) is a crucial and challenging task to improve the effectiveness of its application. The accuracy of the calibration depends on efficient methods and validation processes. This paper aims at developing local calibration methods for joint faulting prediction model of Jointed Plain Concrete Pavement (JPCP). This study not only focuses on improving the prediction accuracy of the joint faulting model but also demonstrating the various optimisation procedures in detail. A total of 27 representative JPCP sections were used in the processes of calibration. Three optimisation approaches were used: (1) One-At-a-Time (OAT) through the trial-and-error procedure, (2) generalised reduced gradient (GRG) using MS Excel (R) Solver, and (3) Levenberg-Marquardt Algorithm (LMA) fitting the functions. The prediction accuracy of local models was improved as compared with the global ones. Average Bias (AB) reduced from 0.3083 to 0.0578, and Standard Error of the Estimate (SEE) reduced from 0.3345 to 0.1912. Among the three local calibration approaches, approach 2 and approach 3 had more significant improvement on results than approach 1. Finally, the integral procedures were provided for local calibration in Ontario.

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第 298 篇

标　　题：Laboratory Study On The Relationship Between Pavement Texture And Tread Rubber Penetration Depth

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：The asphalt pavement texture is vertical asymmetric, and the tread rubber may contact

part of pavement surface. Therefore, the tread penetration depth (d) is probably essential for developing a reliable relationship between pavement performance and texture. This study investigated the effect of pavement ond, and simplified the contact by squeezing a rubber plate into three-dimensional (3D)-printing specimens. The 44 specimens were manufactured based on the surface morphologies of pavements and artificial surfaces with characteristics of pavement texture. The specimens' surfaces were characterised by parameters from ISO-25178. A set of self-designed fixture was mounted on a loading machine to exert precise force. The contact area was recorded by leaving the stain attached to the rubber plate on the specimens' surface. The value ofdwas obtained based on the specimens' Abbott-Firestone curves and the measured contact area. The results showed that the parameters focusing on the top topography of the pavement surface always exhibited a strong positive correlation withd. Furthermore, the parameter representing the volume of peak material showed almost the strongest linear relationship withd. The intercept and slope of the linear equations increased with the increase in the loading pressure or decline in the rubber hardness.

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WOS 号： 000571303500001

第 299 篇

标　　题： Studying The Properties Of Sbs/Rice Husk Ash-Modified Asphalt Binder And Mixture

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Sustainable materials in the field of road pavement have become a research direction in recent years. In this study, the rice husk ash with small dosage of styrene-butadiene-styrene (SBS) was added as a bioadditive into the base asphalt to modify its properties. Different contents (0, 2, 5, 10, and 15%) of rice husk ash (RHA) and 1% of SBS were selected to prepare the modified asphalt. Penetration, softening point, ductility, rotational viscosity test, and temperature sweep test were conducted to investigate the properties of SBS/RHA-modified asphalt binder. Rutting test, moisture susceptibility, and low-temperature cracking were utilized to evaluate the performances of SBS/RHA-modified asphalt mixture. The results showed that the penetration decreased and the softening point and rotational viscosity enhanced while the ductility slightly decreased with the incorporation of rice husk ash. The SBS/RHA-modified asphalt mixture had better high-temperature performance than that of the virgin asphalt mixture but slightly lower moisture stability and low temperature performance. The tensile strength ratio of the virgin and modified asphalt mixture met the requirement of specification. The tensile strain of mixture SR15 was lower than the requirement for the asphalt mixtures on the basis of the specification. For the SBS/RHA-modified asphalt

binder based on the comprehensive properties, the content of rice husk ash should not be higher than 15%.

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WOS 号： 000576117700002

第 300 篇

标　　题： A New Joint Morphology Parameter Considering The Effects Of Micro-Slope Distribution Of Joint Surface

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期　　刊： ENGINEERING GEOLOGY

摘　　要： An accurate description of the morphology of a joint surface is necessary to interpret its shear behavior. Accurately distinguishing the shear behavior differences may be difficult if the defined morphology parameter ignores the micro-slope distribution of the joint surface. The initial climbing angle was therefore defined and used to characterize the micro-slope distribution of the ascent section of joint profile, and a new method was proposed for calculating the morphology parameter, M. The parameter M embodies anisotropy, and the values of M for all profile lines, which are selected on the same joint at equal intervals in one direction, are log-normally distributed. To study the mechanical effects of M, joint replicas with three different strengths were 3D-printed using the scanned point cloud information of the natural joint. An anisotropic direct shear test was conducted to obtain the joint shear parameters in eight directions. The results indicated that the new morphology parameter accurately reflects the anisotropic shear behavior of the joint, and displayed tangential, positive linear, and power relations with shear strength, apparent cohesion, and friction angle, respectively. Furthermore, an index for evaluating the shear failure characteristics, established by using the new morphology parameter, can effectively distinguish the differences between the climbing and shear-off behavior on the joint. The parameter M, which considers the micro-slope distribution, can thus correctly represent the physical and mechanical properties of a joint, and its application is conducive to the precise quantification of joint shear behavior.

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第 301 篇

标　　题：Evaluation Of Ground Displacements Caused By Installing Jet Grouted Columns Using Machine Learning Methods

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：During the jet grouting process, large volumes of high pressurized fluids injected into the soils will cause significant ground displacements, which may bring harmful impacts on surrounding environment. Therefore, it is essential to provide an accurate estimation of the ground displacement in the design stage. Based on multiple nonlinear regression (MNLR) and support vector regression (SVR), the prediction approaches are established, respectively. The column radius (R-c), Young's modulus (E), and distance from column center to target point (L-OA) are selected as the input parameters, while the displacement of target point A at the radial direction (delta(A)) is taken as the output parameter. Comparisons results on the prediction performance of ground displacements indicate that the MNLR-based approach has a better prediction effect. The design charts of the MNLR-based approach for predicting the ground displacement are created, which will be helpful for the practicing engineers to get a quick estimation.

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WOS 号：000578172600003

第 302 篇

标　　题：Ultrasonic Velocity, Attenuation, And Mechanical Behavior Of Longmaxi Bedded Shale Under Uniaxial Compressive Tests

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期　　刊：ARABIAN JOURNAL OF GEOSCIENCES

摘　　要：Knowledge of ultrasonic wave velocity and attenuation related with bedding orientations plays an important role for successful downhole, hydraulic fracturing, and surface seismic data interpretation. Real-time ultrasonic wave measurements in load direction have been conducted on Longmaxi shale specimens during compressive fractured process in this study. The relations between mechanical properties and ultrasonic response of shale with various bedding angles are investigated. The P- and S-wave velocities increase with increasing stress to the peak strength, which can be ascribed to the closure of microcracks and pores perpendicular to the wave propagation

direction. And then they decrease with sudden fall of stress at the post-peak stage that is controlled by the coalescence of newly generated microcracks to macroscopic fractures. The P-wave velocity is more sensitive to the bedding angles and axial stress than S-wave velocity. The axial stress weakens the velocity anisotropy of shale. The P-wave attenuations decrease (quality factor values increase) for 0 degrees, 15 degrees, and 30 degrees shale specimens under pressure, whereas the first increment and then less variation occur for 45 degrees, 60 degrees, 75 degrees, and 90 degrees specimens. The difference may be caused by the bedding scattering that is more pronounced when the beddings are more inclined and perpendicular with respect to the wave propagation direction. The P-wave quality factor has a close relationship with the peak strength for each inclination specimen. What' s more, the failure modes have been illustrated based on the wave velocity and attenuation anisotropy.

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第 303 篇

标　　题： Studying Bump At Bridge Approach Of Short Subgrade With Oblique Prestressed Concrete Overlaying Asphalt Layer

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： The differential settlement of short subgrade between two highway structures (bridges, tunnels, culverts, etc.) is significantly greater than that of the other subgrade for the insufficient compaction of short subgrade owing to limited construction site. This paper aims to establish the control criteria to prevent bump at bridge approach for differential settlement of short subgrade with oblique prestressed concrete overlying asphalt layer (AC + OPC) composite pavement. In this work, the short subgrade and AC + OPC composite pavement were defined. Meanwhile, the driving comfort was analysed and the control criteria for differential settlement of short subgrade with different lengths were obtained based on the driving comfort using the driving comfort test. Finally, the effects of different layer parameters on stress and deflection were investigated and the control criteria for differential settlement of short subgrade were established based on the void area beneath the slab using the finite element software ANSYS. Results show that the length of short subgrade between two highway structures is defined to be less than 200 m. The vehicle speed and longitudinal slope have significant effects on the vertical acceleration. The asphalt layer modulus, OPC layer thickness and modulus, base layer thickness and modulus, and foundation modulus have effects on the flexural stress and deflection, especially the OPC layer thickness. The relationship between the additional stress and void area beneath the slab is derived. In addition, the control

criteria for differential settlement of short subgrade with different lengths are put forward based on the void area beneath the slab and driving comfort. The application of AC + OPC composite pavement can prevent bump at bridge approach of short subgrade effectively. The results of this paper can provide guidance for the application of AC + OPC composite pavement.

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第 304 篇

标　　题： Investigation Of Esthetic Evaluation And Its Influencing Factors For A Tunnel Portal Based On Dynamic Vision

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期　　刊： PLOS ONE

摘　　要： With the development of modern cities, roads, and landscapes, it is becoming increasingly important for infrastructure such as tunnels to provide an esthetically pleasing experience. In this respect, it is necessary to conduct studies that consider the esthetic design of tunnel portals using esthetics research. Regarding the esthetic evaluation of tunnel portals, this paper fully considers the dynamic visual effect from the driver's perspective. This study combines the use of Blender, SpeedTree Modeler Cinema, Adobe Photoshop CS6, and other software for secondary development. These programs are connected to the driving simulation platform Euro Truck Simulator 2 (which is equipped with a driving simulator) to construct a set of driving simulation tests that enable the esthetic evaluation of a tunnel portal. The Banlun Tunnel on the Funing-Longliu Expressway in Yunnan Province, China, is used as a case study, and four impact factors that vary significantly in esthetic design are included: the linearity, color, greening and texture of the portal. Using an orthogonal experimental design, the influence of the esthetic degree was simulated and evaluated, and the order of sensitivity to esthetic factors of a headwall tunnel portal was sequentially determined as follows: the portal texture exerts the maximum impact on the beauty degree of the headwall portal, followed by the portal greening and the portal color, while the portal linearity exerts the minimum impact. The results show that the developed driving simulation test system can be used to determine the sensitivity of esthetic factors for a tunnel portal and obtain an optimal collocation of esthetic factors on different levels; hence, it provides feedback for use in designing the optimum esthetic tunnel portal. This test system can be used as a reference when conducting future evaluations and studies on tunnel portal esthetics.

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第 305 篇

标　　题： Effects Of Groove Feature On Shear Behavior Of Steel-Sand Interface

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Surface groove morphology of structure and particle distribution of soil had a significant effect on the surface friction of structure. In order to investigate the interface shear stress-shear displacement curves, interface model and interface shear strength index when normal stress, groove width, and groove angle change, the interface shear tests of standard sand with steel plates are performed using an improved direct shear apparatus. Test results indicate that the peak shear stress increases with normal stress and the intersection angle between groove direction and shear direction. When the angle increases by 45 degrees, the peak shear stress increases range from 4% to 13%. The peak shear stress increases with groove width, for every 1 mm increase in groove width, and the increasing extent of peak shear stress ranges from 4% to 22%, 3% to 13%, and 1% to 6%, respectively. When the groove angle is 45 degrees and 90 degrees, the increasing extent of peak shear stress decreases with groove width, but when the groove angle is 0 degrees, the decrease regularity of peak shear stress increasing extent is not obvious. The hyperbolic model and Gompertz-C model are used to study the shear stress-shear displacement curves of sand-steel interface. The ratio of the interface peak shear stress of the hyperbolic model and Gompertz-C model to that of the shear test ranges from 0.90 to 1.03 and 0.88 to 0.98, respectively. The interface friction angle at the sand-steel interface ranges from 22 degrees to 29 degrees, and the friction angle of the rough interface is larger than that of the smooth interface. The interface friction angle increases with the intersection angle between the groove direction and the shear direction, the largest at 90 degrees, the second at 45 degrees, and the smallest at 0 degrees. Under the same groove angle, the interface friction angle increases with the groove width, for every 1 mm increase in groove width, and the increasing extent of interface friction angle ranges from 4% to 15%, 4% to 7%, and 2% to 3%, respectively. The increasing extent of interface friction angle decreases with groove width, and this change rule is more obvious at the groove angle of 45 degrees and 90 degrees than at 0 degrees.

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第 306 篇

标　　题：Adhesive Characteristic And Mechanism Of Ballastless Track Sealant In Hydrolysis Condition

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期　　刊：FRONTIERS IN MATERIALS

摘　　要：The current evaluation method cannot predict accurately the hydrolysis resistance of sealants applied in ballastless slab track. And the degradation mechanism of sealant in hydrolysis condition has not been researched systemically. In this paper, the hydrolysis resistance of different sealants was researched with the aid of the self-developed direct tensile test method. The atomic force microscope was employed to analyze the micro-adhesion force on the surface of sealants, and thereby the correlation between macro-behavior and the micro-mechanism of sealants during hydrolysis was established. Results showed that the characteristics of the interface between sealants and substrates are reduced after hydrolysis, and that sealants with higher soft-segment content have good resistance to hydrolysis. Reduction of the bonding area after hydrolysis is also an important factor in the reduction of the characteristics of the adhesive interface. The micro-adhesion force of soft segments shows a fluctuating reduction tendency, and that of hard segments reduces more significantly during hydrolysis. The micro-adhesion force has good correlation with the maximum tensile force, but a poor correlation with failure displacement. The maximum tensile force is proved to be an optimal evaluation index in determining the hydrolysis resistance of sealants.

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第 307 篇

标　　题：Simulation Parameter Test And Seepage Effect Analysis Of Pile-Anchor Support For Binary Slope

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：It is a difficult point in the field of geotechnical engineering to test the simulation parameters of the pile-anchor supporting structure of slope excavation and analyze the effect of seepage on the stress of the structure. This study relies on the right side slope treatment project of a highway in Guizhou Province. Aiming at the defect that the current numerical simulation parameter selection is fuzzy, the deep displacement monitoring data andPvalue inspection method are used to check the simulation parameters. We establish a 2D finite element model of slope excavation and support. The superposition calculation method of pore water pressure was used to analyze the stress characteristics of the slope-supporting structure after applying steady-state seepage. The analysis shows the following. (1) Initial support stage: the steady-state seepage causes the axial force extreme value of the prestressed anchor cable to increase by 11.22% at this stage. (2) Secondary support stage: the steady-state seepage reduces

the shear limit of the antislide pile by 3.11% and the bending moment by 14.90%. (3) Comparative analysis of the two supporting phases: the newly constructed pile-anchor supporting structure has a significant effect on the original pile-anchor supporting structure. At the same time, the bending and shearing resistance of the newly added antislide piles has not been fully exerted. The research results provide new ideas for the research on the safety control ability of the slope support construction process.

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第 308 篇

标　　题： Preparation, Characterization And Repeated Repair Ability Evaluation Of Asphalt-Based Crack Sealant Containing Microencapsulated Epoxy Resin And Curing Agent

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to improve the repeated repair ability of asphalt-based crack sealants, two types of microcapsules were prepared and added into asphalt-based crack sealant. The epoxy resin and curing agent were microencapsulated by using interfacial polymerization method, and named as A-type and B-type microcapsules respectively. The effects of emulsifier content and core-wall ratio on the preparation of two types of microcapsules were analyzed, and SEM, FT-IR, TG-DSC, and FOM analyses were performed to study the microscopic features of microcapsules, including the particle size and size distribution, chemical components, morphological features, thermal stability as well as the dispersion of microcapsules in the sealant. Then, DSR tests were conducted with two-stage loading mode to evaluate the repeated repair ability of asphalt-based crack sealants with different dosages of microencapsulated epoxy resin and curing agent. The results show that the optimal emulsifier contents are 0.5% and 0.7% for the A-type and B-type microcapsules respectively, and the corresponding core-wall ratios are 1.3:1 and 1.1:1 respectively. The two types of microcapsules were successfully prepared with well-distributed particle sizes and sufficient thermal stability, which are be well dispersed in asphalt-based sealants. The repeated repair ability indexes were proposed based on DSR complex shear modulus and the corresponding loadings cycles. It is found that the repeated repair ability of composited sealants is obviously improved. The optimal dosage of two types of microcapsules are 3%, and a sufficient healing time is required for repairing crack due to the indispensable curing process of epoxy. (C) 2020 Elsevier Ltd. All rights reserved.

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第 309 篇

标　　题： Performance-Based Seismic Fragility And Residual Seismic Resistance Study Of A Long-Span Suspension Bridge

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Earthquakes can cause serious damage to traffic infrastructure and even induce the collapse of bridges, which is even worse. At the same time, earthquakes are key factors to the overall service capacity of the traffic network. Therefore, mastering the failure mechanism and evaluating accurate residual seismic resistance of a bridge under earthquakes are of great significance to the rapid recovery of traffic network function. For this reason, a performance-based methodology for the evaluation of the residual seismic resistance of a suspension bridge is proposed. In this paper, we provide the fragility curves of the key sections of the pier by incremental dynamic analysis (IDA), mathematical statistical analysis, and the damage law and obtained the failure state of the structure and the overall seismic capacity residual ratio and the stage seismic capacity residual ratio of the structure. Then, based on the research results of IDA, the reserve seismic capacity is analyzed as well. The research results explore a new method to accurately estimate the residual seismic capacity for resilience assessment.

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第 310 篇

标　　题： Mechanical Characteristics Of Primary Support Of Large Span Loess Highway Tunnel: A Case Study In Shaanxi Province, Loess Plateau, Nw China Primary

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期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要： When a large span loess tunnel is excavated, the rock mass is disturbed, and it is difficult to form a load-bearing arch under shallow depth region. As a result, the structural deformation is complicated. This paper analyzed the deformation of 18 sections in Grade V rock mass and the primary support structural force of 2 sections in a case study of a highway loess tunnel in the large span loess highway tunnel group of Huangyan Traffic Capacity Expansion Engineering in Northern Shaanxi Province-Jianzicha No.2 Tunnel. The analyzed results were combined with the FLAC 3D numerical simulation to study the deformation of rock mass in Jianzicha No.2

tunnel and the stress characteristics of primary support. The results showed that (1) The time-space relationship curve of arch deformation indicated three stages of rapid deformation stage -continuous deformation stage-slow deformation stage in the construction by annular excavation with reserved core soil method. (2) The rock mass pressure distribution of tunnel basically presented the bilateral symmetry characteristics. The rock mass pressure distribution of arch was relatively uniform, and the rock mass pressure at the invert was relatively large. (3) The outer and inner sides of primary support arch steel rib was subjected to compression, and the stress distribution was relatively uniform and large. (4) The primary support shotcrete was mainly subjected to compression, and the stress distribution was basically characterized by bilateral symmetry. The stress distribution of shotcrete at the arch was relatively uniform and large, and the stress of shotcrete at the inverted part was relatively small. This paper studied the time-space law of supporting structure deformation in the shallow section of V grade surrounding rock, and designs the supporting parameters of V grade surrounding rock for large-span loess highway tunnel, which has guiding significance for the construction of similar projects in the future.

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WOS 号： 000567711200001

第 311 篇

标　　题： Validation Of Long-Term Temperature Simulations In A Steel-Concrete Composite Girder

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通讯作者： Liu, YJ (corresponding author), Changan Univ, Sch Highway, Xian, Shaanxi, Peoples R China.

期　　刊： STRUCTURES

摘　　要： Temperature actions are taken into account in the design of bridges, as temperature variation can lead to structural deformation and stress. Accurate temperature actions values are a must for bridge design, which is based on the insight of genuine temperature field in the bridge. However, long-term thermal simulations and sufficient validations that are significant in the study of bridge temperature actions have not been presented. In this study, the shadow recognition method and a simulation model were developed and validated for long-term thermal simulation to be used in future studies on the determination of characteristic values of temperature actions in composite bridges. The validation study was conducted by comparing temperature variations and temperature actions between simulated results and test data measured in a composite girder for 15 months. The results show that the model is capable of calculating accurate temperature distribution and practical temperature actions. The model could be used in future studies and applied in more areas and bridges.

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WOS 号： 000569323600001

第 312 篇

标　　题：Application Of A New Empirical Model Of Nonlinear Self-Excited Force To Torsional Vortex-Induced Vibration And Nonlinear Flutter Of Bluff Bridge Sections

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期　　刊：JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS

摘　　要：Long-span bridges are susceptible to vortex-induced vibration (VIV) and flutter in different reduced wind range. Currently, VIV and flutter are considered as two different types of wind-induced vibration and different empirical models were proposed. The possibility of building a universal empirical model for both torsional VIV and nonlinear flutter was explored. In the previous study, a new empirical model was proposed for describing aerodynamic nonlinearities during soft flutter of a bluff bridge section with a medium side ratio. In this study, the empirical model was refined and extended to both torsional VIV and nonlinear flutter for a general bluff body, especially for a flat bridge deck, which is more common in long-span bridges. In the empirical model, aerodynamic nonlinear damping effect was modeled by a cubic velocity term and its applicability was validated by a series of elastically-mounted sectional model tests of a flat twin-side-girder bridge deck. The results indicated that the proposed empirical model was suitable for predicting the stable amplitude of torsional VIV and nonlinear flutter, although the motion-induced pure force varies with side ratios. It was found that torsional VIV and soft flutter share the same nonlinear damping mechanism during the development of LCO.

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第 313 篇

标　　题：A Prediction Method For The California Bearing Ratio Of Soil-Rock Mixture Based On The Discrete Element Method And Ct Scanning

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Because of the large amount of gravel with particle sizes over 40 mm in the soil-rock mixture (SRM), it is impossible to determine its California Bearing Ratio (CBR) via the

indoor test method, which is a key parameter for designing the backfill in underground mined cavities or the road subgrade constructed with SRM. In this paper, X-ray computed tomography (CT) scanning and 3D reconstruction technology were used to construct the 3D structure of SRM particles with a particle size greater than 5 mm. Based on the vertical vibration test method (VVTM) and PFC3D, the numerical simulation method (NSM-CBR) of SRM was established. The CBR of the SRM with a maximum particle size over 40 mm (SRM-G) was studied by NSM-CBR, and the effects of factors such as maximum particle size, soil content, and large-size particle content (d >= 40 mm) on the CBR were investigated via NSM-CBR. Based on the laboratory tests and NSM-CBR, the prediction model and the determining method of CBR of SRM-G were established and verified. The results show that the maximum deviation between the CBR obtained from NSM-CBR and laboratory tests was 7.4%. The CBR of SRM-G decreases linearly with the increase in soil content and increases with the increase in maximum particle size and large-size particle content. The practical project shows that the maximum deviation between the predictive and measured values of the CBR of SRM-G was less than 1.5%, indicating that the prediction model and the method established in this paper have high reliability.

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第 314 篇

标　　题： Analysis Of Temperature-Induced Deformation And Stress Distribution Of Long-Span Concrete Truss Combination Arch Bridge Based On Bridge Health Monitoring Data And Finite Element Simulation

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期　　刊： INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS

摘　　要： Through decades of operation, deformation fluctuation becomes a central problem affecting the normal operating of concrete truss combination arch bridge. In order to clarify the mechanism of temperature-induced deformation and its impact on structural stress distribution, this article reports on the temperature distribution and its effect on the deformation of concrete truss combination arch bridge based on bridge health monitoring on a proto bridge with 138 m main span. The temperature distribution and deformation characteristics of the bridge structure in deep valley area are studied. Both of the daily and yearly temperature variation and structural deformation are studied based on bridge health monitoring. Using the outcome of monitoring data, three-dimensional solid finite element models are established to analyze the mechanism of temperature-induced deformation of the whole bridge under different temperature fields. The influence of temperature-induced effect is discussed on local damage based on the damage observation of the background bridge. The outcome of comparisons with field observation validates the analysis results. The relevant monitoring and simulation

result can be referenced for the design and evaluation of similar bridges.

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第 315 篇

标　　题： Simulation Parameter Selection And Steady Seepage Analysis Of Binary Structure Slope

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期　　刊： WATER

摘　　要： The selection of calculation parameters for slope excavation support design and the analysis of seepage stability is a significant challenge. This difficulty also hinders the development of slope support engineering. This study examined the right binary structure slope engineering of the K5 + 220-K5 + 770 section of the TJ1A mark of the Jiangkou-Weng'an Highway in Guizhou province. In this study, we propose and use the deep displacement monitoring data and p value test method to check the simulation parameters. Furthermore, the superposition calculation method for steady-state seepage analysis of slope geotechnical structure is proposed. A comparative analysis of the displacement, strain, stress, and safety factor of the slope after the application of pore water pressure was carried out for three slope conditions. The analysis showed that steady-state seepage has a significant effect on the displacement of the slope during the completion of excavation. As a result, a continuous distribution of strain arises on the slope along the interface between the potential sliding surface and the rock-soil layer, and then forms a continuous sliding zone. Additionally, steady-state seepage has a significant effect on the position of the displacement distribution during the initial support of the slope, leading to a significant increase in the extreme value of the shear outlet displacement of the potential slip surface of the slope and in the extreme value of equivalent strain. Finally, steady-state seepage reduces the displacement and equivalent strain upon construction of the secondary slope support. The steady-state seepage has a limited effect on the stress concentration, but reduces the safety factor calculated using the strength reduction method, in all three stages of slope excavation and support. This study enriches the analysis methods for determining the stability of a dual-structure slope during the rainy season, and provides new ideas for the safety and control of slope support projects.

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第 316 篇

标　　题：Laboratory Evaluation Of A Vertical Vibration Testing Method For An Sma-13 Mixture

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期　　刊：MATERIALS

摘　　要：In order to simulate the on-site compaction conditions of a Stone Matrix Asphalt (SMA) mixture, The Vertical Vibration Testing Method (VVTM), Superpave Gyratory Compactor (SGC), and Marshall method are used to test the SMA-13 mixture, and the physical and mechanical properties of the asphalt mixture designed by these three methods are tested. Subsequently, the influences of the molding method on the mechanical properties are compared. The influence of vibration compaction time on the volume parameters of the SMA mixture is studied. Following the heavy traffic compaction standards, the vibration compaction time of the SMA mixture is determined. The results show that the densities of the heavy Marshall specimen, VVTM specimen, and SGC specimen are 1.018 times, 1.019 times, and 1.015 times greater than that of the standard Marshall specimen, respectively. The passing rate of the 4.75 mm aggregate of the standard Marshall specimen is 29.9%, and that of the VVTM specimen and SGC specimen is 31.1% and 30.5%, respectively, while that of the heavy Marshall specimen is 34.5%. The mechanical strength of the specimen can be greatly improved as the density increases. On the other hand, by the same compaction work, the mechanical strength of the VVTM specimens can be increased by at least 7% compared with the heavy Marshall specimen. The mechanical strength of the VVTM specimen is increased by at least 22% compared with the standard Marshall specimen. The results also show that under the optimal asphalt-aggregate ratio and the same compaction work, the compressive strength and shear strength of the VVTM specimens are increased by at least 6% and 9%, respectively, compared with the Marshall specimens. In summary, the performance of the asphalt mixture designed by the VVTM is superior, providing a wider choice for future asphalt mixture design.

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第 317 篇

标　　题：Performance Of Noise Reduction And Skid Resistance Of Durable Granular Ultra-Thin Layer Asphalt Pavement

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期　　刊：MATERIALS

摘　　要：In this paper, the ultra-thin layer (UTL) is defined as the dense framework structure mixture made of asphalt binder, fine aggregate with nominal maximum aggregate size (NMAS) not greater than 13.2 mm and possible additives (mineral or organic), thickness of 2-4 cm. The study aims to investigate comprehensive performance of UTL asphalt mixture. The method of impact freeze thaw split test and the index of impact freeze-thawing damage degree (IFTDD) are proposed to reflect the durability. The indoor tire-rolling-down test system and accelerated abrasion machine are used to simulate the tire-pavement interaction and test road noise and skid resistance, respectively. Though evaluating the influencing factors (pavement thickness, gradation, asphalt binder type, and the content of KS additive) on durability, the optimum parameters with excellent durability are recommended. Combined with the test of noise and skid resistance, the factors affecting the surface function are analyzed. Moreover, the prediction mathematical model of skid resistance and the long-term safety benefit value E-eff are put forward. Results indicate that pavement thickness is the most significant factor effecting on durability, and gradation is the most significant factor affecting noise. Compared with KS additive, gradation has a greater influence on skid resistance index of Texture Depth (TD), whereas, KS additive is the most significant factor affecting British Pendulum Number (BPN). Furthermore, with the addition of asphalt rubber (AR), IFTDD and noise are reduced by 29.17% and 1.6 dB, and BPN and TD increase by 0.7 and 0.03 mm, remarkably. Compared with different asphalt types, the noise of UTL asphalt rubber mixture with 13.2 mm NMAS (UTL13 AR) is the lowest. Additionally, when KS content increases by 0.6%, the noise increases by 3 dB. Furthermore, on the basis of the calculation results of E-eff, UTL13 AR mixture with 0.5% KS has the best long-term benefit of pavement safety and is recommended for field project.

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第 318 篇

标　　题：Test Method On Adhesive Property Of Joint Sealant In Supporting Layer Of Ballastless Slab Track

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：The current test method cannot predict the properties of a joint sealant accurately, and therefore this paper proposes a new test method to evaluate its adhesive property. Field investigation was conducted to examine the main forms of joint sealant failure and its actual working conditions. Our findings enabled us to develop a new test method for evaluating the adhesive properties of sealants. A testing procedure, a standard substrate, and optimal testing parameters were determined in the light of analyses of test results. We conducted differential scanning calorimetry (DSC) and X-ray photoelectron

spectroscopy (XPS) tests to research the adhesive mechanism of the sealant. Results showed that adhesive failure is the main failure form, and it is caused mainly by horizontal joint expansion. Using peak load as the standard evaluation index, we noted that quartz substrate has the weakest bonding interface with joint sealants. The adhesive strength of sealants has a positive correlation with the isocyanate index and elongation rate, and a negative correlation with temperature. The optimal elongation rate was determined to be 100 mm/h, at which there is good repeatability and stability. Sealants with high isocyanate index can present two glass transition points and react more easily with SiO2, but may also result in a rougher surface that could reduce the chemical interaction between polyurethane and SiO2. (c) 2020 American Society of Civil Engineers.

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第 319 篇

标　　题： Exploration Of Roadway Factors And Habitat Quality Using Invest

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期　　刊： TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT

摘　　要： Roadways vary in structural, geotechnical, locational, and operational properties, and synergies among these factors may present overwhelming challenges to understanding their full effects on the habitat quality (HQ). To explore the impact of dense roadway networks on an ecologically fragile region in the northwest of China, this study applied the Integrated Valuation of Ecosystem Services and Trade-offs (InVEST) to evaluate the HQ spatiotemporal distribution of the study area. Then, Generalised Estimating Equations (GEE) were formulated to examine the cumulative impact due to the operation of an increasing amount of roadways over the past two decades. According to the results, the influence of different road types on the HQ was apparent within the road-effect zone, and road grading reduction, road length and operation duration increase can harm the HQ within the road-effect zone. Overall, this study generates knowledge concerning the design and operation of environmentally-friendly roadways in ecologically fragile areas.

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第 320 篇

标　　题： Prediction Formula For Temperature Gradient Of Concrete-Filled Steel Tubular Member With An Arbitrary Inclination

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期　　刊： JOURNAL OF BRIDGE ENGINEERING

摘　　要： Concrete-filled steel tubes (CFSTs) have been used extensively as main members with different inclinations in bridge structures; however, investigations on the influence of member inclination on temperature gradient are inadequate. To fill this gap, long-term measurements were made of the structural temperature of three CFST members with inclinations of 0 degrees, 45 degrees, and 90 degrees, along with simultaneous meteorological parameters, including solar radiation, air temperature, and wind speed. It was found that distinctions do indeed exist in the sun-side temperature differences of CFST members with different inclinations. Subsequently, by stepwise regression of the accumulated temperature and meteorological data, an empirical formula was established to predict the daily maximum temperature difference of CFST members of arbitrary inclination. Finally, finite-element modeling was performed on the temperature field of a CFST arch bridge and verified the proposed formula with a high degree of confidence. Therefore, the proposed prediction formula and the corresponding method can provide relatively valuable references for the improvement of the thermal design of CFST bridges in current specifications.

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第 321 篇

标　　题： Effects Of Paving Technology, Pavement Materials, And Structures On The Fatigue Property Of Double-Layer Pavements

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Double-layer paving technology, which is a new technology for construction asphalt pavements, has received increasing research attention for several years. However, few studies have focused on the effect of asphalt pavement layer thickness and mixture-type combinations on the fatigue properties of a double-layer pavement. Therefore, the fatigue properties of the double-layer and traditionally paved asphalt pavements were studied in this work. The effects of two paving technologies, three mixture combinations, and two asphalt layer thickness combinations on the fatigue properties of asphalt pavements were studied through bending beam tests, and a fatigue equation of different asphalt pavements was established using the two-parameter Weibull distribution. Subsequently, the fatigue lives of different pavements were compared and analyzed under the same cyclic load. Results indicate that the flexural strength and fatigue life of the double-layer pavement increased by at least 10% and 54%, respectively, compared with those of a traditionally paved pavement structure. The

goodness of fit of the equation established using the Weibull distribution exceeded 0.90. For the traditional paving technology, compared with the pavement structure combination of 4-cm AC-13 surface layer/6-cm AC-20 bottom layer, the fatigue life of a 3-cm AC-13 surface layer/7-cm AC-20 bottom layer can be increased by at least 8%, while the fatigue lives of other pavement structures are reduced significantly. The results also indicate that the fatigue life of the double-layer pavement structure with the 3-cm AC-13 surface layer/7-cm AC-20 bottom layer can be increased by at least 114% compared with that of the traditionally paved pavement structure (4-cm AC-13 surface layer/6-cm AC-20 bottom layer). Additionally, the fatigue lives of other pavement structures can be improved. To effectively improve the fatigue life of an asphalt pavement, a double-layer pavement structure with the 3-cm AC-13 surface layer/7-cm AC-20 bottom layer combination is recommended.

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第 322 篇

标　　题： Application Of The Discrete Element Method And Ct Scanning To Investigate The Compaction Characteristics Of The Soil-Rock Mixture In The Subgrade

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： The soil-rock mixture (SRM) usually contains a large amount of gravels exceeding 40 mm in size, so the traditional laboratory method cannot directly test its maximum dry density (MD), making it difficult to evaluate the compaction degree of the SRM subgrade during construction. In this paper, a numerical simulation method of the vibration compaction method for the SRM (NSM-VCM) was developed based on a discrete element method (DEM) and CT scanning. Based on the established NSM-VCM, the MD of SRMs with a maximum particle size greater than 40 mm (SRM-G) was investigated comprehensively. Based on the results of laboratory tests and the NSM-VCM, a predictive model and determination method of the MD of SRM-G were developed. Finally, field measurements were conducted to validate the laboratory investigations. The results showed that the maximum error between the MD of the SRM obtained from the NSM-VCM and the laboratory test was 0.1%, indicating that the established NSM-VCM has high predictive accuracy. The MD of SRM-G increases with an increasing maximum particle size and dosage of giant granules. Only when the soil-rock ratio is appropriate can SRM-G form a better skeleton dense structure, which is important for improving the MD and mechanical strength. The

maximum error between the estimated MD and the measured MD from the field site is 1.3%, which indicates that the prediction model and method for SRM-G established in this paper have high precision. These results address the issue that the MD of SRM-G cannot be determined in a laboratory.

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第 323 篇

标　　题： Role Of Mineral Filler In Asphalt Mixture

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： Mineral filler, fine-grained mineral particles naturally present in or manufactured and added to aggregates play a significant role on the performance of asphalt mastic and asphalt mixtures. A clear understanding of effects of filler on the properties of asphalt paving mixtures is critical to ensure a good asphalt mixture design and its field performance. In this study, the basic properties of mineral filler, mainly including physical and chemical properties, were first reviewed and followed by the effects on mastic and mixture performances. This review finds that particle size distribution and specific surface area are the two most important physical characteristics for fillers in terms of its impact on mastic performances. Fillers, including diatomite, hydrated lime and cement, can improve the high temperature and durability performances of mastic and mixture. However, fillers, like glass powder, steel slag and bentonite, have a detrimental effect on the low-temperature performances. It can be concluded that it is important to carefully select the mineral filler type and proportion in order to improve the asphalt mixture performances.

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第 324 篇

标　　题： Performance Evaluation Of Bdm/Unsaturated Polyester Resin-Modified Asphalt Mixture For Application In Bridge Deck Pavement

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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： Although epoxy resin-modified asphalt mixture (ERMAM) shows excellent performances as used in bridge deck pavement, its cost is high and low-temperature

anti-cracking resistance is poor, so unsaturated polyester resin-modified asphalt mixture (UPRMAM) is proposed to replace ERMAM. However, there is still a great gap in strength between UPRMAM and ERMAM. In this paper, 4,4 '-bismaleimidodi-phenylmethane (BDM)/unsaturated polyester resin-modified asphalt mixture (BDM/UPRMAM) is presented for bridge deck pavement. Marshall, splitting, three-point bending, rutting, bending creep, immersed Marshall, freeze-thaw splitting, four-point bending fatigue and oil corrosion tests are performed to compare the performances of BDM/UPRMAM, pure unsaturated polyester resin-modified asphalt mixture (PUPRMAM) and ERMAM. Results show that the addition of BDM into PUPRMAM makes the splitting tensile strength, flexural-tensile strength and dynamic stability increase by 17.6%, 29.2% and 80.94%, respectively. It also improves the resistance to water damage and fatigue disease significantly while it decreases low-temperature performance. Compared with ERMAM, BDM/UPRMAM has similar splitting tensile strength, worse flexural-tensile strength, dynamic stability and fatigue resistance, better low-temperature crack resistance and lower cost. As a result, BDM/UPRMAM can be used as the bridge deck surfacing material.

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第 325 篇

标　　题： Comparison Of Mechanical Properties Of Cement-Stabilized Loess Produced Using Different Compaction Methods

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Mechanical properties are important indexes to evaluate the improvement effect and engineering performance of cement-stabilized loess (CSL). This paper presents a comparison of the mechanical properties of CSL compacted using hammer quasi-static compaction method (QSCM) and vertical vibration compaction method (VVCM). The compaction properties, unconfined compressive strength (UCS), splitting strength (SPS), and resilient modulus (RM) of the laboratory-compacted CSL using VVCM and QSCM are tested and compared. Furthermore, the effects of compaction method, cement content, compaction coefficient, and curing time of the CSL specimens are investigated. In addition, field measurements are carried out to validate the laboratory investigations. The results show that the laboratory-compacted CSL using VVCM has a larger dry density and smaller optimum water content than that using QSCM. And the compaction method has a great influence on the mechanical strength of CSL. The UCS, SPS, and RM of the specimen produced using VVCM are averagely 1.17 times, 1.49 times, and 1.17 times that of CSL produced using QSCM, respectively, and the UCS, SPS, and RM of the specimens produced using these two methods increase linearly as the cement content and compaction coefficient increase, while the mechanical strength

growth curve experiences three periods of increasing sharply, increasing slowly, and stabilizing with the curing time increased. Moreover, the results also show that the mechanical properties of laboratory-compacted CSL using VVCM have a better correlation of 83.8% with the field core samples.

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第 326 篇

标　　题： Reliability Assessment And Residual Life Estimation Of Concrete Girder Bridges Strengthened By Carbon Fiber During The Service Stage

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In recent decades, carbon fiber reinforced plastics (CFRP) have been widely used to repair and maintain concrete structures around the world. Since the parameter uncertainties of load and resistance are very important for the reliability assessment of RC bridge strengthened by CFRP, this paper presents a method to estimate the reliability and residual life of RC bridges strengthened by CFRP. In the proposed method, uncertainties of material properties, geometry parameters, load model, and time-dependent resistance model are taken into account. The proposed method combines the inverse reliability method and the calculation method of load and resistance of RC bridge strengthened by CFRP and is illustrated by an example RC bridge strengthened by CFRP during the service stage. The results indicate that the proposed approach can provide valid information regarding parameter uncertainties for the reliability of RC bridge strengthened by CFRP during the service stage. Additionally, the effects of parameter uncertainty of the reliability and residual life of RC bridge strengthened by CFRP during the service stage are analyzed and discussed. The proposed method is more robust and reliable than the traditional method.

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第 327 篇

标　　题： Study On The Temperature Control Effects Of An Epoxy Resin Composite Thermoregulation Agent On Asphalt Mixtures

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：The preparation of an epoxy resin composite thermoregulation agent (ERCTA) and its asphalt mixture thermoregulation effects are studied. The maximum temperature difference, latent heat-accumulated temperature value and latent heat thermoregulation index are used to characterize the ERCTA thermoregulation effects. The higher the ERCTA dosage is, the better the thermoregulation effects are, within certain limits. The ERCTA causes an abrupt change in the specific heat capacity of the asphalt mixture, and the higher its dosage is, the higher the transformation peak is. The specific heat capacity-temperature relationships of asphalt mixtures with different ERCTA dosages are obtained.

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第 328 篇

标　　题：Analysis Of Deformation Behavior And Microscopic Characteristics Of Asphalt Mixture Based On Interface Contact-Slip Test

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：To analyze the slip deformation behavior of asphalt mixture, an interface contact-slip tester of asphalt mixture was developed in this investigation. Four evaluation indicators, including the maximum slip shear stress tau(sl), the slip shear strain epsilon(S), the slip failure modulusE(S) and the interface slip energy index E-T, were proposed. According to the correlation and sensitivity analysis, the optimum evaluation indicator was determined. By analyzing the variation coefficient of test results, the key experiment parameters were recommended. The gray binarization method of MATLAB software was adopted to process the slip failure surface of specimen, and the bonding ratio B-n was calculated to analyze the effect of asphalt bonding on strength formation. Based on the deformation curve, the slip deformation behavior of asphalt mixture and the influence factors were analyzed from the microscopic perspective. Results obtained indicated that the optimum test conditions are the loading head of 28.5 mm, the diameter of the support ring of 80 mm, and the loading rate of 5 mm/min. The tau(sl) was selected as the evaluation indicator of slip deformation behavior due to the best correlation with RD, good stability and sensitivity. The bonding effect of asphalt binder is greater than particle contact effect for suspended-dense asphalt mixture. The slip deformation of asphalt mixture can be divided into five stages, including densification, elastic deformation, viscoelastic deformation, initial cracking and plasticity slip deformation. The contact from coarse aggregates and bonding from asphalt binder can enhance the slip deformation resistibility. While the interference of fine particles and the lubrication of asphalt can accelerate the slip deformation of asphalt mixture. (C)

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第 329 篇

标　　题： Influence Of Freeze-Thaw Cycles On Thermal Conductivity, Water Permeability And Mechanical Properties Of Asphalt Mixtures

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期　　刊： IRANIAN JOURNAL OF SCIENCE AND TECHNOLOGY-TRANSACTIONS OF CIVIL ENGINEERING

摘　　要： This research studied the effect of freeze-thaw cycles on the thermal conductivity, water permeability and mechanical properties of asphalt mixtures in the cold region. Three types of asphalt mixtures, namely a stone mastic asphalt (SMA) mixture, dense graded asphalt concrete (AC), asphalt-treated base (ATB) mixture, were produced in the laboratory. The thermal conductivity test and water permeability test were used to study the thermal conductivity and water permeability of asphalt mixtures, respectively. Meanwhile, the uniaxial compression test and indirect tensile test were carried out to investigate the mechanical properties of asphalt mixtures. The results showed that with the increase in the number of freeze-thaw cycles, the thermal conductivity and mechanical properties of all asphalt mixtures were weakened, while the water permeability of them was improved. In addition, the effect of freeze-thaw cycles on the thermal conductivity and mechanical properties of ATB mixture was more significant than that of SMA mixture and AC.

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WOS 号： 000579256400001

第 330 篇

标　　题： Molecular Dynamics Analysis Of Moisture Effect On Asphalt-Aggregate Adhesion Considering Anisotropic Mineral Surfaces

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期　　刊： APPLIED SURFACE SCIENCE

摘　　要： The objective of this work is to analyze the effect of moisture on the bonding and debonding behaviors between asphalt and aggregates based on molecular dynamics (MD) simulation, considering the anisotropic characteristics of mineral surfaces. Full atomistic models adopted for MD simulations were constructed using the 12-component asphalt model and two types of representative minerals, alpha-quartz and calcite. Anisotropic wettability was studied by simulating the dynamic processes of a

water nano-droplet spreading on anisotropic mineral surfaces. An improved energy ratio (ER) considering the residual adhesion between asphalt and aggregates in a moist state was established to evaluate the moisture susceptibility of asphalt mixtures. It was found that (1) anisotropic mineral surfaces have a significant influence on the bonding properties and moisture susceptibilities of asphalt mixtures; (2) the concentrated hydroxyl groups on the hydroxylated alpha-quartz surfaces significantly increase surface hydrophilicity and reduce the resistance to water damage; (3) freshly-cleaved calcite surfaces contribute the most to moisture susceptibility, while un-hydroxylated alpha-quartz surfaces contribute the least among the mineral surfaces studied. This simulation work provides insights to better understand the moisture damage mechanisms of asphalt mixtures at a microscopic level.

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第 331 篇

标　　题： Design And Performance Of A Cantilever Piezoelectric Power Generation Device For Real-Time Road Safety Warnings

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期　　刊： APPLIED ENERGY

摘　　要： This paper presents a batch-processable cantilever piezoelectric device suitable for road traffic conditions, and the power it converts can provide a real-time safety warning for automobiles in hazardous areas. Based on road traffic characteristics, environment characteristics and construction convenience, a multilayer vertical butterfly array piezoelectric device with high sensitivity is designed. Furthermore, to verify the reliability of the device for the early warning in the laboratory stage, the power generation rules under different traffic conditions are studied systematically, and the applicable situations in different combinations of automobile types and speeds are clarified. Finally, the effects of instantaneous safety warning are verified, and the installation measure of device is determined. The results indicate that the power effect of the device first increases and then decreases with the increase in the speed (Corresponding to the vibration frequency generated by the axles of automobile). The power effect of a single device is optimal when simulating a light traffic conventional speed of 50-90 km/h (7-11 Hz), the maximum electrical output is 26 V-22.09 mW; while the power under heavy traffic is relatively poor, which is 20.8 V-7.84 mW. Moreover, the flashing effect of warning sign powered by a single device is better under the speeds, and the devices will be installed in front of the hidden section in piece-by-piece. The clean electric energy converted by the piezoelectric device will be helpful for real-time road safety early warning, reduce power loss for long-distance transmission of power grids, and promote the process of intelligent transportation applications.

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WOS 号： 000571787900003

第 332 篇
标　　题： Experimental Research On Fatigue Behavior Of Existing Reinforced Concrete Beams
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期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： In order to obtain the law of the fatigue damage development of reinforced concrete hollow beams that has been in service for 24 years, its solid hollow beams were removed and transported to the laboratory for loading test. Two beams were selected for static loading to obtain the ultimate flexural bearing capacity, and three beams were, respectively, subjected to constant-amplitude fatigue loading with different load amplitudes. The static and dynamic behaviors of the beams were monitored in the fatigue test. The fatigue failure of the beams showed that the outermost rebar at the butt weld fractured at first, and the crack width at the fracture position of the steel bar was about 0.3 mm, which was largest in all cracks. After a rebar was broken, midspan deflection and flexibility increased by approximately 20% and 10%, respectively, relative to the initial state. The damage developed rapidly in the following range: (1) the first 10,000 fatigue cycles; (2) after fatigue fracture of the rebar; and in the intermediate stage of fatigue test, the damage development was relatively stable. As the loading amplitude increased, the stiffness degradation and the cumulative damage that occured under the same loading cycle were more significant.
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WOS 号： 000588336000001

第 333 篇
标　　题： Formulation And Properties Of A Newly Developed Powder Geopolymer Grouting Material
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期　　刊： CONSTRUCTION AND BUILDING MATERIALS
摘　　要： This paper aims to develop a new kind of powder geopolymer grouting material (S-F powder Geopolymer) and investigate the properties. The slag powder, fly ash, alkali activators A and B, chemical additive, reinforcing material and water were employed to prepare this material. The single factor and orthogonal tests were conducted to study the

composition of S-F powder Geopolymer. The physical and mechanical properties were evaluated by a series of laboratory tests such as fluidity, bleeding and expansion rate, mechanical properties tests et al. The results show that the optimum formula of S-F powder Geopolymer is that slag powder to fly ash is 80:20, the alkali activators A and B are 8% and 6.5%, the reinforcing material is 9% and the water reducing agent is 1%. In addition, the S-F powder Geopolymer has good physical and mechanical properties, which can ensure the performance of road repaired by this material. The S-F powder Geopolymer can be used to fill void beneath cement pavement slab and to repair crack of cement-stabilized base of asphalt pavement. The results of this paper will help the practice to have better understanding on the powder geopolymer grouting material and give recommendations to guide future field application of this material. (C) 2020 Elsevier Ltd. All rights reserved.

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第 334 篇

标　　题： Interpreting The Creep Behavior Of Asphalt Mortar At High Temperature Through Experimental And Numerical Methods

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Rutting or permanent deformation is a major distress for asphalt pavement structures that are subjected to heavy traffic loadings. In this study an experimental study was conducted to evaluate the creep characteristics of asphalt mortar at elevated temperatures. The compressive strength of three types of asphalt mortar gradations used in airfield pavement were tested by the uniaxial compression test at 40 degrees C, 50 degrees C and 60 degrees C. In addition, triaxial creep test was used to test the creep of the three mortars at stress levels of 100 kPa, 300 kPa and 500 kPa. After that, the Burgers model and the modified Burgers model were chosen to simulate the creep curves. Viscoelastic fitting analysis results shown that the correlation R-2-value of the two models were found to be greater than 0.95 at each stress level, the Burgers model has an R-2 more than 0.98. it indicated that the Burgers model can better describe the creep characteristics of the asphalt mortar under repeated loadings. (C) 2020 Elsevier Ltd. All rights reserved.

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第 335 篇

标　　题： Evaluation Of Interlayer Stability In Asphalt Pavements Based On Shear Fatigue Property

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Interlayer fatigue resistance is an important property to ensure the durability and stability of asphalt pavements. Shear fatigue damage is one of the main failure modes of asphalt pavements, but the existing design methods involve little in the way of shear fatigue property. In this work, the fatigue life of five different interlayer bonding conditions was studied by a direct shear fatigue test. The fatigue test data was processed by the Weibull distribution function. The laboratory prediction model of interlayer fatigue life was obtained with shear stress (tau) and interface stiffness (K-min) as variables. A decay model of interlayer bonding property was proposed based on the fatigue life model. The axle-load conversion formula was obtained based on the laboratory prediction and decay models. The laboratory fatigue life prediction model was revised, and the final prediction model was obtained. Finally, a method to evaluate interlayer stability was proposed based on the shear fatigue model and conversion method of axle-load. The study provides a theoretical basis for the interlayer design and stability evaluation of asphalt pavement. (C) 2020 Elsevier Ltd. All rights reserved.

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第 336 篇

标　　题：3-Dimensional Finite Element Modelling Of Asphalt Mixtures For Thermal Conductivity Determination

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：Laboratory determination of the thermal conductivity k of asphalt materials is time consuming. Numerical determination of k is more viable practically for the purpose of mix design and paving temperature control. Researchers have applied microstructure finite element models for k determination. The method requires modelling skills and is computational resources demanding. This study shows that a simple row-column finite-element model of cubical cells can be employed to predict k with the same level of accuracy as microstructure models. Based on theoretical considerations of heat conduction mechanism and the construction and paving process of asphalt mixtures, this study reveals that exact mixture microstructure representation is unnecessary and impractical for the k determination problem. The simple proposed model, having straight-forward finite-element mesh representation and high computational efficiency, offers a practical tool for k determination to enable timely thermal evaluation of mix design, temperature analysis for paving control, and structural behaviour study under thermal loading.

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第 337 篇
标　　题： Life-Cycle Crack Resistance And Micro Characteristics Of Internally Cured Concrete With Superabsorbent Polymers
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期　　刊： CONSTRUCTION AND BUILDING MATERIALS
摘　　要： To explore the crack resistance of internally cured concrete with superabsorbent polymers (SAPs) during its life cycle, plate induction test at the early plastic stage, ring restraint test at the curing stage and three-point fracture test at the service stage were designed to systematically track the variations in the crack characteristics. The key internal curing parameters of the SAP mesh and extra water input are optimized by the weighted efficacy coefficient method. Internal curing with SAPs is demonstrated to postpone the cracking initiation time, limit the cracking potential and improve the fracture energy. XRD shows that the addition of SAPs does not change the type of hydration products but influences the intensity of the diffraction peaks. A larger particle size of SAPs results in a higher CH and lower peak intensity of beta-C25. It is indicated that SAPs can prolong the water release cycle and regulate the hydration process to ensure the continuous and uniform hydration of cementitious materials. The porosity and the critical pore diameters decrease with the continuing age of the concrete, indicating that SAPs effectively reduce the pore connectivity and improve the pore structure. The enhancement mechanism of internal curing was revealed with a narrower ITZ width and lower Ca/Si ratio, which reflect the improvement of the crack resistance of the concrete. The experimental procedure is useful for the evaluation of crack resistance during the life cycle of concrete and the popularization of engineering applications for internally cured concrete pavement.
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第 338 篇
标　　题： Experimental Feasibility Study Of Ethylene-Vinyl Acetate Copolymer (Eva) As Cement Stabilized Soil Curing Agent
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期　　刊： ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要： Loess resources are abundant and widely distributed in the world, but insufficient strength and water-stability cannot meet the requirements of subgrade soil. Ordinary soil reinforcement technology does not apply to loess. This paper provides a theoretical reference for the application of copolymers as soil curing agents in pavement construction and the treatment of loess. The effect of CSS (cement stabilized soil) specimens and CESS (cement-EVA stabilized soil) specimens were studied to evaluate whether cement-EVA stabilized loess can be used as subgrade soil when adding cement and EVA (ethylene-vinyl acetate copolymer) as a soil curing agent to the loess from the perspective of chemically stabilized soil. The performance of cement-EVA stabilized loess was evaluated through the analysis of mechanical properties, damage resistance, water-stability, anti-freezing ability, dry shrinkage and analysis, and micro-morphology of CSS specimens and CESS specimens. The results show that: the addition of EVA significantly improved the properties of cement stabilized loess. The amount of 300 mL/m(3) EVA increased the 28 d strength of CESS by about 26.4%, and as the amount of EVA increased, the strength gradually increased, but the growth rate gradually decreased. The addition of EVA made the specimens more resistant to load and water damage. The toughness index VI of the CESS specimens with 600 mL/m(3) EVA was increased by 20%-30% compared with the CSS specimens, and the water stability coefficient K was increased by 5%-10%, and the frost resistance coefficient AFA was increased by about 20%-30%. In addition, the addition of EVA slowed down the shrinkage of cement stabilized loess, and the 30 d drying shrinkage of the CESS specimen was reduced by about 30%. It can be seen in the scanning electron microscope test that with the increase of EVA, cement hydration products gradually increased, pores gradually decreased, and the structure was dense. This means adding EVA to cement stabilized loess can cause chemical reactions to form gels, which surround soil particles, eliminates the pore among the soil particles. The price of EVA is lower and the dosage is little, which can reduce the cost of the entire life of the pavement. In general, EVA is an effective curing agent for strengthening loess and its practical application in the pavement can be further studied in the future.

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第 339 篇

标　　题： Experimental Study Of The Performance Of Porous Ultra-Thin Asphalt Overlay

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期　　刊：INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要：Porous ultra-thin asphalt overlay (PUAO) is widely used in maintenance and new road surface layers. Since the paving thickness of PUAO is only about 20 mm, it is necessary to study its own performance and the overall performance of the double-layer material formed by the ultra-thin overlay and the under-layer mixture. PUAO and PUAO/asphalt concrete double-layer specimens with different air voids were prepared and the performance of the specimens were studied. The results showed that as the air voids increased from 15.8% to 24.4%, the PUAO's high-temperature rutting dynamic stability decreased, the tensile strength ratio first decreased and then increased and the acoustic absorption coefficient peak value increased gradually, but the peak value of frequency moved from 400 Hz to 1250 Hz. The dynamic stability and low-temperature bending strength of the PUAO/AC-13 double-layer specimens were higher than those of the PUAO single-layer specimens. However, the double-layer specimen had a smaller permeability coefficient than the single-layer specimen. The International Friction Index showed that after 600,000 abrasion cycles, the F60 values of the five PUAOs were higher than those of the DUAO, indicating that the PUAO material had excellent skid resistance performance.

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第 340 篇

标　　题：Optimization Of Cable Force Adjustment In Cable-Stayed Bridge Considering The Number Of Stay Cable Adjustment

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Modern cable-stayed bridges are spatial, multicable systems. The cable force needs to be adjusted during the construction phase and maintenance phase. The existing calculation methods of cable force adjustment mainly considered the rationality of structural force, but only few research studies have been conducted on how to reduce the number of stay cables which need to be adjusted. This study aims to propose an optimization calculation method including the optimization module with the sensitivity analysis and updating design variable module (UDVM), which are used for cable force adjustment in cable-stayed bridges. Based on the finite difference method, the sensitivity analysis is adopted in the optimization module, which can capture the response of structures as design variables vary; the particle swarm optimization method is adopted for structural optimization. The proposed method can dramatically reduce the number of stay cables which need to be adjusted and ensure the main girder stresses remain in a reasonable state during stay cable adjustment progress by UDVM. Moreover, the proposed method can continuously update the objective function,

constraint conditions, and design variables. Finally, this proposed optimization calculation method is applied to two different cable-stayed bridges to validate the reliability and feasibility of the method.

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第 341 篇

标　　题： Temperature Field Characteristics And Influencing Factors On Frost Depth Of A Highway Tunnel In A Cold Region

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期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY

摘　　要： Frost damage frequently occurs in cold-region tunnels due to temperature changes, posing risks to the structural stability and traffic safety. Therefore, temperature variations and its distribution in tunnels are crucial factors that have to be considered. Temperature measurements were conducted in the Xing'anling tunnel in northeast China from 2016 to 2019 to investigate the spatiotemporal characteristics of the temperature field. An equation to determine frost depth based on the Stephen's method was established to evaluate the influence of different factors on frost depth. The sensitivity of frost depth to different influencing factors was investigated using system stability analysis. The results showed that mean annual temperature inside the Xing'anling tunnel has gradually increased from 2016 to 2019 due to global warming. Freezing front was characterized by three stages based on the freezing rate, i.e., the fast freezing stage, transitional freezing stage, and stable freezing stages. The maximum frost depth ranged from 1.5 to 5.1 m without an insulating layer covering the lining, and a lag of about 2 months was observed with air temperature. Along the length of the entire tunnel, four stages of frost depth were observed, namely, fluctuations and a decrease, a steady decrease, fluctuations and an increase, and a steady increase. Frost depth exhibited an asymmetrical distribution to the length of the entire tunnel. Temperature parameters had the largest influence on frost depth, followed by water parameters and thermal parameter. Density parameters had relatively little influence on frost depth.

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第 342 篇

标　　题： An Alternative Aerodynamic Mitigation Measure For Improving Bridge Flutter And Vortex Induced Vibration (Viv) Stability: Sealed Traffic Barrier

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期　　刊： JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS

摘　　要： This study proposes an alternative aerodynamic mitigation measure, i.e., sealed traffic barrier, for bridges and verifies its efficacy in improving the flutter and vortex induced vibration (VIV) stability of bridges through wind tunnel tests for three distinctive real-world bridge projects. The results show that (1) The measure of the sealed traffic barrier with regular intervals along the bridge deck has a significant influence on the flutter and VIV performance of the bridge. Thus, a reasonable design of the traffic barrier can simultaneously improve the bridge's flutter and VIV stability; (2) The sealed traffic barrier with vertical intervals along the bridge can effectively suppress the vertical VIVs of the bridge, while the sealed traffic barrier without vertical intervals, i.e., configured continuously along the bridge, has a better vibration suppression effect on the torsional VIV than that on the vertical VIV; (3) This proposed measure installed on both sides of the bridge deck imposes favorable suppression effect for the flutter vibration, similar to the upward central stabilizer. In case with the sealing form fixed, but a reduced height, for the barrier, the flutter stability at different wind attack angles is slightly decreased; and (4) In certain scenarios, increasing the ventilation rate of the traffic barrier results in an increase for the flutter critical wind speed at positive wind attack angles, but a decrease for the flutter critical wind speed at negative wind attack angles. This aerodynamic mitigation measure has been successfully applied to more than ten other bridge projects based on the wind tunnel tests by the leading authors, offering a reliable approach in improving both flutter and VIV for bridges.

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第 343 篇

标　　题： Effect Of Key Aggregate Morphology And Mold Modulus On The Spatial Distribution Of Internal Air Voids In The Compacted Asphalt Mixture

作　　者： [Lei, Yong; Wang, Hainian; You, Zhanping; Ji, Chuanjun; Dong, Shi; Yang, Xu; Gao, Junfeng; Xiao, Jinkun] Changan Univ, Sch Highway, S Erhuan Rd Middle Sect, Xian 710064, Shaanxi, Peoples R China; [Lei, Yong] North Carolina A&T State Univ, Dept Civil & Environm Engn, 1601 E Market St, Greensboro, NC 27405 USA; [You, Zhanping; Gao, Junfeng] Michigan Technol Univ, Dept Civil & Environm Engn, 1400 Townsend Dr, Houghton, MI 49931 USA; [Yang, Xu] Monash Univ, Dept Civil Engn, Clayton, Vic 3800, Australia

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期　　刊： JOURNAL OF TESTING AND EVALUATION

摘　　要： Air voids in asphalt mixtures have a significant effect on the mechanical performance and functional characteristics of asphalt pavement. The reasonable spatial distribution of internal air voids is not only necessary to ensure the road performance of asphalt

pavement in the field but also helps to enhance the determination accuracy of a performance parameter of an asphalt mixture specimen in the laboratory. To improve the influence of uneven spatial distribution of internal air voids on the structure strength of asphalt mixture, especially the determination involved in the mechanical parameters of an asphalt mixture specimen in the laboratory, four different asphalt mixtures were fabricated by a Superpave Gyratory Compactor to research two influential factors: the morphological features of key 4.75-mm-diameter aggregates and the compaction mold modulus. The Aggregate Image Measurement System was employed to analyze the morphological features of the 4.75-mm-diameter aggregate, and 1 rubber gasket was pasted on the mold bottom plate and base plate to change the compaction mold modulus. The spatial distribution of internal air voids in the asphalt mixture specimen was captured through mathematical analysis on X-ray computed tomography scanning images. The results showed that 4.75- mm aggregates with higher sphericity can produce a more homogeneous spatial distribution of air voids in the compacted asphalt mixture specimen. Along the axial direction, the internal porosities of sublayers in the asphalt mixture specimen fluctuated from 4.5 to 15.6 %. The internal porosity in the asphalt mixture specimen increased with a decrease in the compaction mold modulus because part of compaction energy was absorbed by the rubber gasket, while the spatial distribution of internal air voids in the specimen compacted by low modulus mold was more homogeneous than that by a higher modulus mold. This research indicated that the spatial distribution of internal air voids in an asphalt mixture specimen can be optimized further with some appropriate controlling methods.

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WOS 号： 000580482000018

第 344 篇

标　　题： Novel Asphalt-Mix Design With High Thermal Diffusivity For Alleviating The Urban Heat Island

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： Excessive surface temperature of asphalt pavement in summer is one of the main causes of urban heat islands (UHIs), so reducing pavement temperature is a potential research perspective for alleviating the UHI effect. This paper proposes a new type of asphalt-mix design. The thermal diffusivity of asphalt pavement is effectively enhanced by replacing the limestone coarse aggregate (LCA) of traditional asphalt mixture with quartzite coarse aggregate (QCA) with high thermal conductivity, which accelerates the heat diffusion of pavements to reduce the pavement temperature and the air temperature near the ground. By designing the material composition of high thermal diffusivity asphalt concrete (HTD-AC) with different replacement ratios of QCA, the asphalt

concrete achieves a higher thermal diffusivity than traditional asphalt concrete. In addition, the mechanical properties of QCA and its adhesion to asphalt were tested. It was proved that the QCA meets road requirements, and QCA can be used in the preparation of HTD-AC. Moreover, asphalt pavement with high thermal diffusivity was verified to have good service performance, which effectively guarantees the quality and safety of urban traffic.

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WOS 号： 000587483800013

第 345 篇

标　　题： Fatigue Performance Of Cement-Stabilized Crushed Gravel Produced Using Vertical Vibration Compaction Method

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： In this study, the fatigue performance of cement-stabilized crushed gravel (CSCG) is examined. The mechanical strength of CSCG specimens formed using the vertical vibration compaction method (VVCM) or quasi-static compaction method (QSCM) is compared with that of field core samples (FCS). Cylindrical specimens formed using VVCM are used to study the splitting fatigue performance, and a fatigue equation is established using Weibull distribution. The factors that influence the fatigue performance, namely gradation and cement content, are also analyzed. The results show that the correlation of mechanical strength between FCS and CSCG formed using VVCM is as high as 90%, whereas that between FCS and CSCG formed using QSCM is 50%. The splitting fatigue life of CSCG obeys the two-parameter Weibull distribution. The results also show that gradation and cement content have significant effects on the fatigue performance of CSCG. For a stress level of 0.65 and reliability of 50%, compared with the fatigue life of CSCG with suspended dense gradation, those with skeleton dense gradation improved by 22.4% and 9%, and the fatigue life of CSCG significantly increased by 44.5% and 28.6% when the cement content was 3% and 5%, respectively. (c) 2020 American Society of Civil Engineers.

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第 346 篇

标　　题： Effect Of Different Fibers On Pavement Performance Of Asphalt Mixture Containing Steel Slag

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： The objective of this paper is to investigate the effect and mechanism of three types of fibers-basalt fiber (BF), polyester fiber (PF), and lignin fiber (LF)-on the pavement performances of asphalt mixtures containing basic oxygen steel making furnace slag (BOF). The dynamic modulus test, low-temperature bend test, and three-point fatigue bending test were conducted, and the antislide performance and attenuation law were analyzed. The reinforcement mechanisms of the three types of fiber in the steel slag asphalt mixture were studied. The results reveal that there are differences in pavement performance after the addition of fibers; fibers could result in increasing the dynamic modulus of steel slag mixtures, especially at lower frequency area; fiber can improve low-temperature crack resistance of steel slag asphalt mixtures; the antislide performance is enhanced after the addition of fibers; fibers can also improve the resistance to repeated bending tensile load to enhance the antifatigue performance of steel slag asphalt mixtures; moreover, BF offers the optimal pavement performance. This research can provide a useful reference for practical applications of BF, PF, and LF in road engineering.

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WOS 号： 000587483800011

第 347 篇

标　　题： Improving The Low-Temperature Performance Of Ret Modified Asphalt Mixture With Different Modifiers

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期　　刊： COATINGS

摘　　要： To improve the low-temperature performance of RET (Reactive Elastomeric Terpolymer) modified asphalt mixture (RETM), polyurethane prepolymer (PUP) was used by wet process, ground waste rubber (GWR) and fibers were used by dry process. Tests of force ductility, bending beam rheometer (BBR), differential scanning calorimeter (DSC), viscosity and multiple stress creep recovery (MSCR) were conducted to study the effects of PUP on the performance of RET modified asphalt (RETA), and beam bending test was conducted to study the effects of GWR and fibers on the performance of RETM. Then, tests of beam bending, wheel tracking, Marshall immersion, freeze-thaw splitting, and economic analysis were further conducted to compare the performance and economy of RETM modified with optimum modifiers suggested. All modifiers improve the low-temperature performance of RETM. PUP content, the content and size of GWR and the content and type of fibers significantly affect the performance of RETA or RETM respectively. After analysis, 10% PUP, 2.1% 80 mesh GWR and 0.2% polyester (PE) fiber are considered as the optimum modifiers,

respectively. Comparison results show that optimum modifiers variously improve the low-temperature performance, rutting resistance and moisture susceptibility of RETM, but they slightly reduced the economy of RETM. Comprehensive evaluation shows that 2.1% 80 mesh GWR and 10% PUP are better than 0.2% PE fiber.

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WOS 号： 000592728300001

第 348 篇

标　　题： Evaluation Of Anti-Aging Performance Of Biochar Modified Asphalt Binder

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期　　刊： COATINGS

摘　　要： As a renewable biomass resource, biochar is new to modify or replace asphalt binder in pavement engineering. This paper focuses on the effect of biochar on the anti-aging performance of asphalt binder. The short- and long-term aging properties of biochar modified asphalt binder were investigated using dynamic shear rheometer (DSR) and bending beam rheometer (BBR) tests. The modification mechanism was investigated through the Fourier-transform infrared spectroscopy (FTIR) test. The aging tests and viscosity analysis showed that the softening point of biochar modified asphalt binder was higher than base asphalt binder, while the aging index and aging viscosity ratio were lower than base asphalt binder. After aging, the temperature sensitivity of biochar modified asphalt binder decreased and the high-temperature stability, reflected by dynamic shear modulus and resistance to rutting, improved. The BBR test after long-term aging showed that the anti-aging performance of biochar modified asphalt binder decreased with the decrease in temperature, and control of the biochar content could ensure good low-temperature performance of the modified asphalt binder after aging. FTIR spectra analysis showed that biochar in modified asphalt binder is physically blended with asphalt binder.

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WOS 号： 000593646600001

第 349 篇

标　　题： Effects Of Ph And Fineness Of Phosphogypsum On Mechanical Performance Of Cement-Phosphogypsum-Stabilized Soil And Classification For Road-Used Phosphogypsum

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期　　刊： COATINGS

摘　　要： This article investigates the effects of phosphogypsum (PG) pH and particle fineness on the mechanical properties of cement-PG-stabilized soil. Using solutions of calcium hydroxide (Ca(OH)(2)) and sulfate (H2SO4) to adjust pH value of PG from 2 to 8. The key pore size used to characterize PG fineness was determined to be 200 mu m based on the Grey relational analysis (GRA), and the fineness of PG was controlled from 12.31% to 56.32% by grinding different time. Cement-PG cementitious materials (CPCM) and cement-PG-stabilized soil with different mixture ratios were formed at an optimum moisture content; following this, the unconfined compressive strength and California bearing ratio values of the samples were tested. Results show that the increased pH or the decreased fineness leads to continuous increases in the unconfined compressive strength of CPCM and cement-PG stabilized soil as well as the CBR value of cement-PG-stabilized soil. However, once PG pH value exceeded 5 or fineness was less than 20%, the mechanical properties of cement-PG-stabilized soil remained stable. A classification standard for road usage PG was established based on the analyses regarding cement-PG stabilized soil's mechanical properties, which has great significance of selecting or disposing road-used PG.

DOI： 10.3390/coatings10111021

WOS 号： 000593586700001

第 350 篇

标　　题： Influence Of Heat Reflective Coating On The Cooling And Pavement Performance Of Large Void Asphalt Pavement

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期　　刊： COATINGS

摘　　要： To reduce the temperature of asphalt pavement in summer, and alleviate the urban heat island effect, a comprehensive method of combining a heat reflective coating and large void asphalt pavement was proposed. Using the developed coating cooling test equipment, the cooling effect of the coating on a large void asphalt mixture was studied in six different proportions, four different colors, and four different dosages, and the durability of the coating was verified by abrasion tests. Finally, the best dosage of the coating was recommended through an adhesion test of the coating, and a water permeability and anti-skid performance test of the pavement. The results show that the reflectivity of the coating can be improved by adding functional fillers, of titanium dioxide and floating beads, into the coating. The order by reflectivity and cooling effect of the four color coatings was green > red > gray > blue, and the maximum cooling value of the green coating reached 9.7 celcius. The cooling performance of the coating decreased with the increase of wear time, and the rate of decrease was fast, then slow, and finally tended to be stable after 20,000 times wear. The coating reduced the

anti-skid performance and the water permeability coefficient of large void asphalt pavement, but still maintained a high level. The green coating with 15% titanium dioxide and 10% floating beads is recommended as the cooling coating for large void asphalt pavement, and its dosage should be controlled at about 0.4-0.8 kg/m(2).

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WOS 号： 000593505500001

第 351 篇

标　　题： Structure Simulation Optimization And Test Verification Of Piezoelectric Energy Harvester Device For Road

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通讯作者： Wang, CH (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： SENSORS AND ACTUATORS A-PHYSICAL

摘　　要： The structure of piezoelectric energy harvester device has a significant impact on electromechanical conversion performance, and appropriate structural parameters are the important premise to ensure electromechanical conversion efficiency. In order to design the detailed structures which are more con-ducive to the electromechanical conversion in the d(33) mode, and optimize or enhance the mechanical response of the piezoelectric energy harvesting unit, a finite element model was established to comprehensively analyze the influence of the detailed structures on the electromechanical response of the energy harvesting unit, based on the results, optimal detailed structural parameters are determined, and lateral mechanical environment of the energy harvesting unit is optimized. Finally, the stacked piezoelectric energy harvester device for road is made, and the rationality of optimization is verified by the MTS indoor comparative test. The results show that the protective pad with a fillet size of 3 mm, a thickness of 3 mm and an elastic modulus of 8000 similar to 15000 MPa can effectively avoid edge stress concentration and obtain maximum top compressive stress for the energy harvesting unit, and also ensure durability and electrical output. Compared with the baseplate, the influence of the upper cover plate on electrical output is more significant, and the elastic modulus of the upper cover plate should be less than 2000 MPa, the thickness should be controlled within 8 similar to 10 mm. The potential difference generated by the energy harvesting unit in lateral constraint environment is 40 % lower than that in no lateral constraint. Under load of 0.7 MPa-10 Hz, the terminal voltage of the optimization group is 2.2 times that of the control group, the average output power is 4.9 times, and the power density is 2.7 times, which shows the optimization rationality of detailed structures.

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第 352 篇

标　　题：Numerical Analysis Of A Long-Span Bridge Response To Tornado-Like Winds

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期　　刊：WIND AND STRUCTURES

摘　　要：This study focused on the non-synoptic, tornado-like wind-induced effects on flexible horizontal structures that are extremely sensitive to winds. More specifically, the nonuniform, intensive vertical wind-velocity and transient natures of tornado events and their effects on the global behavior of a long-span bridge were investigated. In addition to the static part in the modeling of tornado-like wind-induced loads, the motion-induced effects were modeled using the semi-empirical model with a two-dimensional (2-D) indicial response function. Both nonlinear wind-induced static analysis and linear aeroelastic analysis in the time domain were conducted based on a 3-D finite-element model to investigate the bridge performance under the most unfavorable tornado pattern considering wind-structure interactions. The results from the present study highlighted the important effects due to abovementioned tornado natures (i.e., nonuniform, intensive vertical wind-velocity and transient features) on the long-span bridge, and hence may facilitate more appropriate wind design of flexible horizontal structures in the tornado-prone areas.

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WOS 号：000595158100007

第 353 篇

标　　题：Numerical Simulation On Thermomechanical Coupling Behavior Of Early-Age Concrete In The Large-Scale Steel-Concrete Connecting Segment Of A Hybrid-Girder Cable-Stayed Bridge

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期　　刊：JOURNAL OF BRIDGE ENGINEERING

摘　　要：Large-scale connecting segments can provide reasonable load transition in hybrid girders, and have been broadly used in long-span cable-stayed bridges. However, the large volume of concrete in connecting segments bears a high cracking risk at an early age in the life of the concrete. In this study, field measurement and numerical simulation were performed on a large-scale connecting segment with early-age concrete to investigate its thermomechanical coupling behavior. Based on the thermal behavior modeling, mechanical behavior modeling was subsequently carried out by considering the comprehensive effects of temperature history and actual age on the development of the hardening concrete's mechanical properties. Both measurement and simulation show that the peak temperature can reach about 90 degrees C, which is far beyond

expectation, and high cracking risks exist in the external surfaces of concrete in the monitored connecting segment. To reduce the cracking risk, methods of multilayer pouring and cooling pipes were then adopted to quantitatively evaluate the anti-cracking effects. Results show that embedding cooling pipes in the thick concrete slabs can significantly lower the peak temperature, further reducing the cracking risk of the concrete. (C) 2020 American Society of Civil Engineers.

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WOS 号： 000602491900006

第 354 篇

标　　题： Theoretical Analyses Of The Stability Of Excavation Face Of Shield Tunnel In Lanzhou Metro Crossing Beneath The Yellow River

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期　　刊： INTERNATIONAL JOURNAL OF GEOMECHANICS

摘　　要： Based on an actual engineering case, this study focused on the limit support pressure, instability mechanism, and instability failure mode of the excavation face in the sand pebble stratum when crossing below the Yellow River. First, PFC3D was used to investigate the instability mechanism and failure mode of the excavation face in the sand pebble stratum. Then, the Terzaghi loose earth pressure formula was reasonably modified, and the limit support pressure was derived using this modified formula and the limit equilibrium mechanics model. Finally, the result was compared with those of an indoor test and a numerical simulation. The research showed that the calculation method proposed in this study was more suitable for underwater shield tunnels and formations where the soil arching effect is evident. The support pressure had a significant influence on the instability failure mode, whereas the influence of the buried depth was small. The limit support pressure decreased with an increase in the internal friction angle, a decrease in the water cover depth, or a decrease in the angle between the maximum principal stress direction and the horizontal direction. (C) 2020 American Society of Civil Engineers.

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第 355 篇

标　　题： Tunnelling-Induced Settlement And Treatment Techniques For A Loess Metro In Xi'An

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Techniques including pre-grouting, long pipe roof, and parameter optimization were employed to ensure the safety of loess metro tunnelling under an existing glass building. Their effects were proved through monitoring the settlement of building and surface during tunnelling. Besides, division of settlement monitoring according to processes, a new method, was conducted to control settlement in time. The highest surface settlement after construction was 16 mm only, meeting the requirement. The result indicates that it is practicable to control the tunnelling settlement strictly in extremely difficult geological areas. The settlement regularities were also studied through numerical simulation; their deformation is larger compared with in situ results while their change trends coincide during most processes. Soil excavations cause settlement primarily, accounting for more than 60%. It is suggested that dual slurry pre-grouting and process-based measurement should be employed before each excavation in water-rich loess areas.

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WOS 号：000594104400003

第 356 篇

标　　题：Stabilization Of Soft Soil Using Low-Carbon Alkali-Activated Binder

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期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：Soft soils pose significant challenges to the constructions on or within them, which are commonly stabilized with lime or ordinary Portland cement. However, these two binders are energy-intensive with high-carbon footprint. The current study presents an investigation of using an alkali-activated binder (AAB), a low-carbon cementitious material, for soft soil stabilization. Experiments including unconfined compressive strength test, compressibility test and hydraulic conductivity test were carried out to investigate the mechanical and hydraulic properties of soils stabilized with AAB of different concentrations. Microstructural characterizations of soil samples before and after AAB stabilization were performed using X-ray diffraction (XRD), scanning electron microscopy (SEM), and energy-dispersive X-ray spectroscopy (EDX). The experimental results show that the AAB can greatly improve the strength of the stabilized soil and meanwhile significantly reduce its compressibility and permeability. The strength of the stabilized soil increases with curing period and higher AAB concentration; the compressibility potential of original soil is noticeably reduced from medium to a low level after AAB stabilization; the hydraulic conductivity of soft soil stabilized with 20% AAB is more than 700 times smaller than that of the untreated. The microstructural characterizations using XRD, SEM and EDX confirm the formation of calcium aluminosiliate hydrate (CASH) gel in the stabilized soil matrix. This gel binds

the soil particles and fills the voids between them and, therefore, increases the strength and reduces the compressibility and permeability of stabilized soil.

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WOS 号： 000590097700001

第 357 篇

标　　题： Laboratory Investigation On The Properties Of Polyurethane/Unsaturated Polyester Resin Modified Bituminous Mixture

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： As a thermosetting material, unsaturated polyester resin (UPR) can effectively improve the high-temperature stability of bitumen. However, compared with epoxy modified bitumen, UPR modified bitumen has inferior low-temperature crack resistance. Therefore, this paper used polyurethane (PU) to modify UPR, and determined the best formulation of PU/UPR modified bitumen. The properties of PU/UPR modified bituminous binder were evaluated by viscosity, tensile, DSR and BBR tests. Besides, through a series of laboratory tests, the road performances of PU/UPR modified bituminous mixture were comprehensively studied. The results indicate that the PU/UPR modified bituminous binder has better tensile strength and low-temperature performance compared with the pure UPR modified bituminous binder, but the high-temperature stability was slightly worse. After PU addition, the flexural-tensile strength and fatigue resistance of the bituminous mixture were obviously improved, and the low-temperature performance improved slightly. The water stability and oil corrosion resistance almost remained unchanged, and the high-temperature performance was slightly decreased.

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WOS 号： 000573927000009

第 358 篇

标　　题： A Thermal-Hydromechanical Coupled Model For Poro-Viscoplastic Saturated Freezing Soil

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期　　刊： EUROPEAN JOURNAL OF ENVIRONMENTAL AND CIVIL ENGINEERING

摘　　要：Most existing thermal-hydromechanical (THM) models used to describe the process of frost heave assumed the freezing soil to be elastic. However, an inelastic constitutive model capable of reflecting the viscous constitutive behaviour of freezing soils should be considered. Based on the existing mathematical model, this study presented an improved mathematical model of coupled water, heat, and stress for saturated freezing soil, in which the soil was assumed to be elastic-viscoplastic and its viscoplasticity was modelled by means of a simple (linear) Norton-Hoff's law. In addition, solid-fluid interface energy was considered to formulate the effective water and ice pressures and liquid-crystal equilibrium condition which can be used to explain the micro-cryosuction mechanism was adopted to replace Clapyron equation which were used in most existing models. To solve the nonlinear governing equations, numerical simulations were performed using COMSOL software. Finally, the improved model was validated by comparing its simulation results with reference model and the distribution curves of frost heave, temperature, water content and flux rate were discussed.

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WOS 号：000589101200001

第 359 篇

标　　题：Electric Energy Output Model Of A Piezoelectric Transducer For Pavement Application Under Vehicle Load Excitation

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期　　刊：ENERGY

摘　　要：Piezoelectric transducers convert mechanical energy in the pavement into electrical energy, providing a new energy supply for road auxiliary facilities. To quantify the relationship between vehicle loads and the electrical energy output of a piezoelectric transducer, the rolling process of a vehicle on the piezo-electric transducer is analyzed. Two output models considering the moving load are established. New piezoelectric transducers are fabricated to verify the models, and differences between the models and the test values are compared in five areas. The loading process was affected by the shape of the piezoelectric transducer and the grounding area of the tire. Although the two models are similar in form, the results show that Model 2 can better represent the electrical energy output because the percentage differences from test results for Model 1 are unstable. Materials with a high strain constant and a low equivalent capacitance can help the transducer achieve higher output voltage and power. Heavy-duty high-speed traffic loads can increase the piezoelectric output of the transducer. The output voltage increases continuously with resistance, whereas the output power has a peak value at a matched resistance. This study can provide a reference for the design of piezoelectric transducers and piezoelectric pavements.

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第 360 篇
标　　题： Experimental Behavior Of The Curved Continuous Twin I-Girder Composite Bridge With A Precast Concrete Slab Subjected To Bending, Shear, And Torsion
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期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： In order to investigate the mechanical behavior, ultimate load carrying capacity, and failure mode of the intact curved continuous twin I-girder composite bridge (TGCB) with a precast concrete slab, one curved continuous composite bridge model with a scale ratio of 1 : 5 of a prototype bridge was designed and manufactured considering the influence of the construction sequence. Four symmetric point loads' test was carried out. In this paper, load-deflection relationship and strain development of steel girders, concrete slab, and reinforcement at key sections were tested and analyzed. Failure mode, crack development, and major crack width at the top surface of the concrete slab in the hogging moment region were also reported. The experimental results demonstrated that the load capacity under the initial cracking level, cracking level with the width of 0.2 mm, and steel girder yielding state is about 1.7, 5.0, and 6.3 times of the design load, respectively. Due to the influence of curvature, the stiffness of the external girder is less than that of the internal girder. However, the ultimate bearing capacity is basically the same, approximately 13.6 times of the design load. During the loading process, plastic hinge was first observed at the intermediate support section as a result of the hogging moment which should be emphasized in design. The local buckling took place after yielding, indicating a class 2 section according to Eurocode 4. In addition, the TGCB had good ductility since the displacement ductility coefficients of the external and internal girders were 4.40 and 4.06, respectively.
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WOS 号： 000595825900001

第 361 篇
标　　题： Effect Of Short-Term Aging On Interface-Cracking Behaviors Of Warm Mix Asphalt Under Dry And Wet Conditions
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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要：This study aims to evaluate the interface-cracking performances of asphalt-aggregate systems of warm mix asphalt (WMA) under different short-term aging levels. Contact angle tests were carried out, and then the thermodynamic indexes of adhesion energy and debonding energy were used to estimate the interface-cracking resistance of asphalt-aggregate systems under dry and wet conditions, respectively. The results show that the aging conditioning can lead to more severe interface-cracking of the asphalt-aggregate systems of WMA. Extension of the short-term aging time from 5 h to 7 h has less impact on the interface-cracking under wet condition than that under dry condition. In addition, when modifying the surface properties of granite with low-density polyethylene (LDPE) and high-density polyethylene (HDPE), the interfacial bond strength of the asphalt-aggregate systems is enhanced, regardless of the aging level of asphalt binder. Moreover, less Lewis acidic component in water will result in lower risk of interface-cracking of asphalt-aggregate system and higher resistance to aging. Based on regression analysis, it is found that the adhesion energy correlates well with the debonding energy, but the linear relationship between the two indexes becomes weak after short-term aging. Furthermore, the aging-induced degradation of interface-cracking resistance is believed to be related to the loss of asphalt polar components when subjected to the aging conditioning.

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第 362 篇

标　　题：High Temperature Property And Modification Mechanism Of Asphalt Containing Waste Engine Oil Bottom

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：This research explores the influence of waste engine oil bottom (WEOB) on the high temperature rheological property of two asphalt binders (i.e. base binder and SBS modified binder). For this study, these binders were first modified by WEOB with different contents (2, 4, and 6 wt%). The high temperature rheological properties were evaluated by viscosity, temperature sweep, and multiple stress creep and recovery (MSCR) tests. It is demonstrated that the incorporation of WEOB reduces the high temperature performance resistance and elastic property while enhances the viscous property of base binder, and the SBS modified binder exhibits an opposite tendency to

the base binder. This effect on these properties is more significant with the increase of WEOB content. Studies for the modification mechanism was conducted via gas chromatography-mass spectrometry (GC-MS), Fourier transform infrared spectroscopy (FTIR) and fluorescence microscopy. Results indicate that the WEOB and binder matrix are coexistence in physical sense. The WEOB provides light components for base binder that help to the dissolution of more asphaltenes, thereby softening the base binder. The light components in WEOB induce the swelling of SBS network structures and then strengthen the barrier of SBS to the thermal motion of asphalt molecules. (C) 2020 Elsevier Ltd. All rights reserved.

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第 363 篇

标　　题： Integrated Treatment Technology Of Storage-Mining Inclined Goaf Under Expressway

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： An inclined goaf caused by storage mining is a serious risk to subgrades and pavements. In this paper, effective investigation and detection methods of goafs were discussed considering the project of the Urumqi East Ring Expressway crossing the existing goaf of Zhongxing no. 2 mine. Moreover, by theoretical analysis and a series of field comparative tests, reasonable grouting parameters and the treatment plan were obtained. By comparing the test results of the field and laboratory, the influence of groundwater on the effect of grouting was revealed to reduce the compressive strength of the consolidating objects of the slurry. The high-density resistivity method presented strong anti-interference ability and high accuracy in a depth range of less than 150 m in the investigation of the goaf. The results of the treatment showed that it is necessary to conduct research and analysis from multiple aspects to obtain the best treatment plan of a goaf and ensure the safety of a project.

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第 364 篇

标　　题： Effects Of Surface Texture And Its Mineral Composition On Interfacial Behavior Between Asphalt Binder And Coarse Aggregate

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The interfacial behavior between asphalt binder and mineral aggregate could directly affect water infiltration and durability of asphalt mixtures. The properties of aggregate, especially the mineral composition and surface texture (ST) characteristics, have a significant impact on the interfacial performance between asphalt and aggregate. In this study, the texture characteristics of aggregates with different lithology (granite, limestone and tuff) were obtained by aggregate image measurement system (AIMS), and the mineral composition of aggregates was determined using X-ray diffraction (XRD). Based on the pull-off test combined with the water immersion method, the effects of aggregate mineral properties, water immersion and its interaction time on interfacial behavior between asphalt and aggregate, were quantitatively analyzed. Furthermore, molecular dynamics models with different mineral compositions and water film thickness were utilized to analyze interfacial behaviors. Results showed that the acidbase analysis method might not serve as an accurate assessment of the aggregate and asphalt interface properties. In addition, the sensitivity analysis of tensile strength (TS) and ST was an effective tool for the control test, and the range obtained was the variation of 0.1 MPa TS within the range of eight ST value with 95% confidence level, which can be adopted for the parallel test of real aggregates with large texture differences. Results also showed that the interface strength of granite was highly affected by the increase in immersion time. In addition, the molecular dynamics model calculation results showed that the electrostatic adsorption capacity of albite with {100} surface was much stronger than {001} section. The W-mwa (adhesion work considering water film) index can effectively characterize the attenuation of adhesion ability, and the electrostatic adsorption of albite model was greatly affected by water immersion.

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第 365 篇

标　　题： Investigation On Preparation And Rheological Properties Of Grafted Organic Long-Chain Carbonitride (Cndc) Modified Asphalt

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to improve the high temperature and low temperature properties of asphalt and its ultraviolet (UV) aging resistance, a type of modifier grafted organic long-chain carbonitride (CNDC) was prepared. The modifier was characterized using various methods, such as Fourier transform infrared spectroscopy, scanning electron microscope and thermogravimetric analysis. The performance of CNDC modified asphalt was analyzed through conventional item tests and dynamic shear rheological

tests. In addition, the dispersion characteristics of CNDC in asphalt was analyzed by optical microscope. The test results showed that the organic long-chain was grafted onto the carbonitride surface successfully and the thermal stability of CNDC was good. The dynamic shear rheological tests results demonstrated that the addition of CNDC could improve the high temperature performance of asphalt. The low temperature crack resistance of asphalt was best when the CNDC content is 3%. Furthermore, the fatigue resistance can be improved by 30% when the CNDC content was 1%. The UV aging resistance of asphalt could be improved when the content of CNDC was less than 3%. The optical microscopy test results showed that the CNDC particles did not agglomerate when the content was less than 3%. The results of the softening point difference indicated that the storage stability of the modified asphalt was good. In this study, CNDC modified asphalt had reached a balance between high and low temperature performance, which was to improve the rutting resistance of asphalt without reducing the low temperature performance. Moreover, the addition of CDNC could improve the UV aging resistance of asphalt. This study can give some help for the research of inorganic material asphalt modifiers. (C) 2020 Elsevier Ltd. All rights reserved.

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第 366 篇

标　　题： Effect Of Different Coarse Aggregate Surface Morphologies On Cement Emulsified Asphalt Adhesion

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Cement emulsified asphalt mixtures are a kind of potential pavement material, but the adhesion between coarse aggregate and asphalt still needs to be studied. In this paper, a qualitative analysis method of the surface morphology of coarse aggregate was proposed and used to evaluate the surface morphologies of four kinds of coarse aggregate, including diabase, basalt, steel slag and recycled aggregate. The interface observation method, surface energy method and shear strength method were used to study the cohesiveness of the coarse aggregate and cement emulsified asphalt. At the same time, the immersion stability test and indirect tensile strength (ITS) test were carried out, and the water stability of the cement emulsified asphalt mixture was explored. The results show that the qualitative analysis method of coarse aggregate surface morphology is a convenient and practical method, and its evaluation results have high reliability. In addition, the surface morphology of the coarse aggregate has a positive correlation with the adhesion of the cement emulsified asphalt mixture, and it also has an indirect impact on the water stability of the mixture. (C) 2020 Elsevier Ltd.

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第 367 篇

标　　题： Formulation Of A New Warm-Mix Recycling Agent And Its Rejuvenating Effect On Aged Asphalt

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Warm-mix recycling asphalt mixture has remarkable environmental and economic benefits. In this study, a new warm-mix recycling agent (WR) was developed by using base oil (80%), surfactant (9.5%), plasticizer (8.0%) and antiaging agent (2.5%) based on uniform design method. Experimental tests including penetration, softening point, ductility, elastic recovery, dynamic shear rheometer (DSR), multiple stress creep recovery (MSCR), bending beam rheometer (BBR), linear amplitude sweep (LAS), rotational viscosity as well as Fourier transform infrared spectroscopy (FTIR) test were conducted to evaluate the properties of aged binders incorporating the WR and other two commercial rejuvenators, i.e. an emulsified rejuvenator (ER) and a resinous rejuvenator (RR). Additionally, the workability and cost of reclaimed asphalt binders were analyzed. Results indicate that the WR is able to rejuvenate conventional physical properties of aged asphalt. Reclaimed asphalt containing WR shows the best low-temperature performance and longest fatigue life than that containing other two commercial rejuvenators. With regard to high-temperature performance, reclaimed asphalt incorporating WR compares favorably with that incorporating ER. The results from FTIR test demonstrated that physical interaction dominated the rejuvenation of aged asphalt after adding the WR. WR can significantly replenish the volatiles in aged asphalt, and restore its components' proportion that resembles the virgin asphalt. In comparison with ER and RR, WR exhibits a lower increased cost and the excellent capability of reducing mixing and compaction temperature. (C) 2020 Elsevier Ltd. All rights reserved.

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第 368 篇

标　　题： Effect Of Different Fibers On The Properties Of Asphalt Mastics

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Asphalt mastic is a key component affecting the performance of asphalt mixtures. Fibers can efficiently improve the performance of asphalt mastic. Four types of fibers, including two types of flocculent fibers (lignin fibers and sepiolite fibers) and two types of bundle fibers (basalt fibers and aramid fibers), were selected to study the effect of fiber morphology on the performance of asphalt mastic in this study. Firstly, the thermal stability, the asphalt absorption, and the microscopic morphology of various fibers were tested. Secondly, relevant performance tests, including penetration, softening point, bending beam rheometer test (BBR), and dynamic shear rheology test (DSR) test, were conducted on asphalt mastic samples prepared with various fibers. The results show that the flocculent and the bundle fibers played different roles in asphalt mastic. The flocculent fibers could stabilize asphalt, while the bundle fibers could enhance the toughness. The addition of fibers into asphalt mastic improved rutting resistance. (C) 2020 Elsevier Ltd. All rights reserved.

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第 369 篇

标　　题：State-Of-The-Art Of Porous Asphalt Pavement: Experience And Considerations Of Mixture Design

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Porous asphalt (PA) is a distinct mixture type that deliberately designed with stone-on-stone contact of the coarse aggregate fraction and high percentage of interconnected air voids to provide water drainage and adequate resistance to both raveling and permanent deformation. During the past decades, PA has attracted much attention in the worldwide. Many studies have been conducted to confirm numerous benefits in terms of safety, comfort and environment. However, the acceptance of PA appears to have some sort of diminished when defects with durability and winter maintenance became a serious practical issue and overtaken by environmental concerns in recent years. Now this dilemma seems to be partially improved, several limitations have gradually ameliorated due to the progress of materials and test methods. While some additional problems are also exposed in the meantime. Therefore, it is necessary to present a comprehensive review of existing research to clarify the challenges that currently being encountered. The content of this article mainly includes international experience and four important aspects of PA mixture design, as well as the favorable contributing factors affecting each design process. In different sections, achievements including the advantages and shortcomings in each branch have been discussed and

suggestions also have been put forward expecting to identify corresponding areas of study for future improvement, thus provide references for the next phase of field application of PA pavement. (C) 2020 Elsevier Ltd. All rights reserved.

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第 370 篇

标　　题： Interface Transformation Behavior Of Bonding/Lubrication Of Aggregate-Asphalt System

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： Asphalt binder is very sensitive to temperature and exhibits bonding or lubrication effects at different temperatures. The bonding/lubrication properties of asphalt affect the mixing, compaction, and service performance of asphalt mixture. To analyze the interface bonding/lubrication transformation behavior of aggregate-asphalt systems, the contact-slip test was conducted at different temperatures using a self-developed tester. The maximum slip force was used to evaluate the contact properties of aggregate-asphalt systems. A relational model between the maximum slip force and the temperature was established, and the asphalt content for maximum bonding was proposed. The temperature transition behavior from bonding to lubrication of asphalt was analyzed and delimited, and the critical transition temperature was determined. Test results show that the temperature intervals of lower than 90 degrees C, from 90 degrees C to 150 degrees C, and above 150 degrees C represent the bonding zone, bonding-lubrication zone and lubrication zone, respectively, for the AC-13 aggregate-asphalt system. The critical transition temperature of bonding-lubrication is 120 degrees C. Coarse aggregates are more sensitive to the lubrication effect of asphalt; however, the bonding effect affects the particle system more significantly with an increased content of fine aggregates. The structural stability of an aggregate-asphalt system is more sensitive to the bonding part, so the interface strength formed by the coupling of the contact friction effect of the particle system and the bonding and lubrication effect of asphalt increases first and then decreases with increased asphalt content.

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第 371 篇

标　　题： Evaluation On Contact Characteristics Of Particle System Based On Mesostructure

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： To effectively evaluate the contact characteristics of a particle system, an aggregate contact-slip tester was developed in this investigation on the microscopic level. Contact indexes, including the maximum slip force, number of macropeaks, and number of micropeaks, were proposed to quantitatively evaluate the contact characteristics of the particle system. The contact tests were conducted on single-file-size particle systems and three graded particle systems of aggregate. By comparing and analyzing the variation coefficient of parallel tests for different speeds and particle sizes, the key test conditions were determined such as loading rate, sampling interval, and test distance. The validity of proposed indexes was verified adopting the ANOVA method by selecting the six-file-size aggregates and three typical graded mixtures. The results show that the appropriate test conditions of this method are loading rate of 10 mm/min, test distance of 80 mm, and sampling interval of 1/45. Each index has little discreteness and shows a good discrimination to the contact characteristics for the materials with different gradations. The maximum slip force reflects the structure stability of the particle system, and the contact effect of the single-file-size particle system enhances with the increase of the aggregate size. The contact among particles of a graded particle system is more frequent, and the system is in an unstable dynamic microadjustment state under the action of external force. The structure stability of the particle system improves with the increase in the number of coarse aggregates, especially particles with a size of 9.5 mm, which is affected by the interference of fine aggregates adversely. The macropeak number and micropeak number, respectively, reflect the particles' contact characteristics when the particle system is in a stable state and a metastable state. The more frequent contact does not mean that the structure of the particle system is more stable. According to the ability to form and maintain the stable structure of asphalt mixture, the order of three gradations is open-graded friction courses (OGFC)-13 stone matrix asphalt (SMA)-13 asphalt concrete (AC)-13. (C) 2020 American Society of Civil Engineers.

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第 372 篇

标　　题： Developing Rules Of Adhesive Properties And Mechanism Of Ballastless-Track Sealants In Shear-Fatigue Loading

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期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要： There is no method for evaluating the shear-fatigue resistance of sealants installed in the supporting layer of ballastless track, and the degradation mechanism of sealants

under shear-fatigue loading has not been studied systemically. This study develops a shear-fatigue loading test method, and the adhesive properties of sealants are researched during shear-fatigue loading. The functional-group character at the failure interface is analyzed using infrared spectroscopy, and then the correlation between macromechanical behavior and the micromechanism is discussed. Results show that both maximum loads and failure displacements have a downward fluctuating trend during shear-fatigue loading, and sealants with lower hard-phase content present better shear-fatigue resistance. No new chemical bond forms in sealants, but more soft phases fuse into hard phases, which decreases the microphase separation degree of sealants. The developing rules for the hydrogen bonding index identify a trend similar to that of the mechanical behavior of sealants caused by the orientation of amorphous phases. The hydrogen bonding index degradation of higher R value sealants is deemed more significant, which agrees well with the results of the direct tension test. (c) 2020 American Society of Civil Engineers.

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第 373 篇

标　　题： Pollutant Concentration Measurement And Emission Factor Analysis Of Highway Tunnel With Mainly Hgvs In Mountainous Area

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期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY

摘　　要： In recent years, with the rapid growth of traffic flow in highway tunnels, the in-tunnel environmental pollution problem has aroused widespread concern in China. Previous studies mainly focused on the emission factors in tunnels dominated by passenger cars (PCs) and light commercial vehicles (LCVs). However, this study concentrated on the characteristics of traffic flow dominated by heavy-goods vehicles (HGVs), environmental monitoring and assessment in highway tunnels in mountainous areas. To explore the emission characteristics of vehicle pollutants in highway tunnels in such regions, a field measurement was conducted in Qinling No. 3 Tunnel in China, focusing on the traffic volume, air velocity, and pollutant concentration. Measurement results show that the average daily traffic volume in Qinling No. 3 Tunnel is 22,218 pcu/d, with the HGVs comprising more than 65%. The average air velocity in case tunnel reaches 5.09 m/s. The average concentrations of NH3, SO2, CO, and NOx in the tunnel are 4.54 ppm, 0.06 ppm, 6.22 ppm, and 4.39 ppm, respectively. The single vehicle emission rates of measured pollutants are calculated based on collected data, among which, the emission factor of NOx is the largest (average: 9.37 g/(km.veh)), while that of SO2 is the lowest (0.09 g/(km.results show that the dilution of NO2 in the tunnel should be considered in the ventilation design of highway tunnels.

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第 374 篇
标　　题： Analyzing The Deformation And Failure Of Geosynthetic-Encased Granular Soil In The Triaxial Stress Condition
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期　　刊： GEOTEXTILES AND GEOMEMBRANES
摘　　要： The equivalent strength and stiffness of geosynthetic-encased soil are two important parameters for analysis of cellular geosynthetic-reinforced foundations and earth structures. However, limited analytical approaches exist for the estimation of these parameters, and this limitation hinders their applications in geotechnical engineering practice. In this study, an analytical method is proposed for the prediction of the stress-strain response of geosynthetic-encased soil by employing the soil response in the triaxial stress condition and the theory of thin cylinders. This method has the advantages of theoretical rigorousness and convenience for use and can consider soil nonlinearity, soil dilatancy, soil plasticity and soil-geosynthetic interaction. Different types of yield criteria for soils can be readily incorporated into the proposed method. The proposed method is validated against the results of triaxial compression tests on geosynthetic-encapsulated sand. The good agreement between the predicted stress-strain curves and the measured curves demonstrates the effectiveness of the method. In addition, design tables and parametric studies are provided by employing the formulated analytical method for application purposes.
DOI： 10.1016/j.geotexmem.2020.06.007
WOS 号： 000593750100002

第 375 篇
标　　题： Collapse Test Studies On Coarse Grain Sulfite Saline Soil As An Embankment Fill Material
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通讯作者： Zhang, SS (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.
期　　刊： ARABIAN JOURNAL OF GEOSCIENCES

摘　　要：For the construction of roads in coarse-grained saline soil areas, coarse-grained sulfite saline soil is often used as an embankment fill material because of the limited choice of local embankment fillers. Because the NaCl in coarse-grained sulfite saline soil dissolves easily in water, when coarse-grained sulfite saline soils are used as embankment fillers, it can easily cause embankment collapse deformation when it meets water. The main objective of this study was to clarify the collapsibility properties of coarse-grained sulfite soils as embankment fillers; the relevant parameters concerning coarse-grained sulfite soils as embankment fillers were provided for embankment engineering. First, through the artificial preparation of typical coarse-grained sulfite saline soils, collapse tests under different salt contents, different initial moisture contents, different initial compaction degrees, and different particle gradations were carried out. Second, natural coarse-grained sulfite saline soils were selected to carry out the collapse tests, and the results were compared with the results of the above-mentioned collapse tests. The results showed that the higher the sulfite content in coarse-grained soil was, the greater the amount of collapse was. A larger embankment compaction degree had a good inhibitory effect on the collapse deformation. The collapsibility of coarse sulfite soils was less relatively when the soil water content was between 100% and 133% of the optimum water content, the compaction degree was 93%, and the soluble salt content was less than 2%. For coarse-grained sulfite saline soil, the larger the proportion of coarse particle was, the smaller the collapsibility ratio was.

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WOS 号：000595735500002

第 376 篇

标　　题：Non-Linear Distributions Of Bond-Slip Behavior In Concrete-Filled Steel Tubes By The Acoustic Emission Technique

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期　　刊：STRUCTURES

摘　　要：This study aims to investigate the non-linear distribution of bond-slip behavior in steel-concrete interface of concrete-filled steel tubes (CFST). An analytical model was proposed to account for the attenuation effect in boundaries of load transfer. In this analysis, a modified governing equation with the second-order ordinary differential form was deduced on the basis of elastic theory. Solutions of slippage, bond stress and potential energy in the steel-concrete interface were then obtained. For the model validation, measurements of acoustic emission (AE), as well as strain gauge, were performed in a push-out test of CFST. Test results agree well with the solutions of the analytical model proposed. The interfacial bond stress exhibits a highly non-linear

distribution along the direction of load transfer. The maximum stress appears nearby the position of 0.2L away from the specimen end, and is about 1.2 times of the average shear strength in steel-concrete interface. In addition, the AE peak frequencies of bond failure have two main bands, including 75-125 kHz and 290-340 kHz. It indicates that there are mainly two failure modes during the debonding of steel-concrete interface in CFST.

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WOS 号： 000595298600004

第 377 篇

标　　题： An Enhanced Motorway Control System For Mixed Manual/Automated Traffic Flow

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期　　刊： IEEE SYSTEMS JOURNAL

摘　　要： Recent advances in vehicle automation technologies have opened up new perspectives for motorway traffic condition monitoring and macroscopic controls. When sufficient automated vehicles (AVs) are present, they can provide wide-ranging and spatiotemporally detailed traffic information. Furthermore, AVs can be programmed to comply with traffic laws and optimized to smooth traffic flows. Thus, deploying AVs are expected to address the issues encountered by the existing variable speed limit (VSL) systems. However, the appealing scenario that 90% or more AVs are on motorways is seen as a long-term goal. Therefore, this article explores the utilization of AV technologies in VSL systems under mixed traffic conditions where AVs coexist with manually driven vehicles. In this article, a VSL system using AVs as a source of data is presented. More specifically, an extended Kalman filter-based data assimilation method is proposed to estimate system variables (i.e., density, speed, critical density, and compliance rate) from the collected AV data. Following this, a model predictive control scheme is adopted to solve the optimal AV-data-based VSL control problem on the basis of estimated system variables. Finally, the efficiency of the proposed system is verified against a real motorway section in New Zealand.

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第 378 篇

标　　题： Full-Scale Bending Test Study For Pc Hollow Slab Girder Using Uhpfrc And Composite Reinforcement Techniques

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期　　刊：JOURNAL OF BRIDGE ENGINEERING

摘　　要：Ultra-high performance fiber reinforced cementitious (UHPFRC) and composite reinforcement techniques have great potential in achieving efficient structural resistance recovery and overall performance enhancement. The goal of this study is to confirm the reinforcement effectiveness by conducting test and analytical studies for three full-scale prestressed concrete hollow slab girders with insufficient bending capacity and stiffness. In this full-scale test study, four-point loading was adopted for one of the test girders before reinforcement to acquire the residual bending performance. Reinforcement measures were then carried out for all three test girders, including a composite concrete (or UHPFRC) layer for the top flange and a steel plate-concrete (or UHPFRC) composite reinforcement for the bottom flange, and bending tests were conducted after reinforcement. Based on the test results, simplified analytical models were developed and empirical equations were proposed for test girders after reinforcement. The present study has proved the effectiveness of UHPFRC and composited reinforcement measures in improving capacity, stiffness, and guarantee of durability comprehensively. (C) 2020 American Society of Civil Engineers.

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第 379 篇

标　　题：Corner And Partition Wall Effects On The Settlement Of A Historical Building Near A Supported Subway Excavation In Soft Soil

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期　　刊：COMPUTERS AND GEOTECHNICS

摘　　要：This paper discusses the settlement characteristics of a historical building near the corner of a supported excavation made in soft soil during the construction of a subway. Measurements from the study site at Daliang Station, Foshan, China are analysed, and the effects of partition walls are explored. The complexity of the corner effects of braced excavations is considered, and deformation forms and damage to buildings near the corners are analysed. Depression, arching, deflection, torsion, differential settlement, and inclination are studied. Finally, partition walls are proposed to reduce the impact of the corner effect on the buildings. We found that the corner effect limits the deflection and deformation of a corner building and has little effect on torsional deformation. Partition walls can significantly reduce the horizontal deformation of underground diaphragm walls and the settlement of corner buildings. The results help to understand the stress behaviour and deformation mechanism of buildings near the corners of braced excavations and on ways to control such deformation.

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第 380 篇

标　　题： Consideration Of The Allowable Groundwater Discharge In A Tunnel Project

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期　　刊： JOURNAL OF COASTAL RESEARCH

摘　　要： Alteration to the groundwater flow system during tunneling may be irrecoverable, such as due to excessive discharge-induced groundwater table drawdown and impact to the regional ecological environment. It is therefore necessary and beneficial to specify allowable groundwater discharge during the planning and design of a tunnel project. A case history for a project during which the groundwater was mismanaged in the tunnel design and construction shows the difficulty of coping with the situation in an environmentally and operationally favorable way, especially for sections with a high-permeability belt or layer in the surrounding rocks. To drain groundwater in a controlled mode in a tunnel project, it is vital to specify the allowable discharge in the tunnel design and to control the groundwater drainage magnitude during construction and operation.

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WOS 号： 000604796700023

第 381 篇

标　　题： Prediction Of Low-Temperature Rheological Properties Of Sbs Modified Asphalt

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The extreme learning machine (ELM) algorithm optimized by genetic algorithm (GA) was used to quickly predict the low-temperature rheological properties of styrenic block copolymer (SBS) modified asphalt through the properties of the raw materials. In this work, one hundred groups of survey data and test data were collected and analyzed. Fourteen vital raw material parameters, such as chemical composition indexes of matrix asphalt and technical indexes of SBS modifier, were selected as the input parameter. The stiffness modulus and m-value of SBS modified asphalt were taken as the output parameter. Then, the GA-ELM prediction model of low-temperature rheological properties was established. According to comparison and analysis with other prediction models, the accuracy and output stability of the GA-ELM prediction model were verified. The results show that the GA-ELM model had obvious accuracy and efficiency. It can be used to predict the low-temperature rheological properties of SBS modified asphalt. Compared with the traditional prediction models, the error of the

GA-ELM model was reduced by 68.97-81.48%.

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第 382 篇

标　　题： The Concrete Performance With Iron Tailings Sand Modified By Polypropylene Fibers Under Aggressive Environment

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： This paper aimed to explore the performance of concrete with iron tailings sand modified by polypropylene fibers under aggressive environment. Three kinds of concrete (ordinary concrete, concrete with iron tailings sand (ITS), and concrete with ITS modified by polypropylene fibers) were exposed to drying-wetting cycles in 5% Na2SO4 solution for 28, 56, 84, 112, and 140 days. The performance, such as pores distribution, crack width, corrosion products, mass variation, expansion variation, compressive strength, flexural strength, and the diffusion of sulfate ion were measured at regular time intervals during the whole exposure period to describe the associated evolution laws. The results show that, in the process of the corrosion of sodium sulfate solution, the formation of gypsum and ettringite (AFT) has an important impact on the harmful pores (>0.1 mu m), cracks, mass variation, expansion variation, compressive strength, and flexural strength of the three concrete. Polypropylene fibers can refine the pores development and inhabit the crack development of the concrete with ITS, further alleviating the rate of sulfate ion attack on concrete and the rate of increase of corrosion products, so that the mass variation, the expansion variation, and the reduction of compressive strength and flexural strength can be limited effectively. Furthermore, in the concrete with ITS modified by 0.1% polypropylene fibers, the content of sulfate ions diffused is always the lowest.

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第 383 篇

标　　题： Preparation And Characterization Of Self-Healing Microcapsules Of Asphalt

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Cracking is one of the main forms of damage to asphalt pavement. The self-healing process of asphalt pavement is the inverse process of crack formation and development. Strengthening the self-healing ability of asphalt materials could restrain cracking and prolong the service life of asphalt pavement. Microcapsule self-healing technology has achieved good results in the field of microcrack repair and has promising research prospects. In this study, two kinds of microcapsules, CA-mic and E-mic, were prepared by in situ polymerization with a self-developed rejuvenator CA and modified epoxy resin as core materials. The micromorphology, thermal stability and chemical structure of the microcapsules were characterized by fluorescence microscopy (FM), scanning electron microscopy (SEM), laser particle size analyzer (LPSA), thermogravimetric analysis (TGA) and Fourier transform infrared spectroscopy (FTIR). The freeze-heating cycle test was adopted to evaluate the durability of the microcapsules. The results showed that the two prepared microcapsules were spherical in shape and uniform in particle size distribution, with compact encapsulation and good durability. Additionally, they could survive under high temperature during asphalt construction. The rheological test of bending beams showed that the low temperature crack resistance of asphalt was improved after adding two kinds of microcapsules. The Fracture - Healing- Fracture tests showed that the two microcapsules could enhance the self-healing ability of the asphalt, and the maximum self-healing rate of the CA-mic could reach 52% and that of the E-mic could reach 47%. (C) 2020 Elsevier Ltd. All rights reserved.

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第 384 篇

标　　题： Combination Design And Performance Evaluation Of Conductive Bonding Layer For Asphalt Pavement Active Deicing

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The purpose is to realize the environmental friendliness and sustainability of pavement active deicing and snow melting. Different types of SBS modified asphalt conductive bonding materials for pavement interlayer bonding and melting ice and snow were prepared. The effects of conductive phase materials, electrodes and spacing on the conductivity and heat generation of conductive bonding layer were studied. The heating effect of SBS modified asphalt conductive bonding layer in pavement structure was analyzed. The feasibility of converting electric energy into heat energy by conductive bonding layer to realize melting ice and snow on pavement was verified. It provides a

new direction for the research and application of green active deicing and snow melting. The results show that the carbon fiber conductive bonding layer had the best conductivity. At the constant temperature of -5 degrees C, the surface temperature of the pavement structure could reach above 0 degrees C after the conductive bonding layer was electrified for 100 min under 36 V voltage, which can realize the deicing and snow melting of the pavement. The distribution of carbon fiber has a certain adverse effect on the bonding performance of conductive bonding layers, but it still shows good bonding performance, water resistance and temperature change resistance. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000582567100157

第 385 篇

标　　题： An Improved Predictive Model For Determining The Permeability Coefficient Of Artificial Clayey Soil Based On Double T-2 Cut-Offs

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Permeability is one of the most important engineering properties of clayey soil. However, the traditional method for determining the permeability coefficient is time-consuming. To establish a simple and accurate predictive method to obtain the permeability coefficient of artificial clayey soil based on the double cut-off transverse relaxation times (T-2 cut-offs) using low-field nuclear magnetic resonance (NMR) technology, eight kinds of artificial clayey soil with different mineralogical compositions were prepared in the laboratory. Evaporation tests at 40 degrees C were carried out on the saturated artificial clayey soil samples in an oven. During the evaporation process, NMR tests were also performed on the artificial clayey soil every hour. The results showed that the evaporation process could be divided into three stages according to different evaporation rates: the constant rate stage (CRS), the falling rate stage (FRS), and the residual stage (RS). The water evaporated in the CRS and FRS was defined as the absolute movable water and the partially movable water, respectively. The water that could not evaporate in the RS was defined as the immovable water. Based on the cumulative signal amplitudes in the T-2 spectrum corresponding to different kinds of water, the double T-2 cut-offs were defined. On the basis of the double T-2 cut-offs and T-2 spectrum of the saturated sample, an improved Timur-Coates (TC) model was established. The prediction capability of the improved model was evaluated by finding the determination coefficient (R-2), mean absolute error (MAE), and root-mean-square error (RMSE). Compared with the typical TC model, the prediction accuracy of the improved model was much higher. In addition,

the relationships between the double T-2 cut-offs and fractal dimension (D) of the T-2 spectrum of saturated artificial clayey soil were also identified.

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第 386 篇

标　　题： Effect Of Raw Material Composition On The Working Performance Of Waterborne Epoxy Resin For Road

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： The purpose of the study is to clarify the curing effect of raw material composition on waterborne epoxy resin, thereby further improving working performance of waterborne epoxy resin. Based on the preferred variety of epoxy resins and curing agents, different types of waterborne epoxy resins were prepared. The effects of different raw material compositions on the physical properties of waterborne epoxy resin were studied systematically. The reasonable material composition and proportion were determined. The influence of physical properties of waterborne epoxy resin on its adhesion properties was evaluated. The results show that raw material composition has a large impact on the working performance of waterborne epoxy resin. The combination of E-44 waterborne epoxy resin and alicyclic amine has the best comprehensive property. And it is 3.65-36.22% higher than other combinations. The adhesive property index of waterborne epoxy resin has a high correlation with the mechanical property index, and they are in direct proportion.

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第 387 篇

标　　题： Research On The Schemes Formulation And Optimization Method Of Sponge Reconstruction In A Highway Service Area

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期　　刊： WATER SCIENCE AND TECHNOLOGY

摘　　要： This study proposed a method for constructing a low impact development (LID) plan to improve the utilization rate of rainwater in a highway service area and solve the problem of waterlogging. Firstly, based on the theory of LID, taking the total runoff as the control goal, and combining it with the functional zoning of the highway service area and the characteristics of LID facilities, several LID schemes were proposed. Then, the evaluation system of the LID scheme in service area was established by the analytic

hierarchy process (AHP). These preliminary construction schemes were compared from three aspects (runoff control efficiency, economic efficiency and social efficiency) to determine the best LID plan. Finally, taking the Pu'er tunnel service area as an example, the construction scheme of the sponge city service area was optimized.

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WOS 号： 000601168700022

第 388 篇

标　　题： Physiological Indices And Driving Performance Of Drivers At Tunnel Entrances And Exits: A Simulated Driving Study

作　　者： [Xu, Jinliang; Zhang, Xiaodong; Liu, Huan; Yang, Kaige; Ma, Fangchen; Li, Haoru; Sun, Yufei] Changan Univ, Sch Highway, Xian, Shaanxi, Peoples R China; [Yang, Kaige] China Railway First Survey & Design Inst Grp Co L, Xian, Shaanxi, Peoples R China

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期　　刊： PLOS ONE

摘　　要： The entrance and exit sections of a tunnel are the accident black-spots in an expressway. For a safe operation of road tunnels, it is necessary to understand a driver's physiological indices and driving performance when driving through tunnels. In this study, the UC-Win/Road simulation software was used to build 12 tunnel models of different lengths. A simulated driving experiment was carried out in a 6-DoF motion platform. The lateral position of vehicles characterizing the driving performance was measured using the motion platform. Electrocardiogram and eye movement data of 25 recruited drivers were collected simultaneously through the experiment. The spatial changes in a driver's heart rate (HR) growth rate, RMSSD, pupil diameter growth rate and vehicle lateral deviation within 300 m before and after the tunnel entrance and exit were analyzed to determine the variation rules in the different tunnels. The study identified the length range in the tunnel entrance and exit sections that influences the drivers. A quantitative analysis was further carried out to analyze the relationship between the physiological indices and the driving performance indicator. The results showed that a driver's heart rate fluctuates significantly 250 m before the tunnel entrance and 50 m before the exit. In this region, the pupil diameter increases gradually, and drivers tend to shift the vehicle to the left. At the tunnel exit, the HR and RMSSD are affected significantly by the tunnel length, and the variation is higher in longer tunnels. In comparison, the tunnel length has no significant effect on the physiological indicators and driving performance of the drivers at the entrance and exit.

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第 389 篇

标　　题： Construction Quality Control Study Of Double-Layer Continuous Paving For Large-Thickness Cement-Stabilized Base

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： In order to verify the interlayer bonding effect of double-layer continuous paving technology of the thick cement-stabilized base and solve the construction quality control problem of the double-layer continuous paving, based on the interlayer bonding mechanism and the evenness passing mechanism, the laboratory interlayer adhesion test, field test of evenness disturbance, and compaction test were conducted to verify the continuous paving interlayer bonding state. The effect of interval time on interlayer bonding state, evenness, and compactness was analyzed, and construction quality control measures were proposed. The test results show that the double-layer continuous paving process could significantly improve the interlayer bonding state, but there is still a gap from the ideal state (completely continuous). The pull-off strength of continuous paving specimens was 2.1 times that of the discontinuous paving specimens; the shear strength was 2.4 times that of discontinuous paving specimens. At different paving intervals, the longitudinal evenness of the upper and lower layers has little difference. The 140 kN axle load controls the transverse evenness disturbance within 3 mm, which met the requirements of the specification. Based on the evenness passing mechanism, the evenness control standard of double-layer continuous paving base was proposed. The compaction process of double-layer continuous paving base was proposed, and the feasibility was verified through the field test of compaction. The best interval time for double-layer continuous paving was also proposed; it is recommended that the best time for paving the upper layer is after the lower layer is laid for 6 hours (the final setting time of the cement). The construction quality control measures proposed in this study provide a theoretical basis for the construction of double-layer continuous paving technology with thick cement-stabilized base.

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WOS 号： 000603612700009

第 390 篇

标　　题： Correlation Analysis Between Aging Behavior And Rheological Indices Of Asphalt Binder

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The aging of the asphalt binder seriously affects the performance of the asphalt pavement, so it is expected to obtain indices that can not only evaluate the aging resistance of the asphalt binder but also indicate the performance of the asphalt mixture. In this study, the changing of the rheological indices before and after asphalt aging were observed. The sensitivities to aging characterized by different rheological indices were also compared with each other. Moreover, the relationships among rheological indices

were discussed. The results show that the aging has a significant impact on the rheological properties of asphalt. The addition of modifier obviously reduced the low-temperature relaxation modulus of asphalt and increased the absolute value of relaxation rate, thereby improving the low-temperature performance of asphalt road. The sensitivity analysis results of rheological indices to aging behavior show that rheological indice [R-3.2kPa] obtained by multiple stress creep recovery test was most sensitive to short-term aging, while rheological indice [R](3.2kPa) obtained by repeated creep recovery test was most sensitive to long-term aging, which helps to provide technical support for the quantitative characterization of the aging behavior of asphalt binder. Correlation analysis of rheological indices show that the indice mr(60 s) in frequency sweep test at low temperatures show a linear correlation with the indices Jnr(3.2kPa) in MSCR test and N-f in linear amplitude sweep test, indicating that the low-temperature relaxation rate of asphalt is closely related to its high temperature performance and fatigue performance. (C) 2020 Elsevier Ltd. All rights reserved.

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第 391 篇

标　　题： Influence Of Water On Warm-Modified Asphalt: Views From Adhesion, Morphology And Chemical Characteristics

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： It has been proven that warm mix asphalt (WMA) has great potential for reducing the fuel consumption and polluting emissions during the construction of asphalt pavement. However, the moisture susceptibility of WMA is one of the main concerns associated with this material, and it limits the wide application of this technology. In this study, a styrene-butadienestyrene (SBS) modified asphalt was selected as a control binder, and two types of WMA additives with different dosages were used to prepare warm modified asphalt binders. Atomic force microscopy (AFM), dynamic shear rheometer (DSR), and fourier transform infrared spectroscopy (FTIR) tests were carried out to evaluate the influence of water immersion on the nano-adhesion properties, morphological characteristics, stiffness, and chemical constituents of asphalt with and without the WMA additives. The results showed that several changes in the asphalt resulted from water immersion, including a decline in the adhesion performance, the appearance of small bumps on the surface of the asphalt, an increase in asphalt stiffness, and the amount of oxygen-containing functional groups and polar components in the asphalt. In addition, the SBS modifier in the asphalt remained stable during water immersion. Considering the effects of the WMA additives, it was found in this study

that the water-induced adhesion degradation, oxidative aging, and increase of the polar components in asphalt could be delayed with the use of Sasobit. (C) 2020 Elsevier Ltd. All rights reserved.

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第 392 篇

标　　题： Analysis Of Interface Interaction Of Aggregate-Asphalt System And Its Effect On Shear-Slip Behavior Of Asphalt Mixture

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The interface interaction of aggregate-asphalt system is a key factor affecting the strength formation and deterioration of the asphalt mixture, which has a great influence on the distress and durability of pavement. To analyze the influence of the interface interaction of aggregate-asphalt system on the shear-slip behavior of asphalt mixture, two self-developed testers were adopted to measure the parameters of particle contact and interface shear-slip, and the effective evaluation methods were proposed on the mesoscopic level. The results indicate that the interface interaction is from the coupling effect of the particle contact and the bonding and lubrication of asphalt. Among involved aggregate-asphalt systems, the AC-13L system has a strong contact strength, while its skeleton structure is easily affected by the lubrication of asphalt. The contact and interaction parameters of involved aggregate-asphalt systems except for AC-13L exhibit a good linear correlation with the shear-slip parameters of asphalt mixtures. The AC-20M system has the strongest contact effect and easily forms a multilevel dense interlocking structure interacting with asphalt, which shows the best resistance to shear-slip deformation. The interference of fine aggregates and the lubrication of asphalt can adversely affect the resistance to slip deformation of asphalt mixtures. (C) 2020 Elsevier Ltd. All rights reserved.

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第 393 篇

标　　题： Study On Thermal Properties Of Steel Slag Asphalt Concrete For Snow-Melting Pavement

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： The utilization of steel slag in asphalt concrete can improve the thermal conductivity of steel slag asphalt concrete. The thermal conductivity of asphalt concrete largely affects the surface temperature distribution of asphalt pavement, which in turn affects the mechanical characteristics of asphalt pavement and the temperature of the environment near the surface pavement. In this study, the thermal properties of asphalt concrete with different steel slag volume contents were investigated in a laboratory. The thermal conductivity was tested using a parallel hot-wire and transient plane source method, and the uniformity and surface temperature were studied through infrared thermal imaging. Next, a 3D infrared image was analyzed based on regional statistics, image binarization, and the coefficient of variation evaluation. The practical snow melting efficiency of thermally conductive asphalt concrete was evaluated using an electrical-thermal system. Experimental results indicate that the thermal conductivity, heating distribution uniformity, and surface temperature of asphalt concrete are first increased, before decreasing with an increase in the steel slag replacement. Regardless, the thermal properties of steel slag asphalt concrete were shown to be better than those of conventional asphalt concrete. The most effective steel slag volume in asphalt concrete was shown to be 60 vol %. The snow melting efficiency of thermal conductivity asphalt concrete can be improved using an electrical-thermal system. The results of this study will help mitigate a shortage of natural resources and improve the temperature distribution of pavements. (C) 2020 Published by Elsevier Ltd.

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第 394 篇

标　　题： Sliding Mechanical Properties Of Fault Gouge Studied From Ring Shear Test-Based Microscopic Morphology Characterization

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期　　刊： ENGINEERING GEOLOGY

摘　　要： Fault activity is a factor causing geological disasters and controlling their spatial

distribution. The information on fault activity can be recorded by the microstructure of the fault gouge sliding surface, which provides an approach to study the macroscopic mechanical behavior of faults. In this study, the ring shear test was used to simulate the shear sliding behavior of a fault gouge under different stress states and water contents, and the microstructure of the shear sliding surface was quantitatively analyzed using scanning electron microscopy (SEM). The results revealed an evident relationship between the microstructure and macroscopic mechanical properties of the fault gouge. The microstructure, represented by sliding scratches, was primarily created by the movement of coarse particles, such as sand and quartz. An index of the sliding scratch ratio was proposed to characterize the microstructure. The sliding scratch ratio is negatively correlated with water content and normal stress, and a multivariate model of sliding scratch ratio was established with water content, normal stress and coarse particle contents. Allying the model to natural scratches of the fault gouge reveals that the observed sliding scratches were formed during slope sliding, which proves the influence of fault on the occurrence of the studied landslide. Influenced by the Gully Land Consolidation projects in the Loess Plateau of China, the groundwater level may increase and then weaken the shear strength of fault gouge, reducing the stability of slopes crossed by fault zone. Therefore, more attention should be paid to potential geological disasters induced by faults in gully filled areas

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第 395 篇

标　　题： How To Achieve Efficiency And Accuracy In Discrete Element Simulation Of Asphalt Mixture: A Drf-Based Equivalent Model For Asphalt Sand Mortar

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The clump-based discrete element model is one of the asphalt mixture simulation methods, which has the potential to not only predict mixture performance but also simulate particle movement during compaction, transporting, and other situations. However, modelling of asphalt sand mortar in this method remains to be a problem due to computing capacity. Larger-sized balls (generally 2.0-2.36 mm) were usually used to model the smaller particles and asphalt binder, but this replacement may result in the mixture's unrealistic volumetric features. More specifically, replacing original elements with equal volume but larger size particles will increase in buck volume and then different particle contacting states. The major objective of this research is to provide a solution to the dilemma situation through an improved equivalent model of the smaller

particles and asphalt binders. The key parameter of the equivalent model is the diameter reduction factor (DRF), which was proposed in this research to minimize the effects of asphalt mortar's particle replacement modelling. To determine DRF, the DEM-based analysis was conducted to evaluate several mixture features, including element overlap ratio, ball-wall contact number, and the average wall stress. Through this study, it was observed that when the original glued ball diameters are ranging from 2.00 mm and 2.36 mm, the diameter reduction factor changes from 0.82 to 0.86 for AC mixtures and 0.80 to 0.84 for SMA mixtures. The modelling method presented in this research is suitable not only for asphalt mixtures but also for the other particulate mix with multisize particles.

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第 396 篇

标　　题： Strain Response Regularity And Viscoplastic Model Of Asphalt Binder And Asphalt Mastic Based On Repeated Creep And Recovery Test

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期　　刊： KSCE JOURNAL OF CIVIL ENGINEERING

摘　　要： As a viscoelastic material, asphalt mixture mainly derives its viscoelastic properties from the asphalt binder. This research aims to comparatively evaluate the strain response regularity of asphalt binder and asphalt mastic through repeated creep and recovery (RCR) test indices. The influences of the asphalt binders, filler volume fraction and filler type on the strain response indices: deformation recovery rate (R) and non-recoverable creep compliance (Jnr) were analyzed according to the RCR test results of the mastics. The viscoplastic (VP) model for characterizing asphalt binder and asphalt mastic behavior was described. The parameters of the model were determined in the prepeak region of the loading, under different stress levels. Simultaneously, the prediction accuracy of the developed VP model was verified, and the applicability of the model was analyzed. The filler volume fraction has the most significant effect on the strain response of the mastic. The R value decreases but the Jnr value increases with the filler volume fractions. The average non-recoverable percent Jnr value decreases with the aging degree increasing. Compared with the unaged (OR) mastics, the Jnr values after rolling thin film oven test (RTFOT) and pressure aging vessel (PAV) decreases by more than 20% and 88%. The improved strain hardening VP model can better simulate the viscoplastic strain response of the asphalt binder and mastic in the RCR test, and the prediction accuracy was greatly improved. The prediction accuracy slightly decreased with creep time increasing. Further research shows that the improved strain hardening VP model is also applicable to the calculation of viscoplastic strains in the RCR test of the asphalt binder and the mastic after RTFOT aging and PAV aging. The improved VP model increases from 5% to 92% off the reference line to within 3%.

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第 397 篇

标　　题： Evaluation Of Rheological Master Curves Of Asphalt Mastics And Asphalt-Filler Interaction Indices

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Understanding the rheological behavior of the asphalt mastic is an important step towards improving the shear-stress response of the mixture. The objective of this study is to observe the rheological master curves and the asphalt-filler interaction of the asphalt mastics in the linear viscoelastic (LVE) range by using various rheological indices. The frequency sweep (FS) test was utilized to investigate the influence factors of the rheological indexes and the applicability of the asphalt-filler interaction indexes. Simultaneously, the correlation of various asphalt-filler interaction indices was established. The results showed that the influence of filler volume fraction and the aging effect exhibited a stonger significant effect on the rheological indices were significantly stronger than that of the binder type and filler type. The aging effect could reduce the difference in the rheological indices between various mastics. The analysis of the asphalt-filler interaction indices showed that the addition of the modifier had a negtive effect on the critical filler volume fraction (Phi m) of the mastic. Moreover, the indices of the complex modulus coefficient (Delta G*), K.D.Ziegel-B-G* (K-B-G*) and complex viscosity coefficient (Delta eta*) presented the consistency in evaluating the asphalt-filler interaction ability. The value of K-B-G* increased with the aging degree, that is, the filler-asphalt interaction increased with aging degree (C) 2020 Elsevier Ltd. All rights reserved.

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第 398 篇

标　　题： Multi Scale Investigation On The Failure Mechanism Of Adhesion Between Asphalt And Aggregate Caused By Aging

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The microand nano-surface properties of asphalt obviously affect the macro-bonding of

asphalt and with aggregates, which is influenced by aging. In this study, the surface morphology and force curves of two asphalts for different degrees of aging (matrix asphalt and SBS modified asphalt) and macro-bonding with the mineral aggregate were measured. Moreover, the micro-nano surface morphology and surface energy were quantitatively evaluated. Furthermore, the micro-nano surface properties of asphalt and the macro-bonding were correlated. Then the evolution mechanisms of asphalt adhesion with aging were revealed by gray correlation analysis on the nano, micro and macro scales. The results showed that the number of microscopic bee-like structures and the nano-roughness of asphalt increased initially and then decreased, the area and maximum length of microscopic bee-like structures, micro-surface energy gradually decreased as the aging time prolongs. Macro-bonding of asphalt with mineral aggregate gradually decreased. The results of grey correlation analysis showed that the attenuation of micro-surface energy caused by aging is the main factor to reduce the value of macro-bonding, further indicating that the main reason for the bonding failure of aged asphalt with aggregate is the weakening of interface chemisorption. The results will provide a good reference for understanding the multi-scale evolution of asphalt performance with aging. (C) 2020 Elsevier Ltd. All rights reserved.

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第 399 篇

标　　题： Experimental And Numerical Study On A Novel Cable Anchorage System To Improve The Maintainability Of Suspension Bridges

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期　　刊： STRUCTURES

摘　　要： In suspension bridges, cable anchorage systems are critical structures for cable tension transmission. Owing to the tedious maintenance and replacement process, it is difficult to reduce maintenance costs and traffic impacts for conventional anchorage systems. To solve this problem, this paper presents the development of a novel prestressed anchorage system used in the Nansha Bridge. The novel anchorage system employs finite bundles of cluster cables with multiple anticorrosive coatings, enabling monitorability and durability and efficient replaceability without traffic interruption. A replaceability model test is performed to reveal the mutual interference characteristics of cluster cable tension and verify the replacement efficiency. Graded load tests are carried out on three specimens to investigate the stress distribution and load-carrying performance. Through elaborate 3D finite element analysis, the mechanical behaviour and stress diffusion characteristics of the crucial components under the anchors are further studied under three extreme scenarios. The results show that the novel anchorage system is reliable with a sufficient safety margin and uniform stress

distribution and that the replacement process is efficient without incurring traffic interruption.

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第 400 篇

标　　题： Properties Of New Cold Patch Asphalt Liquid And Mixture Modified With Waterborne Epoxy Resin

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： In order to eliminate the deficiencies of the solvent-based cold patch asphalt mixture, this paper presented the cold patch asphalt mixture modified with waterborne epoxy resin (WER). Firstly, the new evaluation method were put forward based on its technical features and application requirements. Then the influence of different compositions and contents of WER on the cold patch asphalt liquid was evaluated by laboratory tests. Further, the pavement performance and workability of WER modified cold patch asphalt mixture were systematically evaluated. The results show that (i) WER can significantly improve strength, moisture susceptibility, high temperature performance and cohesion. However, the inappropriate addition may lead to poor storability and low temperature performance. So the optimal WER content is recommended 1.2-1.8 wt%, and its component ratio of epoxy resin to curing agent is 3:1. (ii) Different WER components produce different performances of mixture. The EP-20 + HGC brings about higher curing strength, excellent high temperature performance and storability. In comparison, the mixture modified with EP-20 + HGA owns preferable initial strength and moisture susceptibility. In the practical project, it is necessary to choose suitable WER considering the performance deficiency of cold patch materials and maintenance needs.

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水利与环境学院

第 1 篇

标　　题： Research On Holocene Loess Erosion Associated To Climate Evolution In China

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China.

期　　刊：POLISH JOURNAL OF ENVIRONMENTAL STUDIES

摘　　要：Loess is the carrier for the Chinese nation's survival, and we can accurately know its erosion changes since the Holocene, the current period of geologic time, which is very important to predict future trends. However, there is very limited quantitative research on Holocene climate change and loess erosion intensity. This research takes the Holocene loess depositional sequence of Shaolingyuan in Xi'an at southern loess plateau as the research object to analyze the magnetic susceptibility and stratigraphic age structure of sedimentary sequences, and describe the climate change in different periods. This method uses the sensitivity of pedogenes and fits the precipitation and temperature equation to quantitatively reconstruct the paleoprecipitation and paleotemperature changes since the Holocene, which determines the relationship between soil erosion intensity and precipitation in order to estimate soil erosion intensity since the Holocene period. Results show that the climate change in Xi'an is as follows: 10000 similar to 8400 a B.P. is the cold temperature transition stage; 8400 similar to 7000 a B.P. is the warm-cold fluctuation stage; 7000 similar to 5000 a B.P. is the warm temperature stage; 5000 similar to 3400 a B.P. is the warm-cold violent fluctuation stage; and 3400 a B.P. is the warm-semi-humid and semi-arid stage. The Holocene soil erosion intensity changes with annual average precipitation. At 9700 a B.P., the annual average rainfall is 676.6mm, the Estimate of soil erosion intensity reaches its peak value (1287.7 Mg.km(-2).a(-1)), and the soil erosion intensity will become more serious for some time in the future. This research proposes a new method for estimating soil erosion intensity changes caused by climate change, which not only infers the relationship between soil erosion intensity and climate change, but also provides a theoretical basis for accurately processing the soil and water conservation works in the loess area.

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第 2 篇

标　　题：Prediction Of The Response Of Groundwater Recharge To Climate Changes In Heihe River Basin, China

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期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：Accurate estimation of groundwater recharge is critical for evaluating the available freshwater resources in the Heihe River basin. Based on the statistical downscaling method coupled with the soil and water assessment tool, this study predicted the

variations in precipitation, surface runoff, lateral flow, evapotranspiration, and groundwater recharge in the Heihe River basin under the A1B scenarios in the future 45 years (2019-2063). It was found that relative errors (R-e), coefficient of determination (R-2), and coefficient of Nash Sutcliffe efficiency (E-ns) at calibration and validation period were 19%, 0.90, 0.82 and 12%, 0.83, 0.75, respectively. These results indicated that the new SWAT models can be properly applied for predictions in the Heihe River basin. The next 45 years were divided into four stages, and precipitation change will follow the order stage III > stage I > stage IV > stage II. In addition, temperatures will gradually increase with time. Precipitation and evapotranspiration will be the major input and output of water resources, respectively. The surface runoff value with large precipitation stage will be nearly six times that of lateral flow. The daily highest temperature affects evapotranspiration, and the temporal variation rate of evapotranspiration is low because of extensive distribution of forests and grasslands. The groundwater recharge will reach a maximum in 2037-2046, which will be nearly two times that in 2019-2029. Groundwater recharge will be small in both 2047-2063 and 2030-2036. Precipitation is a major influence factor on groundwater recharge, but temperature slightly affects groundwater recharge. Underlying surface conditions such as land use, soil type, and properties also affect groundwater recharge. The precipitation after 2047 will not be very large, and temperatures will be high, and large evapotranspiration will lead to a rapid decrease in groundwater recharge.

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第 3 篇

标　　题： Heavy Metals Contamination In Urban Surface Soils Of Medak Province, India, And Its Risk Assessment And Spatial Distribution

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期　　刊： ENVIRONMENTAL GEOCHEMISTRY AND HEALTH

摘　　要： The main purpose of the current study is to assess the contamination status, human health risk, and spatial distribution of heavy metals in the urban soils from the Medak province in India. For this purposes, a total of 40 urban surface soil samples were collected and analyzed seven heavy metals including chromium (Cr), copper (Cu), cadmium (Cd), arsenic (As), nickel (Ni), lead (Pb), and zinc (Zn). The results of the study showed that the concentration of Cr (81-751 mg/kg), Cu (2-180 mg/kg), Zn (25-108 mg/kg), Pb (5-77 mg/kg), Ni (1-50 mg/kg), As (0.4-14 mg/kg), and Cd (0.1-4.2 mg/kg), respectively, was found above their natural background values. The geo-accumulation index analysis indicated that except Zn, all other tested heavy metals had a range of moderately to heavily polluted/contaminated in the study region. Spatial distribution pattern analysis inferred that the soil heavy metal (Cu, Cr, Zn, and Ni)

pollutions in western regions of Medak were relatively larger than that in central and eastern regions. The hazard index (HI) values for Cu, Cd, Zn, As, Pb, and Ni were below 1, implying that there is no non-carcinogenic risks exposure from these heavy metals in soil for children and adults in the study region. However, HI value for Cr ranged from 3.08E-01 to 2.86E+00 for children, implying that children were relatively vulnerable population than adults in the current study region. Comparatively speaking, 67.5% and 100% total carcinogenic risks for Cr values for adults and children were larger than the acceptable threshold value of 1.0E-04, indicating chromium poses the greatest carcinogenic risk in the study region.

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第 4 篇

标　　题： Heavy Metals Pollution Assessment And Its Associated Human Health Risk Evaluation Of Urban Soils From Indian Cities: A Review

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期　　刊： ENVIRONMENTAL GEOCHEMISTRY AND HEALTH

摘　　要： Urban soils of 32 Indian cities were collected from literature-based data for the period of 2001-2019 to measure the contamination levels of six heavy metals including arsenic (As), chromium (Cr), copper (Cu), zinc (Zn), nickel (Ni), and lead (Pb) and also evaluated the potential human health risk for adults and children. The results indicated that concentrations of six heavy metals in the urban soils were much higher than both geochemical background values (Grade-I) and also Canadian soil quality guideline values (Grade-II) in most of the cities in India. Higher concentration of Cr and Ni was in cities mainly located in southern (Karnataka), northern (Uttar Pradesh), and eastern (Odisha); As and Pb primarily in central (Telangana), while Zn and Cu largely in western (Maharashtra) and eastern (Jharkhand) states of India, respectively. The index of geo-accumulation (I-geo) values varied largely and showed moderately polluted to extremely polluted levels, possibly caused/influenced by anthropogenic activity in the urban regions in India. The non-carcinogenic health risk due to Cu, Zn, Ni, and Pb in most urban regions was lower than the threshold value (HI < 1), indicating no non-carcinogenic health risk for adults and children. As and Cr on children, non-carcinogenic risk was very higher than that of adults, and their risk values were also exceeded the threshold value, indicating that As and Cr in the urban soils posed considerable non-carcinogenic health risks on urban residents. The total carcinogenic/cancer risk due to Pb in most urban regions was lower than the recommended limit of 1.00E-04, while Cr and As have shown potential cancer risk for both adults and children. Therefore, As and Cr are the sole heavy metals that cause potential health risk in an urban region residents in India, which needs to be paid more

attention and also controlling measures should be initiated.

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第 5 篇

标　　题： Source Identification Of Airborne Bacteria In The Mountainous Area And The Urban Areas

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期　　刊： ATMOSPHERIC RESEARCH

摘　　要： Airborne microbes are an abundant component of the atmospheric aerosol, which has important influences on atmospheric conditions and public health. However, their possible sources have not been well-studied. To identify the sources of airborne bacteria, airborne PM2.5, PM10 samples and microorganism samples from surface-soil and leaves were collected at three different sampling sites involved in the mountainous area and urban areas in Xi'an, China in summer and autumn. The samples were then analyzed by fluorescence staining and high-throughput sequencing to explore the relationship in bacterial community structures between ambient air samples and possible sources. Results show that the concentrations of airborne microbes differed among sites and between seasons. The airborne bacterial community structures also varied with seasons and sites, with seasonal differences being greater than spatial ones. In both seasons, leaf-surface represented the main local source of airborne bacteria. At the mountainous area, bacteria from surface-soil and leaf-surface contributed the most to the airborne microbial community; at both mountainous and urban areas, this contribution was more pronounced in autumn. Furthermore, back trajectories arriving at the three sampling sites showed that the airborne bacteria may come from other regions by long-distance airflow. The results of this study provide a better understanding about the sources of ambient bacteria.

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第 6 篇

标　　题： Quantification Of Transient Specific Yield Considering Unsaturated-Saturated Flow

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期　　刊：JOURNAL OF HYDROLOGY

摘　　要：Specific yield is one of the most important hydrogeological parameters, and is a key factor connecting flow processes in the unsaturated and saturated zones. In this study, an innovative expression for the dynamic (or time-dependent) specific yield is proposed considering the coupled unsaturated-saturated flow process. The new specific yield equation includes parameters such as saturated water content, residual water content, pore characteristic parameter, initial depth of water table, time-dependent depth of water table, initial pressure head, and time. The involving parameters in this new specific yield equation reflect the impacts of lithology, initial water table depth and other factors. This new equation approaches an asymptotic (steady-state) value which is the same as reported previously for a shallow water table condition. Both advective and diffusive unsaturated flow processes are taken into consideration, which is in contrast to a previous study that ignored the diffusive unsaturated flow process. The model established in this study reveals the complete dynamic process of variation of water content and water head in the unsaturated zone. The newly developed specific yield equation can be incorporated into groundwater flow theory considering a dynamic water table reflective of a physically based unsaturated-saturated flow process.

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第 7 篇

标　　题：Sorption Behavior Of Hexabromocyclododecanes (Hbcds) On Weihe River Sediment

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要：The sorption of hexabromocyclododecanes (HBCDs) on sediment affects the fate and transport of HBCDs in rivers. The sorption of HBCDs on sediment from the Weihe River was investigated by performing batch equilibration experiments, and the effects of changing the pH ionic, strength, and humic acid concentration (HA) on sorption were evaluated. The obtained results indicated that fast rather than slow sorption was the dominant process. Nonlinear sorption isotherms were acquired, and the Freundlich (R-2 0.94-0.98) and Langmuir (R-2 0.95-0.99) models both described the sorption of HBCDs well. The adsorption capacity for alpha-HBCD, beta-HBCD, and gamma-HBCD were calculated using the Langmuir model, and were 443.56, 614.29 and 1146.37 mg/kg, respectively. Thermodynamic analysis shows that HBCDs sorption on sediment is a spontaneous exothermic process. HBCDs sorption was affected by the HA

concentration and ionic strength. The amounts of HBCDs sorbed to the sediment decreased as the ionic strength increased, and first increased and then decreased as the HA concentration increased. Changes in pH did not clearly affect the sorption of HBCDs. Synchrotron radiation Fourier-transform infrared spectra (SR-FTIR) was used to characterize the adsorption mechanism, and the obtained result indicated that hydrophobic interactions dominated the mechanism involved in HBCDs sorption on sediment.

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第 8 篇

标　　题： The Contents And Release Behavior Of Heavy Metals In Construction And Demolition Waste Used In Freeway Construction

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期　　刊： ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要： A large volume (more than 4.0 million m(3)) of treated construction and demolition waste (CDW) is planned to be used in the construction of the Xi'an-Xianyang north loop line freeway in West China. These CDW were preliminarily separated into broken concretes, bricks, and porcelains in the treatment plants. In this study, a total of 190 CDW samples including 80 concretes, 80 bricks, 20 porcelains, and 10 mixed samples were collected from five treatment plants. Five farmland soil samples near treatment plants were collected as controls. The contents of 10 elements including cadmium (Cd), arsenic (As), copper (Cu), nickel (Ni), zinc (Zn), chromium (Cr), lead (Pb), manganese (Mn), silver (Ag), and mercury (Hg) in these samples were measured. The contents of 8 elements (Cu, Ni, Zn, Cr, Pb, Mn, Ag, and Hg) in all CDW samples were qualified for the third-level criterion of the Standard of Soil Environment (GB15618-2008). However, Cd contents in 37 concretes, 34 bricks, 6 porcelain samples, and 4 mixed CDW samples exceeded the national third-level standards (1 mg/kg) in GB15618-2008. And As contents in 28 concretes, 21 bricks, 5 porcelain samples, and 3 mixed CDW samples were higher than the national third-level standards (40 mg/kg). The total exceeding standard rates (ESRs) of Cd and As were 42.6% and 30%, respectively. The leaching tests for Cd and As were also done due to their higher ESRs. The results showed that the release amounts (mu g/kg) of Cd and As from CDW were increased with increasing liquid to solid ratio (0.4-10 l/kg) but decreased with increasing pH (4-7). The leached concentrations of Cd and As from four types of CDW samples were both in a descending order: brick, mixed materials, concrete, and porcelain. The measured concentrations (mu g/L) of Cd and As in leachate were all lower than second-grade criteria of Standard for Groundwater Quality (GB3838-2002). By comparing the leached concentrations of Cd and As with the value in European criteria

(EU Council Decision 2003/33/EC) for hazardous wastes, all the CDW samples should be classified as inert or non-hazardous wastes. Thus, it could be concluded that heavy metals in these CDW would not pollute surrounding soil, surface water, and groundwater environment when applied in freeway construction.

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第 9 篇

标　　题： Seasonal And Inter-Annual Variability Of Groundwater And Their Responses To Climate Change And Human Activities In Arid And Desert Areas: A Case Study In Yaoba Oasis, Northwest China

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期　　刊： WATER

摘　　要： Climate change and human activities have profound effects on the characteristics of groundwater in arid oases. Analyzing the change of groundwater level and quantifying the contributions of influencing factors are essential for mastering the groundwater dynamic variation and providing scientific guidance for the rational utilization and management of groundwater resources. In this study, the characteristics and causes of groundwater level in an arid oasis of Northwest China were explored using the Mann-Kendall trend test, Morlet wavelet analysis, and principal component analysis. Results showed that the groundwater level every year exhibited tremendous regular characteristics with the seasonal exploitation. Meanwhile, the inter-annual groundwater level dropped continuously from 1982 to 2018, with a cumulative decline depth that exceeded 12 m, thereby causing the cone of depression. In addition, the monthly groundwater level had an evident cyclical variation on the two time scales of 17-35 and 7-15 months, and the main periodicity of monthly level was 12 months. Analysis results of the climatic factors from 1954 to 2018 observed a significant warming trend in temperature, an indistinctive increase in rainfall, an inconspicuous decrease in evaporation, and an insignificant reduction in relative humidity. The human factors such as exploitation amount, irrigated area, and population quantity rose substantially since the development of the oasis in the 1970s. In accordance with the quantitative calculation, human activities were decisive factors on groundwater level reduction, accounting for 87.79%. However, climate change, including rainfall and evaporation, which contributed to 12.21%, still had the driving force to change the groundwater level in the study area. The groundwater level of Yaoba Oasis has been greatly diminished and the ecological environment has deteriorated further due to the combined effect of

climate change and human activities.

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第 10 篇

标　　题： Performance And Microbial Community Of The Canon Process In A Sequencing Batch Membrane Bioreactor With Elevated Cod/N Ratios

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期　　刊： WATER SCIENCE AND TECHNOLOGY

摘　　要： In this study, the effects of elevated chemical oxygen demand/nitrogen (COD/N) ratios on nitrogen removal, production and composition of the extracellular polymer substances (EPS) and microbial community of a completely autotrophic nitrogen removal via nitrite (CANON) process were studied in a sequencing batch membrane bioreactor (SBMBR). The whole experiment was divided into two stages: the CANON stage (without organic matter in influent) and the simultaneous partial nitrification, anaerobic ammonia oxidation and denitrification (SNAD) stage (with organic matter in influent). When the inflow ammonia nitrogen was 420 mg/L and the COD/N ratio was no higher than 0.8, the addition of COD was helpful to the CANON process; the total nitrogen removal efficiency (TNE) was improved from approximately 65% to more than 75%, and the nitrogen removal rate (NRR) was improved from approximately 0.255 kgN/(m(3)center dot d) to approximately 0.278 kgN/(m(3)center dot d), while the TNE decreased to 60%, and the NRR decreased to 0.236 kgN/(m(3)center dot d) when the COD/N ratio was elevated to 1.0. For the EPS, the amounts of soluble EPS (SEPS) and loosely bound EPS (LB-EPS) were both higher in the CANON stage than in the SNAD stage, while the amount of tightly bound EPS (TB-EPS) in the SNAD stage was significantly higher due to the proliferation of heterotrophic bacteria. The metagenome sequencing technique was used to analyse the microbial community in the SBMBR. The results showed that the addition of COD altered the structure of the bacterial community in the SBMBR. The amounts of Candidatus 'Anammoxoglobus' of anaerobic ammonia oxidation bacteria (AAOB) and Nitrosomonas of ammonia oxidizing bacteria (AOB) both decreased significantly, and Nitrospira of nitrite oxidizing bacteria (NOB) was always in the reactor, although the amount changed slightly. A proliferation of denitrifiers related to the genera of Thauera, Dokdonella and Azospira was found in the SBMBR.

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第 11 篇

标　　题： A Novel And Non-Toxic Dopamine Detection Method Based On Self-Polymerisation

Of Dopamine

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期　　刊：JOURNAL OF EXPERIMENTAL NANOSCIENCE

摘　　要：In this article, we report a simple, effective, sensitive, non-toxic and environmentally friendly method for the detection of dopamine (DA). This method utilises the property of the self-polymerization of dopamine under alkaline conditions, and gets the concentration of dopamine by measuring the fluorescence intensity of polydopamine (PDA) nanoparticles. And this method only uses NaHCO3 to start the polymerization process, so that the detection experiment becomes simple and inexpensive. The fluorescence intensities of the mixed solution produced at different reaction times and different concentrations were studied. Finally, a good linear relationship was obtained in the range of 1.0-400 mu M with a correlation coefficient of 0.9946 and a detection limit of 0.3 mu M. The method has high selectivity and important application value for detecting dopamine-related diseases.

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第 12 篇

标　　题：Nitrogen Utilization Characteristics And Their Influence On Groundwater In The Weishan Irrigation Region

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期　　刊：POLISH JOURNAL OF ENVIRONMENTAL STUDIES

摘　　要：In agricultural production, the main cause of groundwater pollution has been the leakage of total Nitrogen (TN) caused by excessive water and fertilizer application. In this study, an experiment combining a field and indoors was used to seek optimal coupling scheme and prevent groundwater pollution caused by excessive fertilization. Results showed that in recent years, groundwater quality has been deteriorating, and nitrate levels have increased by approximately three times (2014-2016). The TN accumulated significantly in a different soil layer, along with crop growth. The N

accumulated mainly in the bottom of the studied soil layer (80-160 cm) over time. Under different water fertilizer treatments, the crop yield, leakage, and N use efficiency (NUE) were obviously various. The effect of irrigation water quantity was more significant for N leakage than fertilizer ($P<0.05$), and more water resulted in more N leakage. Additionally, considering the comprehensive benefits for winter wheat. medium fertilizer (N, 225 kg ha(-1)) is an optimal scheme with medium water (3150 m(3) ha(-1)). For summer maize, medium water (1350 m(3) ha(-1)) and high fertilizer (N, 162 m(3) ha(-1)) were optimal treatment. The above schemes have the best comprehensive benefits for agricultural production in the case area.

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第 13 篇

标　　题： Hydrophobic And Anti-Fouling Performance Of Surface On Parabolic Morphology

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： The hydrophobicity and anti-fouling properties of materials have important application value in industrial and agricultural production and people's daily life. To study the relationship between the unit width L-0 of the parabolic hydrophobic material and the hydrophobicity and anti-fouling properties, the rough surface structure of the parabolic with different widths was prepared by grinding with different SiC sandpapers, and further, to obtain hydrophobic materials through chemical oxidation and chemical etching, and modification with stearic acid (SA). The morphology, surface wetting and anti-fouling properties of the modified materials were characterized by SEM and contact angle measurement. The oil-water separation performance and self-cleaning performance of the materials were explored. The surface of the modified copper sheet forms a rough structure similar to a paraboloid. When ground with 1500 grit SiC sandpaper, it is more conducive to increase the hydrophobicity of the copper sheet surface and increase the contact angle of water droplets on the copper surface. Additionally, the self-cleaning and anti-fouling experiments showed that as L-0 decreases, copper sheets were less able to stick to foreign things such as soil, and the better the self-cleaning and anti-fouling performance was. Based on the oil-water separation experiment of copper mesh, the lower L-0 has a higher oil-water separation efficiency. The results showed that material with parabolic morphology has great self-cleaning, anti-fouling, and oil-water separation performance. The smaller the L-0 was, the larger the contact angle and the better hydrophobic performance and

self-cleaning performance were.

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第 14 篇

标　　题： The Precursor-Guided Hydrothermal Synthesis Of Cubi2O4/Wo3 Heterostructure With Enhanced Photoactivity Under Simulated Solar Light Irradiation And Mechanism Insight

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期　　刊： JOURNAL OF HAZARDOUS MATERIALS

摘　　要： Z-scheme heterojunction can efficiently suppress the electron-holes recombination and promote the charges transfer rate, which result in the high photocatalytic performance. Herein, a flower-flake-sphere like CuBi204/WO3 hybrid photocatalyst was fabricated via a precursor-guided hydrothermal method. The morphology, -c 14 Jr W*4 `---7SW Itor silictartat'41ii vestigated by multiple techniques (XRD, FT-IR, SEM, TEM, XPS, UV-vis, BET, PL, ESR. etc.). Partictilarly, the 60 wt% CuBi2O4/WO3 nanocomposite exhibited the highest photocatalytic activity for tetracycline (20 mg/L) _degradation under simulated solar light irradiation. The rate constant was 0.0179 min -1, which was almost 8 times and 4.5 times higher than that of bulk WO3 and CuB1(2)O(4), respectively. The experimental results confirmed that CuBi2O4 made a direct Z-scheme heterojunction by band alignment with WO3, which are conducive to the efficient charges separation and prolonged carriers lifetime. According to the quenching experiments, -OH and -02- were testified to be the predominant active species. The electrons accumulated in the CuBi2O4 negative CB and the holes in the WO3 positive VB made significant contribution to the strong redox ability of the CuBi2O4/WO3 nanocomposite. This work provides some deep insights into the design of band -alignment-based Z-scheme heterostuctures, which is also applicable to other catalytic system.

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第 15 篇

标　　题：Predominance Role Of The Superoxide Radical Over The Hydroxyl Radical In The Dechlorination Of Trichloroethene In Aqueous Phase Using Cu Doped Tio2

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL ANALYTICAL CHEMISTRY

摘　　要：Trichloroethylene (TCE), a frequently used chlorinated solvent has been completely degraded in aqueous solution over the as-synthesised Cu-TiO2 irradiated with UV light. The effect of pH and the role played by specific generated reactive oxygen species in the mineralisation process were evaluated. Cu-TiO2 was synthesised and characterised according to our previous study. The photodegradation results, which followed the pseudo-first-order kinetic model, revealed that pH had a negligible effect on the degradation as the complete dechlorination occurred in all adjusted pH solutions. In addition, probe compound tests using nitrobenzene and tetrachloromethane suggested that the hydroxyl radical ((OH)-O-center dot) is mainly generated when coupling UV with Cu-TiO2, and the superoxide radical anion (O-2(center dot-)) is highly generated when UV is applied alone. Free radical quenching studies demonstrated that O-2(center dot-) is the major radical responsible for the degradation of TCE compared to (OH)-O-center dot. The results obtained in the present study can serve as a support for further studies on the removal of TCE using UV coupling catalyst.

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第 16 篇

标　　题：Immobilisation Of Synthesised Tio2 Nanosheets Onto The Surface Of The Mesh And Its Modification Effect On The Wettability Behaviour

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL ANALYTICAL CHEMISTRY

摘　　要：In this study, a widely used TiO2 was synthesised by a simple hydrothermal solution and was characterised by using X-ray diffraction, scanning electron microscopy and energy dispersive spectroscopy. Analytical results showed that the synthesised TiO2 was in anatase form and consisted of well-defined sheet-shaped structures having a rectangular outline. Moreover, the calcination temperature remarkably affected the crystalline phase of the product as a mixture of rutile and anatase phase was obtained with the product calninated at 1000 degrees C. The synthesised TiO2 was further involved in a coated process using stainless mesh as a subtract. The contact angle

measurement revealed a modification on the surface wettability of the mesh with the underwater oil contact angle larger than 150 degrees and the oil/water separation efficiency over 90% even after thirty cycles of reuses. The substrate analysis indicated that the TiO2 made a separating layer thus, affected the wettability behaviour of the mesh. Moreover, the TiO2 coated mesh maintained excellent underwater superoleophobicity behaviour after immersed in corrosive solutions for 5 days. The present study suggested the effectiveness of immobilising synthesised TiO2 for the modification of surface wettability.

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第 17 篇

标　　题： Rational Design Of 3D/2D In2O3 Nanocube/Znin2S4 Nanosheet Heterojunction Photocatalyst With Large-Area High-Speed Channels For Photocatalytic Oxidation Of 2,4-Dichlorophenol Under Visible Light

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期　　刊： JOURNAL OF HAZARDOUS MATERIALS

摘　　要： We have rationally designed and fabricated of face-to-face 3D/2D In2O3 nanocube/ZnIn2S4 nanosheet heterojunction by growing ZnIn2S4 nanosheets on the surfaces of In2O3 cubes as photocatalysts for 2,4-di-chlorophenol (2,4-DCP) degradation under visible light. Herein, the unique 3D/2D In2O3 nanocube/ZnIn2S4 nanosheet hierarchical structure not only exposes far more abundant heterojunction interface active sites compared to 3D/0D In2O3 nanocube/ZnIn2S4 nanoparticle, but also produces numbers of compact high-speed nanochannels in the junctions, which significantly promotes the separation and migration of photogenerated carriers. Profiting by structural and compositional advantages, the optimized 3D/2D ZnIn2S4-In2O3 photo-catalyst shows excellent photocatalytic activity and stability in the degradation of 2,4-DCP, which is 1.85, 2.60, 3.02 and 3.54-fold higher than that of 3D/0D ZnIn2S4-In2O3, ZnIn2S4 nanosheet, ZnIn2S4 nanoparticle and In2O3, respectively. Meanwhile, the main active species (center dot O-2(-), center dot OH and h(+)) produced in the photodegradation process were determined and the intermediates and degradation mechanism were studied in detail. Besides, the application on the removal of 2,4-DCP in natural water and actual wastewaters by 3D/2D ZnIn2S4-In2O3 also have been studied. This work provides a new strategy for efficiently optimize the advantages of binary nano-architectures to effectively degrade phenolic pollutants in the environment.

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WOS 号： 000501387100066

第 18 篇

标　　题： Vehicle Movement Analyses Considering Altitude Based On Modified Digital Elevation Model And Spherical Bilinear Interpolation Model: Evidence From Gps-Equipped Taxi Data In Sanya, Zhengzhou, And Liaoyang

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Aggravating energy shortages and increasing labor costs have become global problems and have garnered special importance in recent years in the transportation sector, especially in taxi markets. Automatic vehicles have a bright future, however, there is an equal amount of skepticism and concern about safety for all the optimism. To unlock the potential of automatic vehicles in intelligent transportation systems, a lot more data and testing are required to promote safety level as far as possible and achieve the organizational aim of reducing accidents to zero tolerance. And it is vital to provide accurate models for vehicle movement analyses. In this study, Modified Digital Elevation (MDE) model and Spherical Bilinear Interpolation (SBI) model were proposed for vehicle movement analyses considering altitude. And the experimental data of 9,990 GPS-enabled taxis in Sanya, Zhengzhou, and Liaoyang were adopted to support comparisons. Measurement results showed that MDE model had over 99% less disparity with direct solution than original model and SBI model could further improve the effects. It indicated that the application of MDE model and SBI model could improve both accuracy and efficiency of vehicle movement analyses and it had a bright future in the field of automatic vehicles. Future directions could be improving models and expanding data.

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WOS 号： 000510880900004

第 19 篇

标　　题： Groundwater Quality Assessment Using Improved Water Quality Index (Wqi) And Human Health Risk (Hhr) Evaluation In A Semi-Arid Region Of Northwest China

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期　　刊：EXPOSURE AND HEALTH

摘　　要：To ensure the safety of drinking water, 51 groundwater samples were collected from a semi-arid area of China and various physicochemical parameters were analyzed. Groundwater quality for drinking purposes along with the associated health risks was assessed using a water quality index (WQI) which was improved using the Criteria Importance Through Inter-criteria Correlation weighting method. The results show that the groundwater was slightly alkaline and the total dissolved solids ranged from 497.26 to 2198.82 mg/L. The ionic dominance pattern was in the order of K+ + Na+ > Ca2+ > Mg2+ > NH4+ for cations, and HCO3- > SO42+ > Cl- > NO2- > NO3- > CO32- > F- for anions, respectively. In the study region, HCO3-Na and HCO3-Ca center dot Mg were the dominant water types, followed by the SO4 center dot Cl-Na type, which are mainly controlled by rock weathering, leaching, and evaporation. 94.12% of the total samples are suitable for drinking; the poor and extremely poor water for human consumption are mainly located in the center and northeast of the study area. The non-carcinogenic health risk for males ranged from 0.0002 to 38.7575, for females 0.0002 to 49.2935, and for children 0.0003 to 84.3167, respectively. The health risk for children was approximately 2.18 times and 1.71 times higher than that for males and females, indicating that children are more susceptible to water contamination. The major pollutants in the study region are nitrite, nitrate, and fluoride. Therefore, the necessary steps to be taken to clean up this highly nitrite-, nitrate-, and fluorine-contaminated groundwater and health risks in this study region.

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第 20 篇

标　　题：Impact Of Metalloporphyrin-Based Porous Coordination Polymers On Catalytic Activities For The Oxidation Of Alkylbenzene

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期　　刊：APPLIED ORGANOMETALLIC CHEMISTRY

摘　　要：Seven metalloporphyrin-based porous coordination polymers: Fe (TZP)Poly (CP1), Co-II (TZP)Poly (CP2), Ni-II (TZP)Poly (CP3), Cu-II (TZP)Poly (CP4), Zn-II (TZP)Poly (CP5), Mn-II (TZP)Poly (CP6), Pb-II (TZP)Poly (CP7) (TZP = 5,10,15,20-tetrakis[4-(2,3,4,5-tetrazolylphenyl)] porphyrin) were prepared and characterized. CP1-CP7 are amorphous aggregation supported with lower crystallinity by scanning electron microscopy, Brunauer-Emmett-Teller and powder X-ray diffraction. These coordination polymers exhibit effective dye scavenging and catalytic activities toward the oxidation of alkylbenzene to ketones and can be reused by filtration with a slight decreasing of catalytic activities. Metal atoms metalloporphyrin polymers have a great influence on the catalytic activities of metalloporphyrin polymers.

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第 21 篇

标　　题：Influence Of Quaternary Paleoclimate Change On The Permeability Of The Loess-Paleosol Sequence In The Loess Plateau, Northern China

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期　　刊：EARTH SURFACE PROCESSES AND LANDFORMS

摘　　要：Permeability differences in multi-cycle loess-paleosol aeolian sediments, which are still poorly understood, have the potential to significantly improve our understanding of climatic change during the glacial-interglacial periods of the Quaternary. In this study, the permeability of a well-preserved and continuous loess-paleosol sequence in the South Jingyang Plateau was investigated. Weathering intensity was inferred using a series of climate proxies including grain-size distribution, magnetic susceptibility and mineralogy. The results of laboratory tests showed that the average saturated hydraulic conductivity of loess layers is higher than that of paleosol layers. Also, clear differences between loess and paleosol were found in terms of depth variations of the vertical and horizontal saturated hydraulic conductivities. Differences in loess-paleosol were also found for other proxies for pedogenic weathering [i.e. clay content, sand content, Kd value (ratio of coarse silt to clay), magnetic susceptibility, dolomite content and the ratios of hornblende/illite and hornblende/chlorite]. Our results showed a high permeability of loess layers associated with weak pedogenic weathering during cold/dry paleoclimatic conditions in glacial stages. On the contrary, paleosol layers developed in a warm/humid climate during the interglacial stages experienced strong pedogenic weathering that resulted in lower permeability. Based on these results, we construct a connection between Quaternary climate change theory and the modern hydrological system. This provides a scientific basis for investigating the distribution and pollution of groundwater resources in the local region. (c) 2020 John Wiley & Sons, Ltd.

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第 22 篇
标　　题： Transcriptome Analysis Of Genes Expressed In The Earthworm Eisenia Fetida In Response To Cadmium Exposure
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期　　刊： CHEMOSPHERE
摘　　要： Eisenia fetida earthworm is an ecotoxicologically important test species to monitor various pollutants. However, there is a little knowledge about the effects of cadmium (Cd) on earthworms at the transcriptional level. Firstly, we exposed E. fetida to soils supplemented with different concentrations (10, 30, 60 mg/kg soil) of Cd. Moreover, we depicted the characterization of gene expressions with E. fetida using high-throughput profiling of gene expression. In addition, a comparison of the gene expression profiles between each Cd treatment group and the control group suggested that differential expressional genes (DEGs) mainly enriched in enzyme activity, metabolism, oxidative stress, regeneration and apoptosis pathways. 8 DEGs from these pathways had been selected randomly to confirm the data of RNA-seq. Among these DEGs, six genes (metallothionein-2, phytochelatin synthase la, CuZn superoxide dismutase, sex determining region Y-box 2, sex determining region Y-box 4b, TP53-regulated inhibitor of apoptosis 1-like) up-regulated and 2 genes (beta-1,4-endoglucanase, apoptosis-stimulating of p53 protein 2-like) down-regulated in response to Cd exposure. The alteration of them indicated that earthworms could reduce the toxicity and bioavailability of Cd in polluted soil ecosystems through different pathways. This work lays an important foundation for linking earthworm transcriptional level with the ecological risk of Cd in soil ecosystem. (C) 2019 Elsevier Ltd. All rights reserved.
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第 23 篇
标　　题： Fabrication Of A Photoelectric-Sensitive Imprinting Polymer By Ppy-Cross-Linked Gel/Cs Complex And Its Comprehensive Treatment Of Cr(Vi)
作　　者： [Xing, Jianyu; Shen, Yu; Dang, Wenwen; Yang, Bin; Fu, Wanchen; Wang, Wei; Bai, Bo] Changan Univ, Sch Environm Sci & Engn, Xian 710054, Shaanxi, Peoples R China; [Xing, Jianyu; Shen, Yu; Dang, Wenwen; Yang, Bin; Fu, Wanchen; Wang, Wei; Bai, Bo] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, 126

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期　　刊： POLYMER BULLETIN

摘　　要： Adsorption is a common method for treating pollutants. High-concentration chemical reagents are always involved in the traditional desorption process, which leads to chemical waste and secondary environmental pollution. To alleviate this problem, polypyrrole (PPy), combined with two inexpensive and renewable biomass compounds, gelatin (Gel) and chitosan (CS), was used to fabricate a novel photoelectric-sensitive Cr(VI) ion-imprinting composite, namely, Gel/CS/PPy. Except for the higher selectivity to Cr(VI), the photoelectric property of PPy enables Gel/CS/PPy to be regenerated with the aid of light and electricity. The result shows that electro-assistant can improve the desorption efficiency by 140%, while photo-assistant can improve the desorption efficiency by 19.8%. As a result, the desorption process will greatly reduce the dependence on chemical reagents and the secondary pollution to the environment. [GRAPHICS] .

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第 24 篇

标　　题： Use Of Multiple Isotopic And Chemical Tracers To Identify Sources Of Nitrate In Shallow Groundwaters Along The Northern Slope Of The Qinling Mountains, China

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期　　刊： APPLIED GEOCHEMISTRY

摘　　要： Isotopes and major ion hydrochemistry are used to investigate potential sources of nitrate contamination in shallow aquifers along the northern slope of the Qinling Mountains, west-central China. Locally, nitrate concentrations exceed a remarkable 850 mg/L, over 40 times background levels observed in fresh mountain springs, and a knowledge and understanding of the nitrate pollution sources is essential for the development of aquifer management and protection strategies that will allow the problem to be effectively controlled. Presently, none of the suspected pollutant sources generates concentrations of nitrate that even approach levels observed in the groundwater, and this is clearly a challenge in terms of assigning responsibility for the contamination and developing appropriate management plans. However, stable isotopes of hydrogen and oxygen (delta D and (delta O-18) in study area waters demonstrate that the centrally located Jijiahe Reservoir and Shidi River have been a major source of

aquifer recharge in recent times and are an obvious source of the contamination. Moreover, delta N-15-NO3- and delta O-18-NO3- determinations suggest that, while nitrate concentrations in the river and reservoir are currently relatively low, a local, long-established fertilizer factory that has likely released high-nitrogen waste to these nearby receptors in the past, is the primary pollutant source. On a positive note, it would appear that the majority of the nitrate contamination, albeit serious in terms of drinking water quality, represents a legacy of past practice and should show gradual improvement due to modern-day environmental protection initiatives, improved equipment, better monitoring and significantly enhanced methods of wastewater treatment. However, the isotope data do indicate that the aquifer continues to be impacted by other anthropogenic activities, including agriculture and livestock raising, downstream of the industrial area and in the eastern part of the study area, meaning that monitoring and active remediation strategies need to be continued with vigilance.

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WOS 号： 000514814800024

第 25 篇

标　　题： Insights Into Hydrological And Hydrochemical Processes In Response To Water Replenishment For Lakes In Arid Regions

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期　　刊： JOURNAL OF HYDROLOGY

摘　　要： Lakes in arid regions are ecologically valuable yet highly fragile due to intense evaporation. To provide an extra water supply for maintaining water balance in lakes, the Ecological Replenishment Water Program (ERWP) in northwest China has significantly changed the hydrological and hydrochemical conditions for these lakes. Descriptive statistics and water and mass balances, together with hydrogeochemical modeling were used in this study to gain an understanding of the impacts of water replenishment (irrigation and drainage water) on evolution for Shahu Lake. A virtual sample was introduced in NETPATH hydrogeochemical modeling to compute the net chemical reactions in the lake water. Variations in TDS indicated that the lake evolved to be saline during 2004-2012 (stage I) and then tended to be fresh during 2013-2014 (stage II). Results highlighted that groundwater outflow and chemical reactions were the overriding factors controlling chemical evolution in the lake system, which greatly depend on the replenishment activities. The salinity reduction from the virtual samples to the final samples were attributed to the precipitation of calcite and dolomite,

dissolution of gypsum, Na-K and Na-Ca exchange, and the CO2 degassing in the lake system at an annual scale of 0.11 g/L in stage I and 0.15 g/L in stage D. The quality of replenishment water was as important as quantity for rehabilitating lakes, as it significantly determines the occurrence of chemical reactions in lake water. Findings from this paper can provide insight into the evolution of arid lakes in response to replenishment activities and can help contribute to better management of a valuable and fragile resource.

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WOS 号： 000514758300042

第 26 篇

标　　题： Classification And Physical Characteristics Of Bound Water In Loess And Its Main Clay Minerals

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通讯作者： Qian, H (corresponding author), Changan Univ, Sch Environm Sci & Engn, Xian 710054, Shaanxi, Peoples R China.

期　　刊： ENGINEERING GEOLOGY

摘　　要： The presence of bound water on the surfaces of loess particles has significant impacts on the physical, chemical and engineering properties of loess, which are crucial for geotechnical engineering and geohazards prevention in loess regions. However, to date we know little about the distribution and properties of bound water in loess. In this study, thermogravimetric analysis (TGA), isothermal adsorption experiment (IAE) and pycnometer method were adopted to determine the contents, type and physical characteristics of bound water in Malan loess (ML) and its main minerals (montmorillonite, MT; and illite, IL). The results indicate MT and IL absorbed the highest and lowest volume of bound water, respectively, and the results for ML were situated in the middle. During TGA, the tightly bound water (TBW) on MT, IL and ML is completely removed at 293 degrees C, 295 degrees C and 235 degrees C, respectively, while the corresponding temperature for loosely bound water (LBW) removing are 164 degrees C, 138 degrees C and 140 degrees C, respectively. IAE results showed the condition for the formation of TBW are: relative humidity (RH) < 69% for MT, and RH < 58% for IL and ML, and that of LBW are: RH > 69% for MT, and RH > 58% for IL and ML The total amount of bound water obtained by TGA and IAE were almost same, but the amounts of LBW and TBW obtained by the two methods were a little different, caused by the different mechanism and the experimental processes. The density of bound water on MT, IL and ML ranged from 1.41 to 1.19 g/cm(3), 1.34 to 1.17 g/cm(3) and 1.39 to 1.14 g/cm(3), respectively, which were much higher than that of free water. Combined with the measured specific surface areas, the maximum thickness of bound water on MT, IL and ML was calculated to be 10.65 angstrom, 2.14 angstrom and 5.25 angstrom, respectively, indicating that the bound

water were multilayer, monolayer and double-layer adsorption, respectively. The properties of bound water are obviously different from those of free water, and the content and the thickness of bound water absorbed on the soil particle surfaces are quite different for different minerals and the loess as a whole. The methods used in this study are helpful for revealing and explaining the soil hydration mechanism. It is also valuable for the understanding the physical and engineering properties of loess and its related minerals.

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第 27 篇

标　　题： Adsorption Characteristics Of Oxytetracycline By Different Fractions Of The Organic Matter From Humus Soil: Insight From Internal Structure And Composition

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： For minimizing the transport of antibiotics to groundwater, the migration of antibiotics in soils should be investigated. Soil organic matter can affect the migration of antibiotics. To date, the influence of aromatics and aliphatic content of organic matter on the adsorption of antibiotics has been controversial. To better understand the reaction mechanism of soil organic matter with antibiotics, this study investigated the adsorption of oxytetracycline (OTC) by humus soils (HOS) and their fractions. HOS were sequentially fractionated into four organic fractions, including the removal of dissolved organic matter (HRDOM), removal of minerals (HRM), removal of free fat (HRLF), and nonhydrolyzable organic carbon (HNHC). Moreover, batch experiments revealed that adsorption capacity was ordered by HNHC > HOS > HRDOM > HRLF > HRM. SEM images and N-2 adsorption/desorption isotherms indicate that adsorption capacity is independent of the external structure. However, adsorption capacity is related to the internal structure and composition. Combination analysis with elemental composition and infrared spectroscopy showed that the adsorption capacity of HRM, HRLF, and HNHC had a good positive correlation with aromaticity, but a negative correlation with polarity and hydrophilicity. Additionally, the rule of binding affinity between OTC and functional groups with different properties was summarized as aromatic > polarity > hydrophilic.

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WOS 号： 000517783300239

第 28 篇

标　　题： Comparison Of Two Different Approaches For Sensitivity Analysis In Heihe River Basin (China)

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期　　刊：WATER SUPPLY

摘　　要：Distributed watershed models should pass through a careful sensitivity analysis and calibration procedure before they are utilized as a decision making aid in the planning and management of water resources. Although manual approaches are still frequently used for sensitivity and calibration, they are tedious, time consuming, and require experienced personnel. This paper describes two typical and effective automatic approaches for sensitivity analysis and calibration for the Soil and Water Assessment Tool (SWAT). These included the Sequential Uncertainty Fitting (SUFI-2) algorithm and Shuffled Complex Evolution (SCE-UA) algorithm. The results show the following. (1) The main factor that influences the simulated accuracy of the Heihe River basin runoff is the Soil Conservation Service (SCS) runoff curve parameters. (2) SWAT performed very well in the Heihe River basin. According to the observed runoff data from 2005 to 2013, the determination coefficient R-2 of the simulation and the efficiency coefficient (Ens) of the model was higher than 0.8. (3) Compared with the Shuffled Complex Evolution, the SUFI-2 algorithm provides almost the same overall ranking of the sensitive parameters, but it is found to require less time with higher accuracy. The SUFI-2 provides a practical and flexible tool to attain reliable deterministic simulation and uncertainty analysis of SWAT, it can lead to a better understanding and to better estimated values and thus reduced uncertainty.

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第 29 篇

标　　题：Major Ion Chemistry And Water Quality Assessment Of Groundwater In The Shigaze Urban Area, Qinghai-Tibetan Plateau, China

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期　　刊：WATER SUPPLY

摘　　要：Shigaze city is situated in the southwestern Tibetan Plateau and is the second largest city in the Tibet Autonomous Region. Groundwater is the major source of domestic and drinking water for urban inhabitants. In this study, the major ion chemistry and a water

quality assessment of groundwater were studied using geochemical methods and fuzzy comprehensive assessment. Groundwater was classified as slightly alkaline soft and hard freshwater, and the influence of anthropogenic activities on groundwater was relatively weak. The dominant cations and anions were Ca2+ and Mg2+ and HCO3- and SO42-, respectively. Overall, the mean concentrations of major ions in groundwater increase gradually over time, except for NO3-; however, the mean value of pH decreases over time. Most groundwater samples belong to the type of HCO3-Ca, and the groundwater has a trend of evolution from HCO3-Ca to the mixed type. Rock weathering was the main hydrogeochemical process controlling groundwater hydrochemistry, and the dissolution of carbonate and silicate minerals were the primary contributors to the formation of the major ion chemistry of groundwater. Major ions of groundwater in the urban area of Shigaze are below the standard limits, and the groundwater is excellent for drinking according to the fuzzy comprehensive assessment.

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WOS 号： 000518596800033

第 30 篇

标　　题： Effect Of Sodium Chloride Concentration On Saturated Permeability Of Remolded Loess

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期　　刊： MINERALS

摘　　要： Loess contains many sodium and chloride ions that can easily be leached when seepage occurs, thus affecting the mechanical properties of loess. This study investigated a series of sodium chloride solution concentrations to explore their influence on the permeability of remolded loess, as well as the underlying mechanism of such. The results indicated that the saturated hydraulic conductivity of remolded loess increases with time in response to different sodium chloride concentrations, and the sample was more permeable with increasing concentration. Moreover, the salt effect promoted the dissolution of calcite and dolomite, and the cation exchange stimulated the leaching of other cations, thus leading to further structural loosening. Furthermore, the aggregation of clay particles increased, thus forming a larger pore space among aggregates and providing effective channels for permeation. These findings provide a theoretical basis for an improved understanding of channel degradation in the loess area of Northwest China.

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WOS 号： 000522452900114

第 31 篇

标　　题：Spatial Distribution, Exposure, And Potential Health Risk Assessment From Nitrate In Drinking Water From Semi-Arid Region Of South India

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期　　刊：HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要：Elevated nitrate concentration in groundwater is a worldwide problem. Continuous exposure to high levels of nitrate in groundwater may cause adverse health effects among residents who use groundwater for consumption. Therefore, this study was conducted to identify the nitrate distribution and its potential health risk assessment from semi-arid region of Peddavagu in Central Telangana (PCT), South India. Groundwater samples were collected from thirty five locations and analyzed for nitrate and other water quality parameters. Nitrate (NO3-) in groundwater was observed to vary from 17 to 120 mg/L, with a mean of 58.74 mg/L. About 57% of samples exceeded the maximum acceptable limit of Indian drinking water standard. About, 40% of groundwater samples drinking water quality index (DWQI) is good, while 60% of groundwater falls in poor quality for drinking purposes. Health risk maps were created based on hazard quotient to quantify the potential health risk of the residents using US Environmental Protection Agency (US EPA) health risk assessment model. Health risk assessment revealed that mean total hazard index (HItotal) for men, women, and children were found as 1.42E + 00, 1.67E + 00, and 1.95E + 00, respectively. Results exhibited that children are at high health risk than men and women in the PCT. Further, the human exposure to the NO3- contaminated water was above the critical limit of non-carcinogenic risk.

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WOS 号：000521279900003

第 32 篇

标　　题：Exposure To Copper Altered The Intestinal Microbiota In Chinese Brown Frog (Rana Chensinensis)

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期　　刊：ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要：The intestinal microbiota is a crucial physiological system that offers multiple services to the host and contributes to the health of host. However, substantially less is known concerning the interrelation between amphibian gut microbiota and Cu exposure. R. chensinensis larvae were exposed to different concentrations of Cu (0, 0.1, 0.25, 0.75 mu M) until reached Gosner stage 38. Histological and morphological data were measured by four Cu exposure conditions. Then, the diversity, structure, and composition of intestinal microbiota were analyzed via 16S rRNA gene sequencing. These results indicated that total body length, intestinal wet weight, and total body wet weight were reduced in 0.75 mu M CuSO4 exposure group. Besides, obvious histopathologic alterations were observed in CuSO4 exposure groups. Alpha diversity significantly differentiated in 0.75 mu M CuSO4 exposure group, and beta diversity showed 0.1 mu M and 0.2 mu M CuSO4 exposure groups separation with the control group. At the phylum level of intestinal microbial community, the relative abundances of Fusobacteria were significantly decreased, while Bacteroidetes was no significant difference in all CuSO4 exposure groups. Furthermore, at the genera level, Flavobacterium has a significant higher abundance in 0.75 mu M CuSO4 exposure group, and high abundance of Rahnella was found in 0.1 mu M CuSO4 exposure group. Also, Cu exposure affected the metabolism function of R. chensinensis tadpoles based on functional prediction analysis. This work provides new perspective to explore the effect of heavy metal on the intestinal health of amphibians.

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WOS 号：000516058500006

第 33 篇

标　　题：Performance Evaluation Of Treating Oil-Containing Restaurant Wastewater In Microbial Fuel Cell Using In Situ Graphene/Polyaniline Modified Titanium Oxide Anode

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期　　刊：ENVIRONMENTAL TECHNOLOGY

摘　　要：Most studies conducted nowadays to boost electrode performance in microbial fuel cell (MFC) have focused on carbonaceous materials. The titanium suboxides (Ti4O7, TS) are able to provide a new alternative for achieving better performance in MFC and have been tested and demonstrated in this study. The Ti4O7 electrode with high electrochemical activity was modified by graphene/polyaniline by the constant potential method. Electrogenic microorganisms were more conducive to adhere to the anode electrode due to the presence of graphene/polyaniline. The MFC reactor with polyaniline /graphene modi?ed TS (TSGP) anode achieves the highest voltage with 980

mV, and produces a peak power density of 2073 mW/m(2), which is 2.9 and 12.7 times of those with the carbon cloth anode, respectively, at the 1000 omega external resistance. In addition, this study evaluates the effects of anolyte conductivity, pH, and COD on the treatment of oil-containing restaurant wastewater (OCRW) in MFC using TSGP anode. The OCRW amended with 120 mS/cm obtains the lowest internal resistance (160.3 omega). Increasing the anodic pH, gradually from acidic (pH 5.5) to alkaline conditions (pH 8.0), resulted in a gradual increase in maximum power density to 576.4 mW/m(2) and a decrease in internal cell resistance to 203.7 omega. The MFC at the COD 1500 mg/L could obtain steady-state output voltage during 103 h while removing up to 65.2% of the COD of the OCRW.

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第 34 篇

标　　题： An Interspecific Variation In Rhizosphere Effects On Soil Anti-Erodibility

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期　　刊： SCIENTIFIC REPORTS

摘　　要： Soil erosion due to underground leakage is a major factor causing land degradation in karst regions. Rhizosphere effects (REs) on soil anti-erodibility (SAE) can alleviate this type of soil erosion by improving soil physical processes such as aggregate stability. However, the magnitudes and causes of interspecific variation in REs on SAE remain unclear. We tested the rhizosphere SAE indices of 42 key woody species distributed worldwide. Biologically active matter (BAM) and analogs of antibiotics (AOAs) that affect the SAE in rhizosphere soils were tested by gas chromatography-mass spectrometry (GC-MS). We then used principal component analysis (PCA) and redundancy analysis (RA) to establish a spectrum of interspecific variability in the REs for the first time. The spectrum shows a gradient of change among species. Eleven species exerted negative REs on the SAE, while the remaining species showed positive effects along the spectrum. The species with large positive effects were mostly deciduous, which have high contents of both BAM and total organic matter and low contents of AOAs in their rhizosphere soil; compared with the other species tested, these species also have more leaves and roots and are better adapted to barren soils. The botanical characteristics of species with negative REs on the SAE differed from those with large positive effects. The contents of BAM in the rhizosphere accounted for 16-23% of the total variation in REs on the SAE. This study quantified interspecific variation in REs and identified root exudates with negative REs.

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第 35 篇

标　　题： Spatial Characteristics Of The Rainfall Induced Landslides In The Chinese Loess Plateau

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期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要： The Chinese Loess Plateau (CLP) is still undergoing development. Nearly one-third of the geological disasters take place in this region in China each year. Prior to assessing the spatial characteristics of the rainfall-induced landslides in the CLP, it is fundamental to establish a detailed landslide inventory map. This study utilizes GLDAS (Global Land Data Assimilations Systems) rainfall distribution data in the CLP based on yearly, monthly, and the daily precipitation data from 57 rain gauge stations. Geostatistics analysis and Geographic Information System technique combined with information on geological disasters within the region were used to study the spatial characteristics and trend variations of rainfall and geological disaster distribution in the region. The results indicate that a positive relationship exists between geological disaster and the average annual rainfall, correlation coefficient reaches 0.82, with zonality disasters (account for more than 90%) in the loess gullies, hills, and ridges. Seven zones of loess landside distribution were identified based on their landside densities. The spatial distribution of the geological disasters is characterized by a linear and zone shape in the CLP. These results provide a useful reference for the study of the mechanism of water-induced loess landslides.

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第 36 篇

标　　题： The Temperature Influence On The Phase Behavior Of Ionic Liquid Based Aqueous Two-Phase Systems And Its Extraction Efficiency Of 2-Chlorophenol

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期　　刊：FLUID PHASE EQUILIBRIA

摘　　要：With the increasing research on the aqueous two-phase systems (ATPS), the ATPS containing ionic liquid (IL) and salt have been widely used in the extraction and purification process. In this work, the partitioning of 2-chlorophenol in novel ATPS composed of n-butylpyridinium trifluoromethanesulfonate and salts (ammonium sulfate, sodium dihydrogen phosphate) is evaluated. Firstly, the cloud point titration method was used to determine the binodal curves data experimentally at four temperatures and atmospheric pressure. And Merchuk equation was used to fit the binodal curves. Then, the gravimetric method was used to initially determine the tie-lines data and the concentration of all the ions in the top and bottom phases were determined by ion chromatography method to study the ion exchange in the ATPS. The reliability of tie-lines was evaluated by Othmer-Tobias and Bancroft equations. Finally, the influence of types of salts and temperature on the phase diagrams were studied carefully. Besides, in order to analyze the application of ATPS in the extraction, the partition coefficient of 2-chlorophenol was calculated at the same total composition while at different temperature. The ATPS formed by n-butylpyridinium trifluoromethanesulfonate, ammonium sulfate, and water at 298.15 K was found to have the maximum amount of partition coefficient and extraction efficiency.

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第 37 篇

标　　题：Hydrochemical Relationship Between Shallow Fluoride And Underlying Paleozoic Carbonates Groundwaters

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期　　刊：GROUNDWATER

摘　　要：In the arid to semi-arid district of Chengcheng, Weinan City, in central Shaanxi Province, diminishing groundwater reserves in the shallow Quaternary (QLB) aquifer and elevated fluoride in the similarly shallow Permo-Triassic (PTF) aquifer, have promoted interest in the development of groundwater resources in the deep but poorly understood Cambrian-Ordovician carbonate aquifer system (COC). To investigate the origin of the COC groundwaters and the relationship between the deep and shallower systems, a hydrochemical study was undertaken involving 179 major and minor ion analyses, 39 stable isotope analyses (delta D and delta O-18), and 14 carbon isotope

analyses (C-14 and delta C-13). PHREEQC 3.0 was used to investigate mixing. Hydrochemical data support the presence of a well-connected regional flow system extending southwards from the more mountainous north. Stable isotope data indicate that the COC groundwaters originate as soil zone infiltration, under a much cooler regime than is found locally today. This is confirmed by C-14, which indicates the groundwater to be palaeowater recharged during the late Pleistocene (similar to 10-12 ka B.P.). The presence of nitrate in the COC groundwaters suggests leakage from overlying shallow aquifers currently provides an additional source of COC recharge, with major faults possibly providing the primary pathways for downward vertical flow.

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WOS 号： 000514237800001

第 38 篇

标　　题： Preparation Of Molecularly Imprinted Fluorescence Sensor Based On Carbon Quantum Dots Via Precipitation Polymerization For Fluorescence Detection Of Tetracycline

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期　　刊： JOURNAL OF APPLIED POLYMER SCIENCE

摘　　要： A facile and effective method was proposed to prepare the molecularly imprinted fluorescence sensor with carbon quantum dots, which were modified vinyl groups by acrylic acid on the surface. The obtained fluorescence composite material was investigated by transmission electron microscope and Fourier transform infrared spectra. After the experimental conditions were optimized, a linear range of 1.0-60 mu mol L-1 was obtained and the detection limit was 0.17 mu mol L-1. The novel fluorescence sensor can be successfully used to detect tetracycline in real samples. This study provides a convenient strategy for selective recognition and rapid detection of tetracycline in the complex environment.

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第 39 篇

标　　题： Vertical Distribution Characteristics Of Soil Moisture With Different Strata In Deep Profile In Guanzhong Basin, China

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期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：The distribution of soil moisture in loess-paleosol sequences is a critical factor that impacts the regional environment in the Chinese Loess Plateau (CLP). In this study, samples were collected from the Xiushidu (XSD) profile at the southern edge of the Jinghe River in Guanzhong Basin; specifically, the Holocene-Middle Pleistocene Lishi strata loess. They were then dry weighed, and moisture content and grain size distribution were determined using the grain size testing method. The impacts of different soil textures, sedimentary environments and other factors on the XSD profile moisture distribution in the study area were examined. The results showed that: (1) During the sequence change process from top to bottom, the soil moisture content of the loess-paleosol sequence increased and the overall average moisture content of the XSD profile was ranked in a descending order as: the middle layer of Middle Pleistocene Lishi loess>the upper layer of Middle Pleistocene Lishi loess>the Holocene>the Late Pleistocene; (2) When film water was predominant, the correlation coefficients for soil moisture content and clay, fine-silty sand, coarse silt sand and microsand content were 0.389, 0.394, -0.419 and -0.451, respectively; (3) In adjacent loess and paleosol layers, the soil moisture content of the overlying loess layer was always greater than the underlying paleosol layer. (4) In the same loess layer, minimum moisture content values were subject to the East Asia winter monsoon; as such, they often appeared in the middle layer of this glacial period. In the same paleosol layer, the opposite trend was observed.

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第 40 篇

标　　题：Poor Groundwater Quality And High Potential Health Risks In The Datong Basin, Northern China: Research From Published Data

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期　　刊：ENVIRONMENTAL GEOCHEMISTRY AND HEALTH

摘　　要：Datong Basin in China is a typical arid-semiarid inland basin, with high levels and wide distributions of arsenic (As), fluoride (F-), and iodine (I). To better understand the presence of low-quality groundwater in Datong Basin and assess the health risks for local residents, groundwater samples were collected from the shallow aquifer and in medium-deep groundwater and analyzed for As, F-, I, and nitrate (NO3-). Maxima of 1932 mu g/L for As, 80.89 mg/L for F-, 2300 mu g/L for I, and 3854.74 mg/L for NO3- were detected in shallow groundwater, which greatly exceeded the WHO limits for

drinking purpose. High-As groundwater was present in both shallow and medium-deep aquifers. High-F- and high-NO3- groundwater was widely distributed in the shallow aquifer, and high-I groundwater was mainly present in the medium-deep aquifers. Poor-quality groundwater in the Datong Basin is mainly caused by local geological and climatic conditions, which are characterized by strong evaporation, active water-rock interactions, thick lacustrine sediment, low groundwater flow rate, and reducing and weak alkaline environments. However, groundwater quality was further impacted by agricultural activities in some areas, as shallow groundwater was also polluted by nitrate. Datong Basin inhabitants face high health risk caused by high concentrations of As, F-, I, and NO3-. The mean noncarcinogenic risk values (HQ(total)) were 18.40 for children, 10.94 for adult females, and 9.47 for adult males due to exposure to contaminants in shallow groundwater; and 13.76 for children, 8.18 for adult females, and 7.08 for adult males because of exposure to medium-deep groundwater. Further, the carcinogenic risks (CR) caused by exposure to As were very high for local inhabitants, with the mean and median CR values of 4.20x10(-3) and 4.13x10(-4) in shallow groundwater and 3.44x10(-3) and 1.71x10(-4) in medium-deep groundwater, respectively.

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WOS 号： 000516648200001

第 41 篇

标　　题： Hydrogeochemical Characteristics And Health Effects Of Iodine In Groundwater In Wei River Basin

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期　　刊： EXPOSURE AND HEALTH

摘　　要： Existing studies show that drinking high-iodine or low-iodine groundwater on a long-term basis may cause goiter and other health problems. However, currently there is a lack of systematic research on the distribution, formation and health effects of iodine in groundwater at the basin scale. Taking the Wei River Basin in the Loess Plateau as a typical study area, this paper used hydrogeological surveys, sample collection, multivariate statistical analysis, health effect evaluations, and other methods, and found that iodine content in groundwater in 60.3% of the region poses potential risks to human health. Groundwater recharge areas were iodine-deficient, mainly located on the upstream Loess Plateau of the Wei River Basin in the vicinity of the Liupan Mountain watershed, and at the piedmont of the Qinling Mountains. Groundwater was low mineralization, neutral, and low-F bicarbonate, and was controlled by the weathering

and dissolution of silicate minerals and evaporites, the dissolution and precipitation of carbonates, and active water circulation conditions. Iodine-deficient endemic goiter had a potential incidence of 5-38% in these areas. Groundwater runoff areas had suitable groundwater iodine content, and the groundwater hydrochemical type was dominated by HCO3-Ca, HCO3-Na, and HCO3 center dot SO4-Na type water. The mineralization degree was modest and the I- content distribution of suitable iodine content areas was controlled by relatively active water circulation conditions. Groundwater discharge areas were high-iodine groundwater areas, where the groundwater hydrochemical type was dominated by meta-alkaline and alkaline HCO3 center dot SO4, SO4 center dot Cl, and Cl center dot SO4 type water, and controlled by the evaporation-concentration of shallow groundwater, the biodegradation of enriched organic matter, and the competitive adsorption of HCO3- and I-. Here iodine-excess endemic goiter had a potential incidence of 5-100%. Considering the results from the study area, this paper recommends that the groundwater iodine safety range for endemic goiter be set to 10.0-300.0 mu g/L.

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WOS 号： 000517397800001

第 42 篇

标　　题： Probing The Effects Of Hexavalent Chromium Exposure On Histology And Fatty Acid Metabolism In Liver Of Bufo Gargarizans Tadpoles

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期　　刊： CHEMOSPHERE

摘　　要： Hexavalent chromium is one of the major detrimental heavy metal pollutants. B. gargarizans tadpoles were treated with different concentrations of Cr6+ (0,13, 52,104, 208, and 416 mu g Cr6+ L-1) from Gs 2 to Gs 42. The effect of Cr6+ on histopathological alterations and transcript levels of fatty acid metabolism-related genes as well as fatty acids composition and content in liver were examined. Histopathological changes were observed in liver at 52, 104, 208, and 416 mu g Cr6+ L-1. Moreover, RT-qPCR analyses showed the downregulated mRNA levels of the genes related to fatty acid synthesis (SCD, MECR, TECR and ELOVLI) and fatty acid beta-oxidation (ACOT1, PPT1, HADH and ACAA2) at 416 mu g Cr6+ L-1. However, the mRNA expression of fatty acid beta-oxidation-related genes (ECHS1, HADHA and ACAA1) were significantly upregulated at 13, 52, 104, 208 and 416 mu g Cr6+ L-1. In situ hybridization revealed BSEP was expressed in hepatocyte nucleus and plasma membrane, and HSDI7BI2 was abundantly expressed in the plasma membrane. The HSD17B12 mRNA levels were significantly upregulated in tadpoles exposed to all Cr6+ treatment groups, while the BSEP mRNA levels were downregulated at 104, 208

and 416 mu g Cr6+ L-1 groups compared to control. In addition, an increase in polyunsaturated fatty acids and a decrease in monounsaturated fatty acids were found in 52, 104 and 416 mu g Cr6+ L+1 groups. Overall, chronic exposure to Cr6+ may suppress fatty acid synthesis, disturb fatty acid beta-oxidation, aggravate disorders of hepatic function and induce hepatic impairment in B. gargarizans tadpoles. (C) 2019 Elsevier Ltd. All rights reserved.

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第 43 篇

标　　题： Interactions Of Chlorella Vulgaris And Fly Ash Cenospheres In Heat-Aided Ballasted Flotation

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期　　刊： ALGAL RESEARCH-BIOMASS BIOFUELS AND BIOPRODUCTS

摘　　要： Heat-aided ballasted flotation using industrial waste heat is a cog-effective and eco-friendly technology to harvest microalgae from aquatic environment. However, the underlying mechanism of this process is not yet fully understood. This study investigates the interactions between Chlorella vulgaris and fly ash cenospheres in heat-aided ballasted flotation based on the Extended Derjaguin-Landau-Verwey-Overbeek approach. The results indicated that Lifshitz-van der Waals interaction played an important role in the attachment of algal cell on fly ash cenospheres. Furthermore, the Lewis acid-base interaction changed from repulsion to attraction in the system due to heating, which promoted the algal cells to attach on fly ash cenospheres, resulting in a higher harvesting efficiency. However, when the temperature was increased to 90 degrees C, the Lifshitz-van der Waals interaction was reversed, which resulted in an energy barrier. The total attractive interaction increased with the decrease in pH from 10 to 4, due to changes in electrostatic interaction. After surface modification of fly ash cenospheres, the electrostatic interaction was always attractive in this system at pH of 7 regardless of temperature variations. Finally, according to the experimental results and the Extended Derjaguin-Landau-VerweyOverbeek analysis, the usage of surface modified fly ash cenospheres for heat-aided ballasted flotation can be advantageous for environmental safety and high efficiency.

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第 44 篇

标　　题： Temporal-Spatial Variations Of Fungal Composition In Pm2.5 And Source Tracking Of

Airborne Fungi In Mountainous And Urban Regions

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期　　刊：SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要：Fungi are ubiquitous in air and their composition is potentially important for human health. Exposure to fungal allergens has been considered as a significant risk factor due to the prevalence and severity of asthma in humans. However, temporal-spatial variations and potential sources of airborne fungi aerosol have been poorly understood. In this study, 48 PM2.5 samples were collected at two sampling sites in Xi'an from April 2018 to January 2019. High-throughput sequencing technology was used to determine the diversity and abundance of fungal composition in all samples. Microbial samples were also collected from leaf-surface and soil to identify the potential sources of fungal aerosols. Results showed that the species richness of fungi in summer and autumn inclined to be higher than that in spring and winter in mountainous and urban regions. Airborne fungal species richness and diversity at Mt. Qinling sampling site were significantly higher compared to Yanta urban sampling site, except in winter. These variations in fungal composition were significantly related to season and location. The influence of atmospheric pollutants (PM2.5, ozone, sulfur dioxide and carbon monoxide) on the richness and diversity of airborne fungal composition was higher than meteorological factors (temperature, relative humidity and wind speed). Moreover, it was observed that the leaf-surface was the primary local source of airborne fungi during all seasons at both sampling sites. Back trajectories arriving at both sampling sites showed that a considerable part of airborne fungi might have come from other regions by medium or long-range airflow. This study will provide an important reference for studying the source and temporal-spatial variations of fun- gal aerosols and further provide basic background data for human health exposure assessment.

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WOS 号：000506214900086

第 45 篇

标　　题：Measurement And Correlation Of Liquid-Liquid Equilibrium Data For The Ternary Systems Tetrabutylammonium Dicyanamide+1-Propanol/2-Propanol + Water At Different Temperatures

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期　　刊： FLUID PHASE EQUILIBRIA

摘　　要： In this work the ionic liquid tetrabutylammonium dicyanamide ([N-4,N-4,N-4,N-4][dca]) was selected as extraction solvent to separate 1-propanol (NPA) and 2-propanol (IPA) from their aqueous solutions. The experimental liquid-liquid equilibrium data for the ternary systems ([N-4,N-4,N-4,N-4][dca] + NPA/IPA + H2O) were measured at 303.15, 308.15, 313.15 and 323.15 K and atmospheric pressure. The equilibrium data were correlated by the NRTL model, and the consistency of correlation parameters was checked. Furthermore, the extraction capability of [N-4,N-4,N-4,N-4][dca] was evaluated using distribution coefficients and selectivities. These parameters, for the ternary systems studied, increase with decreasing temperature. This study shows that [N-4,N-4,N-4,N-4][dca] is a promising solvent for the extraction of NPA and IPA from water.

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WOS 号： 000517851800006

第 46 篇

标　　题： Control And Remediation Methods For Eutrophic Lakes In The Past 30 Years

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期　　刊： WATER SCIENCE AND TECHNOLOGY

摘　　要： Accelerated eutrophication, which is harmful and difficult to repair, is one of the most obvious and pervasive water pollution problems in the world. In the past three decades, the management of eutrophication has undergone a transformation from simple directed algal killing, reducing endogenous nutrient concentration to multiple technologies for the restoration of lake ecosystems. This article describes the development and revolution of three remediation methods in application, namely physical, chemical, and biological methods, and it outlines their possible improvements and future directions. Physical and chemical methods have obvious and quick effects to purify water in the short term and are more suitable for small-scale lakes. However, these two methods cannot fundamentally solve the eutrophic water phenomenon due to costly and incomplete removal results. Without a sound treatment system, the chemical method easily produces secondary pollution and residues and is usually used for emergency situations. The biological method is cost-effective and sustainable, but needs a

long-term period. A combination of these three management techniques can be used to synthesize short-term and long-term management strategies that control current cyanobacterial blooms and restore the ecosystem. In addition, the development and application of new technologies, such as big data and machine learning, are promising approaches.

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第 47 篇

标　　题： Non-Darcian Flow In Loess At Low Hydraulic Gradient

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通讯作者： Qian, H (corresponding author), Changan Univ, Sch Water & Environm, Xian 710054, Shaanxi, Peoples R China.

期　　刊： ENGINEERING GEOLOGY

摘　　要： Determining the mechanism of water flow in loess involves many problems that are vital to science and engineering. Water flow through loess has usually been assumed to follow Darcy's law, but this has not been properly validated. The main objective of this study is to validate the applicability of Darcy's law for loess. For this purpose, we conducted constant-head permeability,experiments and mercury injection porosimetry (MIP) on loess specimens of different dry densities. The results indicate that Darcy's law is not suitable for describing water seepage in loess at low hydraulic gradient, since there is a threshold hydraulic gradient (i(0)) below which no flow is observed and a critical hydraulic gradient (i(cr)) below which the relationship between the hydraulic gradient (i) and seepage velocity (v) is non-linear. The MIP results show that variation in hydraulic conductivity is closely related to the pore size distribution (PSD) in loess specimens: i(0) is positively correlated with the content of pores with diameters in the range of 0.01-1 mu m and negatively correlated with the content of pores with; diameters larger than 3 mu m The existence of bound water on loess is the main reason that its permeability, deviates from Darcy's law. The mechanism of water movement in loess can be fully understood by considering the effect of bound water.

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第 48 篇

标　　题： Examining The Physical And Chemical Contributions To Size Spectrum Evolution During The Development Of Hazes

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期　　刊： SCIENTIFIC REPORTS

摘　　要： China has experienced severe hazes with high concentrations of particulate matter in recent years. The understanding of the size spectrum evolution of submicron particulate matter is critical to making efficient remediation policies to minimize the regional and global environmental impacts from hazes. During a time period of about one month, we monitored five severe haze episodes in Xi'an and four severe haze episodes in Beijing, which were characterized by two distinct kinds of aerosol mass concentration growth processes: accumulative-rise and abrupt-rise. A new method was developed to quantitatively evaluate the physical and chemical contributions to growth processes by analysing the size spectrum evolution data. The results showed that the accumulative-rise processes are governed by primary emissions and the abrupt-rise processes are governed by secondary chemical reactions. The population balance equations (PBE) were used to describe the variation of size spectrum of fine particulate matter, and the respective contributions of the physical aggregation rate and the chemical growth rate. The PBE model is solved using the adjustable direct quadrature method of moments (ADQMOM) to simulate the abrupt-rise process of haze development and to calibrate the contribution of the physical and chemical effects on the size spectrum of aerosol particles.

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WOS 号： 000563370200037

第 49 篇

标　　题： Temporal Changes Of Groundwater Quality Within The Groundwater Depression Cone And Prediction Of Confined Groundwater Salinity Using Grey Markov Model In Yinchuan Area Of Northwest China

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期　　刊： EXPOSURE AND HEALTH

摘　　要： Due to long-term overexploitation, the Yinchuan area of China has formed a groundwater depression cone in the confined aquifer. The formation of the groundwater depression cone will have a great impact on the hydrochemical evolution of

groundwater, thus affecting the groundwater quality and associated human health. To study the characteristics and evolution of the depression cone and its impacts on the confined groundwater quality, groundwater level data from 1990 to 2019 and groundwater quality data from 1991 to 2018 were collected and analyzed. Groundwater level charts were generated to delineate the evolution of the groundwater depression cone. Graphical approaches and correlation analysis were applied to reveal the general hydrochemical characteristics of the groundwater within the depression cone and the major factors affecting the hydrochemical evolution of the confined groundwater. Grey Markov model was used to predict the TDS concentration in the confined aquifer in 2019 and 2020. The results show that the groundwater level in the groundwater depression cone center has recovered to a certain extent since 1993 due to existing groundwater protection measures, but the horizontal area of the groundwater depression cone (the area confined by 1100 m groundwater level contour) has increased greatly and it has expanded to 310.51 km(2) by 2019. Groundwater samples from the phreatic aquifer were mainly of SO4 center dot Cl-Ca center dot Mg and HCO3-Ca center dot Mg types, and the confined groundwater was mainly of SO4 center dot Cl-Na and HCO3-Ca center dot Mg types. Groundwater leakage from phreatic aquifer to the confined aquifer, dissolution and precipitation of minerals and cation exchange are important factors affecting the hydrochemical evolution of confined groundwater, and these factors have different effects in different years. The forecasted values of TDS concentration in 2019 and 2020 are 450.60 and 433.50 mg/L, respectively.

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WOS 号： 000521912700001

第 50 篇

标　　题： Influence Of Tectonic Uplift Of The Qinling Mountains On The Paleoclimatic Environment Of Surrounding Areas: Insights From Loess-Paleosol Sequences, Weihe Basin, Central China

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通讯作者： Qian, H (corresponding author), Changan Univ, Sch Environm Sci & Engn, Xian 710054, Shaanxi, Peoples R China.

期　　刊： CATENA

摘　　要： The southern edge of the Chinese Loess Plateau affected by the stepwise uplift of the Qinling Mountains is a transitional climatic area between the different climatic environments and sedimentary characteristics to the north and south sides of the Qinling Mountains. The study of different Quaternary loess deposits in this region is conducive to improving our understanding of the micro-scale climatic effects of tectonic developments. Here, we use a series of experimental methods on a well-preserved loess-paleosol sequence in the South Jingyang Plateau to obtain proxy data, including grain-size, magnetic susceptibility, loss on ignition, and geochemical elemental. Changes in grain-size, magnetic susceptibility and loss on ignition indicate that the East Asian monsoon has undergone significant changes due to the continued

global cooling and mid-Pleistocene climate transition during the deposition process of XSD loess, i.e., the intensities of the winter and summer monsoons were simultaneously enhanced. Elemental correlations and factor analysis indicate the sedimentary environment and provenance of the deposits, while elemental enrichment and element ratios, including Si/Ti, Al/Ti, Rb/Sr and Zr/Rb, are consistent with changes in the intensity of pedogenic and of the East Asian monsoon as reflected by climate proxies, illustrating that XRF core scanning analysis technology has great potential in the field of Quaternary environmental changes of loess. Furthermore, the stepwise uplift of the Qinling Mountains, which has blocked the winter and summer monsoons to a certain extent, has had a significant impact on the relative degree of loess accumulation and pedogenic in the northern piedmont, southern piedmont and intermontane basin of the Qinling Mountains and also appears to have promoted settlement by early humans. Hence, the study of paleoclimate in areas of active tectonic movement has the potential to promote our understanding of micro-scale climate change in this region in the future.

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第 51 篇

标　　题： Spatial Variability And Radiation Assessment Of The Radionuclides In Soils And Sediments Around A Uranium Tailings Reservoir, South Of China

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期　　刊： JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY

摘　　要： The concentrations of U-238, Ra-226, Th-232 and K-40 and gross alpha, beta were measured in soils and sediments around a uranium tailings reservoir to analyze the distribution of radionuclides and evaluate radiation impacts. Results showed that the highest concentrations of U-238, Ra-226 and Th-232 occurred in the tailings sand, while the highest concentrations of K-40 in the farmland. Nuclides concentrations and radioactivity levels decreased with distance away from the reservoir area. Moreover, the calculated gamma absorbed dose rates varied from 54 to 5369 nGy h(-1) in study area. The average absorbed dose rate was approximately 52 times higher than the national average value in the tailings reservoir, but it reduced to about twice in the sediments downstream.

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第 52 篇

标　　题：Assessment And Mechanism Of Fluoride Enrichment In Groundwater From The Hard Rock Terrain: A Multivariate Statistical Approach

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期　　刊：GEOCHEMISTRY INTERNATIONAL

摘　　要：Groundwater is only the primary source for drinking water in the northern Telangana, South India, where a number people suffers from fluorosis. With this concern a 34 groundwater samples were collected and studied to identify the occurrence, hydrochemical distribution of fluoride groundwater, using geo-statistical tool such as principal component analysis (PCA), saturation indices (SI), and correlation analysis were executed in this study. The concentration of fluoride ranges from 0.06 to 4.33 mg/L, with a mean of 1.13 mg/L and 30% of groundwater samples having above the maximum acceptable limit of 1.2 mg/L fluoride for drinking purposes. Fluoride shows a considerable relation with pH, and TDS, while fluoride also demonstrations an insignificant correlation with Ca2+. Moreover, alkaline nature, elevated HCO3-, Na+ and Na+-HCO3- water type were also influenced to enhance the fluoride concentration in the groundwater. The two components from the principal components (PC) analysis reveals that chemical variable accounts for above 67% of the total variance of the groundwater chemistry. The PC-1 and PC-2 have high positive loadings reveals that the dissolution of fluoride bearing minerals like apatite and biotite are the chief source to larger concentration of fluoride in the study region groundwater. Further, groundwater also obviously approves the over-saturated with respect to calcite, fluorite, and dolomite are the major factors to upholds the enrichment of fluoride concentration, while the geogenic activities are also a principal controlling factors to influence the groundwater chemistry in the study region.

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WOS 号：000525599100008

第 53 篇

标　　题：Intrinsic Cross-Correlation Analysis Of Hydro-Meteorological Data In The Loess Plateau, China

作　　者：[Wei, Xiaowei; Zhang, Hongbo; Gong, Xinghui; Wei, Xingchen; Dang, Chiheng; Zhi, Tong] Changan Univ, Sch Environm Sci & Engn, Xian 710054, Peoples R China; [Zhang, Hongbo; Gong, Xinghui] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effect Arid Reg, Minist Educ, Xian 710054, Peoples R China

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China.

期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要：The purpose of this study is to illustrate intrinsic correlations and their temporal evolution between hydro-meteorological elements by building three-element-composed system, including precipitation (P), runoff (R), air temperature (T), evaporation (pan evaporation, E), and sunshine duration (SD) in the Wuding River Basin (WRB) in Loess Plateau, China, and to provide regional experience to correlational research of global hydro-meteorological data. In analysis, detrended partial cross-correlation analysis (DPCCA) and temporal evolution of detrended partial-cross-correlation analysis (TDPCCA) were employed to demonstrate the intrinsic correlation, and detrended cross-correlation analysis (DCCA) coefficient was used as comparative method to serve for performance tests of DPCCA. In addition, a novel way was proposed to estimate the contribution of a variable to the change of correlation between other two variables, namely impact assessment of correlation change (IACC). The analysis results in the WRB indicated that (1) DPCCA can analyze the intrinsic correlations between two hydro-meteorological elements by removing potential influences of the relevant third one in a complex system, providing insights on interaction mechanisms among elements under changing environment; (2) the interaction among P, R, and E was most strong in all three-element-composed systems. In elements, there was an intrinsic and stable correlation between P and R, as well as E and T, not depending on time scales, while there were significant correlations on local time scales between other elements, i.e., P-E, R-E, P-T, P-SD, and E-SD, showing the correlation changed with time-scales; (3) TDPCCA drew and highlighted the intrinsic correlations at different time-scales and its dynamics characteristic between any two elements in the P-R-E system. The results of TDPCCA in the P-R-E system also demonstrate the nonstationary correlation and may give some experience for improving the data quality. When establishing a hydrological model, it is suitable to only use P, R, and E time series with significant intrinsic correlation for calibrating model. The IACC results showed that taking pan evaporation as the representation of climate change (barring P), the impacts of climate change on the non-stationary correlation of P and R was estimated quantitatively, illustrating the contribution of climate to the correlation variation was 30.9%, and that of underlying surface and direct human impact accounted for 69.1%.

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第 54 篇

标　　题：Deposition Of Mofs On Polydopamine-Modified Electrospun Polyvinyl Alcohol/Silica Nanofibers Mats For Chloramphenicol Adsorption In Water

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期　　刊：NANO

摘　　要：Nanofiber mats produced by electrospinning, with the advantages of specific surface area, porosity and chemical tenability, are an ideal support material for deposition of metal-organic framework (MOF) crystals. In this study, four types of MOFs (MIL-53(Al), ZIF-8, UiO-66-NH2 and NH2-MIL-125(TH) were deposited on polydopamine (PDA)-modified electrospun polyvinyl alcohol (PVA)/SiO2 organic-inorganic hybrid nanofiber mats by bulky synthesis. Because of the formation of Si-O-C-O-Si bridges between PVA chains and silica network, electrospun PVA/SiO2 organic-inorganic hybrid nanofiber mats are quite stable in water or organic solvents and at high temperature are suitable as supports for MOFs deposition. The PDA layer, which exhibits a powerful adhesive ability to attach foreign objects, can effectively improve growth of MOFs on the surface of PVA/SiO2 nanofiber mats. The obtained MOF composites combining the unique properties of electrospun nanofibers mats and MOFs particles become flexible and tailorable, greatly expanding the application range of MOFs materials. The synthesized MOF composites were used to adsorb chloramphenicol (CAP) in water. It was found that the four MOF composites could remove CAP from water effectively and MIL-53(Al) composite had the highest adsorption capacity due to the higher specific surface area.

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第 55 篇

标　　题：Photothermal Polymethylsilsesquioxane-Vinyltrimethoxysilane-Polypyrrole Xerogel For Efficient Solar-Driven Viscous Oil/Water Separation Through One-Pot Synthesis Route

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期　　刊：JOURNAL OF PHOTONICS FOR ENERGY

摘　　要：Increasing oil spill accidents and oil industrial wastewater have led to the frequent occurrence of oily contaminants To remedy these environmental risks, separating oil/water mixtures by absorbent materials has shown great potential. However, viscous oils are difficult to clean up with conventional materials because of their high viscosity with respect to practical applications. A photothermal (PMSQ)-vinyltrimethoxysilane (VTMS)-polypyrrole (PPy) xerogel was fabricated to heat the viscous oil by utilizing the photothermal property of PPy. The chemical structure and micronano morphology

of the obtained composite xerogel were confirmed by Fourier transform infrared spectroscopy, scanning electron microscopy, and contact angle goniometry. Experiments of oil adsorption show that the PMSQ-VTMS-PPy xerogel could be applied for viscous oil/water mixture separation, exhibiting excellent properties such as water-repellency, high oil/water separation capacity, adequate buoyancy, good reusability, and easy fabrication. Such a remarkable performance of the PMSQ-VTMS-PPy photothermal xerogel is caused by the fact that crude oil could be heated by harvesting sunlight to reduce the viscosity of oil and achieve the goal of rapidly separating the oil/water mixture. Because of the facile and scalable merits, the one-pot sol-gel method presented is very suitable for industrial uses. (C) 2020 Society of Photo-Optical Instrumentation Engineers (SPIE)

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WOS 号： 000590138400008

第 56 篇

标　　题： Seasonal Variation Of Drinking Water Quality And Human Health Risk Assessment In Hancheng City Of Guanzhong Plain, China

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期　　刊： EXPOSURE AND HEALTH

摘　　要： This research was conducted to understand the seasonal characteristics of water quality for domestic purpose in Hancheng City of the Guanzhong plain, China. The health risks were also assessed using the water quality monitoring data collected from the Hancheng Center for Disease Control and Prevention. For this study, 48 samples were collected from the drinking water distribution system (chlorinated water and terminal tap water) in the dry and wet seasons, and were analyzed for pH, total hardness (TH), total dissolved solids (TDS), Cl-, SO42-, F-, NH4-N, NO3-N, Cr6+, As, Hg and Mn. The water quality was assessed using the entropy water quality index (EWQI) and the results show that above 80% of the water samples are of good quality which is suitable for drinking and other domestic purposes. The potential non-carcinogenic risks of Cr6+, As, F-, and NO3-N and carcinogenic risks of Cr6+ and As to consumers were assessed by the model recommended by the US Environmental Protection Agency (USEPA). The non-carcinogenic health risks in the dry season are higher than the risks in the wet season for both adults and children. Water quality indicators considered in the risk assessment contribute with different degrees to the total non-carcinogenic risk during

the dry and wet seasons. The order of the average non-carcinogenic risk values of the chlorinated water and terminal tap water in the dry season was F- > As > NO3-N > Cr6+, while that in the wet season was F- > NO3-N > Cr6+ > As. People face higher carcinogenic risk in the wet season in terms of terminal tap water consumption, while they face higher carcinogenic risk in the dry season in terms of the chlorinated water. Children face almost twice higher the carcinogenic risks than the adults.

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第 57 篇

标　　题： Effective And Reusable Oxidative Desulfurization Of Dibenzothiophene Via Magnetic Amino-Mil-101 Supported H3Pmo6W6O40 Components: Comparison Influence On Various Types Of Mil-101

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期　　刊： ENERGY & FUELS

摘　　要： Different metal-organic frameworks, MIL-101(Al) and MIL-101(Fe), were compared to use in fixing active components H3PMo6W6O40 (abbreviated as POM in this work), and Fe3O4 was also introduced to endow them with magnetic properties, namely, the final catalysts as Fe3O4@NH2-MIL-101-POM (abbreviated as Fe@NH2-MIL-101-POM). Their characterization was assessed by FT-IR, XRD, BET, SEM, and vibrating sample magnetometer analyses, mainly discussing the comparison of different MIL-101 materials in the system. Under the oxygen in air as the oxidant, both catalysts were used in the oxidative desulfurization process to remove dibenzothiophene (DBT). Moreover, POMs loading amount, catalyst amount, reaction temperature, air flow rate, and agitation rate were also compared to study for optimal reaction conditions. Remarkably, Fe@NH2-MIL-101(Fe)-POM showed an excellent conversion (100%) in 60 min with a lesser catalyst amount and more recycling times. The results could be attributed to the larger surface area of MIL-101(Fe), leading to attachment with more active components, which could provide more contact opportunity with DBT under air. This finding shed new light on the MIL-101(Fe) materials in the oxidative desulfurization process as an effective supporter to fix other active components in the future.

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第 58 篇

标　　题：Synthesis Of Cost-Effective Pomelo Peel Dimethoxydiphenylsilane-Derived Materials For Pyrene Adsorption: From Surface Properties To Adsorption Mechanisms

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期　　刊：ACS OMEGA

摘　　要：This study investigated the adsorption behaviors of pyrene (PYR) on a pomelo peel adsorbent (PPA), biochar (PPB), and H3PO4-modified (HPP), NaOH-activated (NPP), and dimethoxydiphenylsilane-treated (DPDMS-NPP) pomelo peel materials. SEM, FTIR, and elemental analyses of DPDMS-NPP's surface structure showed that the material was characterized by a well-developed porous structure, a large specific surface area (698.52 m(2)g(-1)), and an abundance of phenyl functional groups. These properties enhance the PYR adsorption performance of DPDMS-NPP. Experimental results indicated that the adsorption capacity of DPDMS-NPP was significantly affected by the amount of material used and the initial concentration of PYR. Kinetic assessments suggested that PYR adsorption on PPA, NPP, and DPDMS-NPP could be accurately described by the pseudo second-order model. The adsorption process was controlled by several mechanisms, including electron donor-acceptor (EDA), electrostatic, and pi-pi interactions as well as film and intraparticle diffusion. The adsorption isotherm studies showed that PYR adsorption on DPDMS-NPP and PPA was well described by the Langmuir model and the maximum Langmuir adsorption capacity of DPDMS-NPP was 531.9 mu g g(-1). Overall, the results presented herein suggested that the use of DPDMS-NPP adsorbents constitutes an economic and environmentally friendly approach for the mitigation of PYR contamination risks.

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第 59 篇

标　　题：Spatial Characteristics Of Heavy Metal Contamination And Potential Human Health Risk Assessment Of Urban Soils: A Case Study From An Urban Region Of South India

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期　　刊：ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY

摘　　要：Due to the rapid development of urbanization, the contamination of heavy metals in urban soils has become one of the major concerns of environmental and risk to humans. The main objective was to determine the contamination of six heavy metals in 25 urban soils and also to evaluate the associated health risk via diverse indices for adults and children. The mean concentration of Pb (47.48 mg/kg), Cr (43.24 mg/kg), Cu (40.64 mg/kg), Zn (34.68 mg/kg), Co (16.54 mg/kg), and Ni (7.55 mg/kg) exceeded the geochemical background values. Pb and Zn were closely attributed to traffic sources. Geo-accumulation index (I-geo) showed that Pb and Co in the soils were at the moderately pollution level, while 4% of soil samples were moderately polluted to heavily pollution levels by Cu. Enrichment factor (EF) showed that soils presented minor to severe anthropogenic pollution levels in the investigated region. The heavy metals to the non-carcinogenic risk of humans in the investigated region are absolutely from Cr and Pb, while the carcinogenic risk is controlled by Cr, and the remaining metals pose no possible risk to the local people. Specially, children had larger health risks in terms of non-carcinogenic risks than adults which may be related to their behavioral and physiological characteristics.

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第 60 篇

标　　题：Hydrogen Bonded-Directed Pure Organic Frameworks Based On Ttf-Tetrabenzoic Acid And Bipyridine Base

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期　　刊：SYNTHETIC METALS

摘　　要：Although MOFs and HOF based on X-shaped tetracarboxylic acid with tetrathiafulvalene (H4L) have been synthesized, the acid-base system of the ligand H4L has not reported. In this research, hydrogen-bonded organic frameworks based on H4L with difference bipyridine base (bipy and bipy-ete) were constructed. The deprotonated forms of H4L could act as hydrogen-bond donors or acceptors depending on the deprotonated carboxyl groups. One salt [H2L](2-)[bipy-H-2](2+) H2O [bipy = 4,4'-bipyridine] 1 and one co-crystal [H4L][bipy-ete] [bipy-ete = trans-1,2-bis(4-pyridyl)ethane], 2, have been synthesized and full characterization. Compound 1 and 2 showed excellent and reproducible photocurrent response. The current response of 2 was larger than that of 1. These results open a new method to design HOFs materials based on TTF, which could act as a potential material to be used in the electro-optic field.

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第 61 篇
标　　题： Assessing Natural Background Levels In Shallow Groundwater In A Large Semiarid Drainage Basin
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期　　刊： JOURNAL OF HYDROLOGY
摘　　要： Natural background level (NBL) is a prerequisite for identifying groundwater pollution and for the evaluation of pollution control effectiveness. However, due to regional differences of natural geogenic, hydrogeological, biological and atmospheric processes, together with long-term intense anthropogenic activities, it is no longer reasonable to assess NBL as a single value without including human impact. This paper shows the importance of regional division based on the knowledge of geology, hydrogeology and anthropogenic activities on the assessment of NBLs. In the study, the Guanzhong Basin, situated in central China with an area of 20,035 km(2) was divided into ten groundwater environmental units (GEUs) based on hydrogeological structures and groundwater flow systems. A total of 509 shallow groundwater samples were collected throughout the basin. Based on samples from each GEU, NBLs of Na+, Ca2+, Mg2+, HCO3-, SO42-, Cl-, F-, Cr6+, TH and TDS were evaluated by using iterative 2-delta technique (2-delta), calculated distribution function (CDF) and Grubbs' test. The results indicate the distinct characteristics of NBLs for the various GEUs: NBLs of Na+, SO42-, Cl-, HCO3-, F- and TDS north of the Wei River obviously exceeded those in the south; NBLs of most ions for GEU-V and GEU-X were highest north and south of the Wei River, respectively. Through detailed analyses of the natural and anthropogenic influences on NBLs, we found that the outcrops of Tertiary rocks in the Li mountains determine the highest NBLs of chemical components for GEU-X south of the Wei River; long-term irrigation is responsible for the highest NBLs of TDS, Na+, Mg2+, HCO3-, SO42- and Cl- for GEU-V; rapid urbanization in Xi'an (GEU-VIII) slows down the accumulation of chemical components (e.g. TDS) in shallow groundwater by reducing evaporation and mixing of shallow water with deep water through ground fissures. Assessment of NBLs on a regional scale lays the basis for identification of groundwater pollution and is helpful for the reasonable management and effective protection of groundwater resources.
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WOS 号： 000527390200011

第 62 篇

标　　题：Analysis Of Spatial Differences In Permeability Based On Sedimentary And Structural Features Of The Sandstone Aquifer Overlying Coal Seams In Western China

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期　　刊：MINE WATER AND THE ENVIRONMENT

摘　　要：A sandstone aquifer covers the primary mineable coal seam within the Jurassic Ningdong coal field in western China and threatens the safety of mining the shallow seam. Although geological boreholes were located in and surrounding the study area, no hydrogeological boreholes existed within it, so six factors (the ratio between the sandstone aquifer and entire strata thicknesses, sandstone thickness, grit thickness, number of sandstone layers, fault fractal dimension, and fold fractal dimension) were used as indicators of aquifer permeability. Using a pair-wise comparison approach, the influence weights of these six factors on the permeability coefficient were defined as 0.131, 0.243, 0.161, 0.106, 0.197, and 0.161, respectively. Integration of the area's geological and hydrogeological conditions, and geological exploration, drilling, and three-dimensional seismic data resulted in partitioning of the permeability levels within the study area after fuzzy comprehensive evaluation. Comparing the results with actual conditions and the observed working panel water inflows verified that the proposed method for analysis of spatial differences can be used to guide future water prevention and control efforts.

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第 63 篇

标　　题：The Quantity And Type Of Ils Needed To Form Magnetic-Heteropolyacid Mesoporous Catalysts And Their Highly Performance For Dbt Removal

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期　　刊：SUSTAINABLE ENERGY & FUELS

摘　　要：Magnetic-heteropolyacid mesoporous catalysts, formed through the linkage of an ionic

liquid, a magnetic Fe3O4@MCM-41 support, and a heteropolyacid, have been prepared and used in the deep oxidative desulfurization process. When various molar ratios of ionic liquid were introduced into the system, viscosity was shown to be an important factor in determining the ODS efficiency, and 0.4 mL of ionic liquid (MPI-0.4) could achieve the best effects. Also, different types of ionic liquid, with the main difference being the length of the carbon chain, showed varying desulfurization effects. With oxygen in the air as the oxidant, MPI-c (ionic liquid carbon chain length n = 14) proved to demonstrate the perfect desulfurization efficiency in the DBT removal process, not only in model oil but also in real diesel, reaching a removal rate of up to 100% within 60 min. Moreover, it could be recycled at least 15 times under simple external magnetic field separation with no obvious decrease in catalytic performance.

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第 64 篇

标　　题： Hydrochemical Characteristic Of Groundwater And Its Impact On Crop Yields In The Baojixia Irrigation Area, China

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期　　刊： WATER

摘　　要： While irrigated crops produce much higher yields than rain-fed crops, the ionic components of irrigation water have important effects on crop yield. Groundwater is widely used for irrigation in the Baojixia irrigation area in China. The chemical characteristics and water quality of groundwater in the Baojixia irrigation area were analyzed and evaluated to study the impact of groundwater quality on crop yield. Results showed cations in the groundwater to mainly be Na+, Ca2+, and Mg2+, whereas the anions are mainly HCO3-, SO42-, and Cl-. Water-rock interaction and cation exchange were identified as the main factors affecting hydrogeochemical properties from west to east. The study found salinity and alkalinity of groundwater in the western region of the study area to be low, and therefore suitable for irrigation. Groundwater in the eastern part of the study area was found to have a medium to high salinity and alkalinity, and is therefore not recommended for long-term irrigation. The groundwater irrigated cultivation of wheat and corn in the research area over 2019, for example, would have resulted in a drop in the annual crop output and an economic loss of 0.489 tons and 0.741 x 10(4) yuan, respectively. Irrigation using groundwater was calculated to result in the cumulative loss of crop yields and an economic loss of 49.17 tons and 80.781 x 10(4) yuan, respectively, by 2119. Deterioration of groundwater quality will reduce crop yields. It is recommended that crop yields in the study area be increased by strengthening irrigation water management and improving groundwater

quality.

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第 65 篇

标　　题： An Improved Scs-Cn Method Incorporating Slope, Soil Moisture, And Storm Duration Factors For Runoff Prediction

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期　　刊： WATER

摘　　要： Soil Conservation Service Curve Number (SCS-CN) is a popular surface runoff prediction method because it is simple in principle, convenient in application, and easy to accept. However, the method still has several limitations, such as lack of a land slope factor, discounting the storm duration, and the absence of guidance on antecedent moisture conditions. In this study, an equation was developed to improve the SCS-CN method by combining the CN value with the tabulated CN2 value and three introduced factors (slope gradient, soil moisture, and storm duration). The proposed method was tested for calibration and validation with a dataset from three runoff plots in a watershed of the Loess Plateau. The results showed the model efficiencies of the proposed method were improved to 80.58% and 80.44% during the calibration and validation period, respectively, which was better than the standard SCS-CN and the other two modified SCS-CN methods where only a single factor of soil moisture or slope gradient was considered, respectively. Using the parameters calibrated and validated by dataset of the initial three runoff plots, the proposed method was then applied to runoff estimation of the remaining three runoff plots in another watershed. The proposed method reduced the root-mean-square error between the observed and estimated runoff values from 5.53 to 2.01 mm. Furthermore, the parameters of soil moisture (b(1) and b(2)) is the most sensitive, followed by parameters in storm duration (c) and slope equations (a(1) and a(2)), and the least sensitive parameter is the initial abstraction ratio lambda on the basis of the proposed method sensitivity analysis. Conclusions can be drawn from the above results that the proposed method incorporating the three factors in the SCS method may estimate runoff more accurately in the Loess Plateau of China.

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第 66 篇

标　　题： In-Situ Monitoring And Characteristic Analysis Of Freezing-Thawing Cycles In A Deep Vadose Zone

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期　　刊：WATER

摘　　要：Freeze-thaw cycles play a critical role in affecting ecosystem services in arid regions. Monitoring studies of soil temperature and moisture during a freeze-thaw process can generate data for research on the coupled movement of water, vapor, and heat during the freezing-thawing period which can, in turn, provide theoretical guidance for rational irrigation practices and ecological protection. In this study, the soil temperature and moisture changes in the deep vadose zone were observed by in-situ monitoring from November 2017 to March 2018 in the Mu Us Desert. The results showed that changes in soil temperatures and temperature gradients were largest in soil layers above the 100-cm depth, and variations decreased with soil depth. The relationship between soil temperature and unfrozen water content can be depicted well by both theoretical and empirical models. Due to gradients of the matric potential and temperature, soil water flowed from deeper soil layers towards the frozen soil, increasing the total water content at the freezing front. The vapor flux, which was affected mainly by temperature, showed diurnal variations in the shallow 20-cm soil layer, and its rate and variations decreased gradually with increasing soil depths. The freeze-thaw process can be divided into three stages: the initial freezing stage, the downward freezing stage, and the thawing stage. The upward vapor flux contributed to the formation of the frozen layer during the freezing process.

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第 67 篇

标　　题：Efficient 3D-Interfacial Solar Steam Generation Enabled By Photothermal Nanodiamonds Paint-Coat With Optimized Heat Management

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期　　刊： APPLIED THERMAL ENGINEERING

摘　　要： Photothermal materials are crucial for maximizing the solar energy in solar steam generation. The conventional photothermal materials have limited absorption broadband, complicated manufacture, expensive cost and difficulty in scaling up. To remedy this dilemma, we herein propose a novel cog-effective nanodiamonds(NDs) paint-coat using filter papers (FPs) as a supporting scaffold. The phy-chemical characterizations of samples like morphology, structure and optical properties indicate that the NDs paint-coat has bandwidth absorption, porous network structure, and high absorption ability. For the sake of evaluating their practical applications, NDs paint-coat and 3D conical structures were further designed to constitute a 3D-interfacial solar steam generation (3D-ISSG). Owing to the rationally 3D structure, the heat loss and optical loss have been effectively restrained through optimized heat management within the 3D-ISSG. The experimental results show that the solar thermal conversion efficiency of 3D-ISSG was achieved up to 82.97% for evaporation under one sun illumination (1 kW/m(2)), which is about 4.16 times as high as the pure water. Moreover, the 3D-ISSG performs reliable reusability after 15 cycling experiments under 1 kW/m(2) solar illumination, indicating its broad application prospect for new energy devices, seawater desalination and water treatment.

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WOS 号： 000525326400020

第 68 篇

标　　题： A Comparison Of Methods To Estimate Groundwater Recharge From Bare Soil Based On Data Observed By A Large-Scale Lysimeter

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期　　刊： HYDROLOGICAL PROCESSES

摘　　要： Effectively estimating groundwater recharge is critical to manage water resources, especially in arid and semi-arid regions as impacted by intensive human activities and climate changes. Rare insights have been gained into groundwater recharge since direct observation is hard to carry out. Although several methods are currently available to estimate groundwater recharge, the estimated results may cover noticeable bias. The behaviours of different methods based on different conceptual frameworks and exhibiting different levels of complexity should be examined to estimate actual groundwater recharge. This study aims to assess the performance of four common methods to estimate groundwater recharge. For this end, large-scale lysimeters equipped with soil water content sensors and water table sensors were set up at a

research site established in Guanzhong Basin of China. The data achieved by 1-year observation were employed to compare four estimation methods. As revealed from the results, the following findings are drawn. (a) Groundwater level fluctuation (GLF) method is simple, whereas its accuracy is determined by specific yield, and adopting a water balance method to estimate specific yield can considerably enhance the accuracy of GLF. (b) The calibrated numerical model can obtain the optimal result compared with the other methods, whereas long-term observation data are required for parameter calibration. (c) In the water balance method, the maximum entropy production (MEP) model and a practical method (estimating evaporation between two rainfall events) were used to calculate evaporation. As indicated by the results, water balance method combined with MEP is capable of obtaining more reliable results of groundwater recharge compared with the practical method. (d) With an analytical model based on linearized Richards' equation, accurate results can be achieved. What is more, the analytical model only needs the measurement of soil moisture near the surface. The limitation of this method is that it is difficult to determine the maximal water flux. The mentioned findings are of critical implications to the management and sustainable development of groundwater.

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第 69 篇

标　　题： Sorption-Desorption Mechanisms And Environmental Friendliness Of Different Surfactants In Enhancing Remediation Of Soil Contaminated With Polycyclic Aromatic Hydrocarbons

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期　　刊： JOURNAL OF SOILS AND SEDIMENTS

摘　　要： Purpose The ionic and nonionic surfactants have different adsorption-desorption models for polycyclic aromatic hydrocarbons (PAHs) in soil-water system, due to the difference in the composition and charge of the hydrophilic groups. Surfactant eluents retained in the soil may also have a secondary effect on the soil environment. Thus, the aim of the study was to investigate sorption-desorption mechanisms and environmental toxicity of different surfactants in enhancing remediation of soil contaminated with PAHs. Materials and methods The distribution of PAHs between different surfactants and soil is influenced by the surfactant bilayer formation. The average molecular density, Sips isotherm, critical micelle concentration (CMC), and critical washing concentration

(CWC) models were used to explore the mechanisms involved in the adsorption-desorption of cationic (cetyltrialkylammonium bromide, CTAB), anionic (sodium dodecyl benzene sulfonate, SDBS), and nonionic (TritonX-100, TX100) surfactants. These models were associated with the surfactant-enhanced remediation (SER) of naphthalene-contaminated soil. The mean concentrations and activity of indigenous bacteria were used to detect the toxic effect of the above surfactants on soil environment. Results and discussion The results of SER experiments showed that there are critical washing points (SDBS = 2.4 CMC, TX100 = 4.6 CMC, CTAB = 3.3 CMC) for different surfactants washing naphthalene (Nap). The values of CWC corresponding to critical washing points were key variables driving the need for added surfactants to remove or immobilize Nap. The CWC of different surfactants could be conveniently predicted by a model based on the surfactant-derived organic carbon. In addition, the mean concentration of viable bacteria in biological culture experiment was highest for TX100, followed by CTAB and SDBS. Conclusions This study revealed the effects of average molecular density and surfactant-derived organic carbon on the distribution of Nap, and suggested a model for calculating CWC of different surfactants, to optimize SER technology. Biological culture experiment indicated that the high concentration and ionic surfactants had a significantly toxic effect on indigenous bacteria.

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第 70 篇

标　　题： Preparation Of Photo/Electro-Sensitive Hydrogel And Its Adsorption/Desorption Behavior To Acid Fuchsine

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期　　刊： WATER AIR AND SOIL POLLUTION

摘　　要： Macroscopic utilization of nanomaterial provides a new idea for the research and development of novel adsorbent, which can enhance efficiency in the adsorption and elution process. In this paper, nano-polypyrrole (PPy) was dispersed into two inexpensive and renewable biomass materials, gelatin (Gel) and chitosan (CS), to fabricate a novel photo/electric-sensitive hydrogel, Gel/CS/PPy. The micro-network of Gel/CS/PPy shows a high adsorption rate of 94.2% for acid fuchsine (AF). Furthermore, with the addition of polypyrrole, Gel/CS/PPy has the characteristic of photo/electric response, which can improve the elution efficiency of AF from the adsorbent. The results showed that the elution efficiency could be increased by 4 times with photo-assistance, and about 2 times with electro-assistance. Predictably, using the methods described in this article, high-quality adsorbents can be designed for more organic pollutants.

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第 71 篇

标　　题： Divergent Gross Nitrogen Transformation Paths In The Topsoil And Subsoil Between Abandoned And Agricultural Cultivation Land In Irrigated Areas

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期　　刊： SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要： The nitrate concentration in groundwater has increased in many irrigated areas worldwide due to the excessive use of both water and fertilizers. Abandoned farmlands in such irrigated areas may alter the nitrogen (N) cycle because of drastically changed water and N inputs. However, the mechanisms of the N cycle in response to such changes remain unclear. We studied biogeochemical N cycling and microbiological responses from abandoned arable lands (AF), for the topsoil (20 cm depth) and subsoil (100 cm depth) layers, in comparison with irrigation-fertilization (control = CK) land, by using Is N tracing techniques, the 16S rRNA gene, and real-time PCR (qPCR) to reveal the mechanisms underpinning the N cycle. We found that the biogeochemical environment of abandoned soils shifted their N-cycling pathways. Except for reduced soil moisture, soil properties of total C and N, as well pH, showed improvement in the two layers of AF. But the microbial abundances of ammoniaoxidizing bacteria (AOB-amoA), archaea (AOA-amoA), bacteria and fungi were all significantly lower in the AF; and they presented a consistent trend in the subsoil of the two lands. Significant differences in gross N transformation rates were found for mineralization rates (M N) and autotrophic nitrification rate (ONH4) between lands or depths. Compared with AF, M-N was increased by 1.45- and 11.75-times, and ONH4 by 1.69- and 2.89-times in the topsoil and subsoil of CK, respectively. Our results suggest that the SM x C/N interaction provides insight into the mechanisms underlying the soil microbe-driven changes to transformation rates in nitrogen dynamics after abandoning water-limited lands. The high moisture and N inputs reported here highlight the dynamics and prevalence of M-N and ONH4. and an increasing the nitrate leaching rate in the unsaturated zone, which poses a major threat to groundwater quality.

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第 72 篇

标　　题： Impact Of An Artificial Lake On The Regional Groundwater Environment In Urban Area Of Northwest China

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： In many densely populated urban areas, artificial lakes have replaced natural river systems as water sources to provide people with water for living and industrial production. However, groundwater mounding due to seepage from water storage facilities will have an impact on the regional groundwater flow regime. This study investigated the effects of the construction and operation of the Doumen Reservoir in northwestern China on the local groundwater flow regime. Groundwater level variations before the construction of the impoundment were analyzed by wavelet analysis and indicated that most of the observed variations in levels were due to changes in groundwater abstraction in the area. Data were collected from drilling and real-time monitoring; a coupled Hydrus-1D and MODFLOW model was developed to simulate the impact of water storage on the surrounding groundwater environment. The simulation results show that compared with the initial flow field, the maximum elevation of the groundwater mound that would develop beneath water storage structured in the area would vary between about 4.9 and 6.9 m. Compared with the impoundment of the test section, other modeled scenarios will cause varying degrees of groundwater mounding around the reservoir area but no flooding of existing infrastructure is predicted to take place. The predicted seepage rate from the facility is 3660 m(3)/day, and anti-seepage measures are recommended to limit the effects of groundwater mounding.

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第 73 篇

标　　题： Alterations To Groundwater Chemistry Due To Modern Water Transfer For Irrigation Over Decades

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期　　刊： SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要： After a long-term surface irrigation in the southern edge of the Chinese Loess Plateau, the local groundwater is diluted to some extent, which differs from most of the other surface irrigation systems. Identifying the origin of groundwater salinity and determining the implications of irrigation can provide insights into the sustainable development of irrigation systems. In this study, a comprehensive investigation of groundwater, river water, canal water, and irrigation system was conducted. Our results suggest that the irrigation activities produce significant influence on the hydrochemistry of both river and groundwater. In the north-eastern part of the study area, hydrochemistry types are mainly HCO3-Na and HCO3 center dot SO4-Na types which is recharged by the river replenished by water transfer for irrigation. In the south-western part, groundwater is mainly HCO3-Na center dot Mg type which largely directly receives canal water recharge. The correlation between the irrigation water volume and the salinity variation confirms that mixing with fresh irrigation water which was derived from the reservoirs and the canals, during the irrigation period, dilutes the local groundwater. The natural hydrogeochemical processes of the loess aquifer suggest that the water-rock interactions and cation exchange process supply the excessive Na+ and other solutes to the groundwater, resulting HCO3-Na type water with high salinity. Additionally, the slow Groundwater flow and poor hydrologic cycle between the groundwater and the scarce rainfall promote natural salts accumulation. The delta O-18 and delta D values indicate that modern rainfall may only account for small part of recharge to groundwater. In contrast, the irrigation water, as well as the canal and the reservoir seepage, contribute to a large proportion of groundwater recharge. The finding is beneficial for the policy-makers for the future water management schemes, in large surface irrigation systems, in order to achieve sustainable development goal. (C) 2020 Elsevier B.V. All rights reserved.

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第 74 篇

标　　题： Influence Of Short-Term Rainfall Forecast Error On Flood Forecast Operation: A Risk Assessment Based On Bayesian Theory

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期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要： To study rainfall forecast error's influence on flood operation, short-term (24 hours ahead) rainfall forecast accuracy in Qian river basin were analyzed, probabilities of

event on flood operation risk were estimated based on Bayesian theory, and the dynamic control scheme was discussed. Results show that, accuracy rate and missing report rate decreased while vacancy rate increased with the increase of rainfall forecast magnitude. For flood operation based on current rainfall forecast information of different magnitudes, level I (no rain) error nearly has no impact on it, level II (light rain) error has a little impact on small flood operation, and level III (no less than moderate rain) error has a great impact on large flood. For the dynamic control scheme in flood season, it is not necessary to discharge flood ahead of schedule so that limited water level can be kept at the upper boundary to provide higher potential energy for power generation when forecasting rainfall shows no rain or light rain, while it should be discharged ahead of schedule so that limited water level can be kept at a lower value to ensure an adequate flood storage capacity when forecasting rainfall shows no less than moderate rain.

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第 75 篇

标　　题： Removal Of Harmful Algal Blooms In Freshwater By Buoyant-Bead Flotation Using Chitosan-Coated Fly Ash Cenospheres

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期　　刊： ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要： Harmful algal blooms (HABs) are a growing problem worldwide, damaging human and ecosystem health. In this study, a novel buoyant-bead flotation (BBF) method using chitosan-coated fly ash cenospheres (CFACs) was developed to remove HABs in freshwater. To achieve a high removal efficiency of harmful algae (Chlorella vulgaris, Scenedesmus quadricauda, and Microcystis aeruginosa), this study investigated the effects of chitosan/fly ash ratios in CFAC composite, CFAC concentration, flotation time, and pH values on the microalgae removal. The optimized ratio of CFACs is 0.1:12, and the optimized CFAC concentration is 0.3-0.7 g L-1. However, the lower or higher ratios (0.1:4, 0.1:8, 0.1:16) result in microalgae reaching a zero-point charge too late or early, which failed to effectively remove HABs with an appropriate coal fly ash dosage. An optimized removal efficiency of 98.50% for Microcystis aeruginosa was reached at pH of 6.0. The optimized efficiency of Scenedesmus quadricauda and Chlorella vulgaris was 99.37% and 91.63%, respectively, at pH of 8.0. At neutral pH conditions, the surface charge of microalgae cells and CFACs are different, promoting

aggregate formation. When CFACs were used to remove microalgae, aggregate size significantly influenced removal efficiency. Meanwhile, at the optimized pH and concentration, the removal efficiency of all three algal species exceeded 90.00% in 5 min. The study highlights an efficient and inexpensive method for removing HABs and obtains the optimized operational conditions.

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第 76 篇

标　　题： Facile Synthesis Polymeric Schiff Base Metal Complex As Electrode For High-Performance Supercapacitors

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期　　刊： JOURNAL OF THE ELECTROCHEMICAL SOCIETY

摘　　要： This research presents a simple method for preparing poly Schiff base ligand (L) and its metal complex (M-L, M = Al3+, Cr3+, Zn2+) as electrode materials for supercapacitors, which is derived from mixing terephthalaldehyde, m-phenylenediamine and metal nitrate in ethanol at room temperature. Compared with L, M-L combine the advantages of larger surface area, appropriate mesopore diameter, unique morphology and suitable conductivity. The electrochemical properties of the materials are assessed by cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) and electrochemical impedance spectroscopy (EIS) analysis in 6 M KOH electrolyte. The results show that the electrochemical performance of M-L significantly improve compared with L, especially when the current density is 0.5 A g(-1), Al-L displays a superior specific capacitance of 608.6 F g(-1). Moreover, the specific capacitance of Al-L still reaches 299.1 F g(-1) after 1000 GCD cycles at 10 A g(-1), which is higher than the initial capacitance of Cr-L and Zn-L. Moreover, the electrochemical resistance of Al-L is smaller than that of others. Therefore, Al-L will become an attractive material in supercapacitors, and opens the door for further research on various poly Schiff base metal complexes (poly[M(Schiff)]) as electrode materials for supercapacitors.

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第 77 篇

标　　题： Estimating The Potential Toxicity Of Chiral Diclofop-Methyl: Mechanistic Insight Into The Enantioselective Behavior

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期　　刊：TOXICOLOGY

摘　　要：Chiral pollutants are widely distributed in the environment; however, the enantioselective toxic effects of these chemicals have still not fully been clarified. Using wet experiments and computational toxicology, this story was to explore the static and dynamic toxic reactions between chiral diclofop-methyl and target protein at the enantiomeric level, and further unveil the microscopic mechanism of enantioselective toxicity of chiral pesticide. Steady-state and time-resolved results indicated that both (R)-/(S)-enantiomers can form the stable toxic conjugates with target protein and the bioaffinities were 1.156 x 10(4) M-1/1.734 x 10(4) M-1, respectively, and significant enantioselectivity was occurred in the reaction. Results of the modes of toxic action revealed that diclofop-methyl enantiomers located in the subdomain IIA, and the strength of important noncovalent interactions between (S)-diclofop-methyl and the residues was greater than that of (R)-diclofop-methyl. The Gibbs free energies of the chiral reactions were - 26.89/ - 29.40 kJ mol(-1) and - 25.79/ - 30.08 kJ mol(-1), respectively, which was consistent with the outcomes of photochemistry and site-specific competitive assay. Dynamic enantioselective processes explained that the impact of intrinsic protein conformational flexibility on the toxic reaction of (R)-diclofop-methyl was lower than that of (S)-diclofop-methyl, which originates from the con- formational changes and spatial displacement of the four loop regions (i.e. h6 <-> h7, h5 <-> h6, and h8 <-> h9). The quantitative data of circular dichroism spectra confirmed such results. Energy decomposition displayed that the electrostatic energy of the target protein-(S)-diclofop-methyl system (- 25.86 kJ mol(-1)) was higher than that of the target protein-(R)-diclofop-methyl complex (- 18.21 kJ mol(-1)). Some crucial residues such as Lys195, Lys-199, Ser-202, and Trp-214 have been shown to be of different importance for the enantioselective toxicity of chiral diclofop-methyl. Obviously this scenario will contribute mechanistic clues to assessing the potential hazards of chiral environmental pollutants to the body.

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第 78 篇

标　　题：Finding High-Quality Groundwater Resources To Reduce The Hydatidosis Incidence In The Shiqu County Of Sichuan Province, China: Analysis, Assessment, And Management

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期　　刊：EXPOSURE AND HEALTH

摘　　要：The prevalence of hydatidosis due to animal husbandry development poses significant health risks to people in the Shiqu County of Sichuan Province, China, where people depend mainly on surface water for domestic uses, which, however, is contaminated due to the development of the animal husbandry. Therefore, groundwater which is protected by the vadose zone and has better quality is now proposed to replace the contaminated surface water as a new source of water supply in this area. To find a high-quality groundwater resource, a detailed investigation and assessment was carried out in this study. The occurrence and distribution of the hydatidosis caused by the consumption of the contaminated surface water were analyzed. The World Health Organization (WHO) and national standards were applied to assess the suitability of groundwater for drinking purpose, and SAR, RSC, %Na, PI were used to evaluate the groundwater quality for irrigation usage. In addition, the overall groundwater quality was assessed using an entropy water quality index (EWQI), and its relationships with the physicochemical indices were discussed using the multiple linear regression models to explore the most important physicochemical indices affecting the groundwater quality. Finally, some measures for the prevention and treatment of the hydatidosis disease were proposed. The results show that the groundwater found beneath the study area is generally in good to excellent quality with low salinity and major ions. Groundwater in all constructed wells except only one is suitable for domestic and irrigation purposes with majority of the samples falling into HCO3-Ca center dot Mg type. The overall groundwater quality is mainly affected by COD, SO42-, and TH. Measures to reduce the incidence of hydatidosis such as cutting off the hydatidosis exposure pathway and improving the sanitation system are proposed.

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第 79 篇

标　　题：Improved Sma-Based Scs-Cn Method Incorporating Storm Duration For Runoff Prediction On The Loess Plateau, China

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期　　刊： HYDROLOGY RESEARCH

摘　　要： In the Soil Conservation Service Curve Number (SCS-CN) method for estimating runoff, three antecedent moisture condition (AMC) levels produce a discrete relation between the curve number (CN) and soil water content, which results in corresponding sudden jumps in estimated runoff. An improved soil moisture accounting (SMA)-based SCS-CN method that incorporates a continuous function for the AMC was developed to obviate sudden jumps in estimated runoff. However, this method ignores the effect of storm duration on surface runoff, yet this is an important component of rainfall-runoff processes. In this study, the SMA-based method for runoff estimation was modified by incorporating storm duration and a revised SMA procedure. Then, the performance of the proposed method was compared to both the original SCS-CN and SMA-based methods by applying them in three experimental watersheds located on the Loess Plateau, China. The results indicate that the SCS-CN method underestimates large runoff events and overestimates small runoff events, yielding an efficiency of 0.626 in calibration and 0.051 in validation; the SMA-based method has improved runoff estimation in both calibration (efficiency = 0.702) and validation (efficiency = 0.481). However, the proposed method performed significantly better than both, yielding model efficiencies of 0.810 and 0.779 in calibration and validation, respectively.

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第 80 篇

标　　题： Contamination Level, Distribution Characteristics, And Ecotoxicity Of Tetrabromobisphenol A In Water And Sediment From Weihe River Basin, China

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Tetrabromobisphenol A (TBBPA) is a brominated flame retardant, which is widely present in the various environmental and biological media. The knowledge on the contamination of TBBPA in Weihe River Basin is still limited. In order to know the pollution level and distribution of tetrabromobisphenol A (TBBPA) in the Weihe River Basin, a total of 34 sediment samples and 36 water samples were collected from the main stream and tributaries of the WeiHe River Basin, and the concentration of TBBPA

in the samples was analyzed by high-performance liquid chromatography-electrospray ionization-mass spectrometry (HPLC-ESI-MS). The detection frequency of TBBPA in sediments and water samples was 61.8% and 27.8%, respectively; the TBBPA concentrations in sediments and water samples were in the range of not detected (N.D.)-3.889 ng/g (mean value of 0.283 ng/g) and N.D-12.279 ng/L (mean value of 0.937 ng/L), respectively. Compared with other areas in China, the residues of TBBPA in the Weihe River Basin were at a relatively low level. The spatial distributions of TBBPA in surface sediments and water indicated that the local point-input was their major source. This is related to the proximity of some sampling sites to industrial areas and domestic sewage discharge areas. The insignificant correlation between TBBPA and total organic carbon (TOC) indicated that TBBPA in sediments is not only influenced by TOC but also affected by atmosphere and land input, wet deposition, and long-distance transmission. The potential risks posed by TBBPA in water and sediment were characterized using the risk quotient (RQ) method. The calculated RQ for TBBPA was less than 0.01, showing that the ecological risk due to TBBPA was quite low for aquatic organisms.

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第 81 篇

标　　题： Controlling Factors And Mechanism Of Groundwater Quality Variation In Semiarid Region Of South India: An Approach Of Water Quality Index (Wqi) And Health Risk Assessment (Hra)

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期　　刊： ENVIRONMENTAL GEOCHEMISTRY AND HEALTH

摘　　要： The study region comprises fractured granitic, basaltic and lateritic aquifer system constituted by Precambrian rocks. Groundwater is the primary source for drinking and household needs. Its quality is a big issue in the three aquifers, which are mostly of human health concern. Many developing regions suffer from lack of safe drinking water, thereby health problems arise in many parts of the regions, and Telangana state is one of them. For this reason, 194 groundwater samples were collected and analyzed for fluoride, nitrate, chloride and other physicochemical parameters. The concentrations of fluoride (F-), nitrate (NO3-), magnesium (Mg2+), total dissolved solids and total hardness are above the acceptable limits for drinking purposes, prescribed by the World Health Organization. The higher concentrations of fluoride and nitrate in drinking water cause health hazards, and above 50% of the groundwater samples are not suitable for drinking purposes with respect to fluoride and nitrate. Weathering of rocks and dissolution of fluoride-bearing minerals can be a cause for higher fluoride concentrations, while anthropogenic sources are one of the major reasons for higher

nitrate concentrations in the study area. Groundwater suitability for irrigation suggests that more than 90% of the groundwater sampling locations are suitable for irrigation. In addition, health risk assessments were evaluated by using the United States Environmental Protection Agency model, to determine the non-carcinogenic risk of fluoride and nitrate in drinking water for adults (females and males) and children. The ranges of hazard index in all sampling locations are varied from 0.133 to 8.870 for males, 0.146 to 10.293 for females and 0.419 to 29.487 for children, respectively. The health risk assessment results indicated that children were more exposed to health risk, due to the intake of high contaminated drinking water with respective of nitrate and fluoride in the study region.

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第 82 篇

标　　题： Effect Of Wheat Straw Derived Biochar On Immobilization Of Cd And Pb In Single- And Binary-Metal Contaminated Soil

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期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要： Biochar is a promising adsorption amendment on reducing the bioavailability of heavy metals in contaminated soils. A greenhouse pot experiment was carried out to study the influence of wheat straw biochar (WSB) at different application rates (0%, 0.5%, 1%, and 5% w/w) on pH, electrical conductivity (EC) and toxicity characteristic leaching procedure (TCLP) extractable concentrations of Cd and Pb in single- and binary-metal contaminated soil. Ryegrass (Lolium perenne L.) was used as an indicator plant to evaluate the bioavailability of Cd and Pb. The results showed that the increase in addition of WSB from 0.5% to 5% significantly decreased the TCLP-Cd and Pb concentrations by 9.28-43.59% and 7.45-50.92%, respectively, as compared with control. Pb exhibited more competitive ability than Cd on WSB adsorption sites when coexisted in soil. The application of WSB alleviated the accumulation and uptake of Cd and Pb in the ryegrass shoot and root biomass and facilitated ryegrass growth. Overall, the application of WSB at a high application rate (e.g., 5%) with ryegrass cultivation is an effective method to immobilize Cd and Pb in single- and binary-metal contaminated soil. In the future, it is necessary to determine the long-term field effects of this application.

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第 83 篇

标　　题：Preparation Of Heterometallic Coni-Mofs-Modified Bivo4: A Steady Photoanode For Improved Performance In Photoelectrochemical Water Splitting

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期　　刊：APPLIED CATALYSIS B-ENVIRONMENTAL

摘　　要：In this work, an efficient nanoporous BiVO4 composite photoelectrode with high photocurrent and low onset potential for photoelectrochemical water splitting is achieved through modification of BiVO4 with a stable heterometallic CoNi-MOF layer. Compared with pristine BiVO4 anode, the formation of CoNi-MOFs/BiVO4 increases the photocurrent density by about 260 %. In addition, the CoNi-MOFs/BiVO4 photoanode is of greater steadiness for water oxidation, without insignificant activity attenuation within 3 reaction hours at 1.23 V vs. RHE. It is postulated that bimetal-organic framework CoNi-MOFs could supply more open sites which account for the impressively enhanced PEC performance of BiVO4 photoanodes toward water splitting under illumination. The results demonstrate a new method to fabricate dual metal nanoparallelepiped-like MOF for steady hydrolysis photoanode material.

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第 84 篇

标　　题：Synthesis Of Modified Chitosan Gel Beads And Adsorption Performance Of Cu(Ii)

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期　　刊：WATER AIR AND SOIL POLLUTION

摘　　要：In the present study, millimeter CS-TPP@MnFe(2)O(4)gel beads (particle size 3-4 mm) were prepared by the sol-gel process using the embedding method, and its performance of Cu(II) and influence factors were studied. The effect of various parameters such as the gel bead addition amount, adsorption time, temperature, pH, and competitive

substances (anion and cationic) was studied. The surface and properties of gel beads were characterized by X-ray diffraction (XRD), Fourier transforms infrared spectroscopy (FTIR), and transmission electron microscopy (TEM). The experimental results showed that the optimal pH for adsorption of Cu(II) by CS-TPP@MnFe(2)O(4)was 5-7, the adsorption of Cu(II) reached equilibrium at 24 h, and the maximum adsorption capacity could reach 125.70 mg g(-1)at 298.15 K by Langmuir isotherm model. K+, Na+, Cl-, NO3-, and SO(4)(2-)had little effect on the adsorption, and Ca2+, Mg2+, and H(2)PO(4)(-)inhibited the adsorption, and SiO(3)(2-)and humic acid (HA) promoted the adsorption of Cu(II) by the adsorbent. After five adsorption-desorption experiments, the desorption rate of gel beads reached 89.3%, and the adsorption capacity of Cu(II) was still high. In conclusion, the CS-TPP@MnFe(2)O(4)gel beads are a type of stable and effective materials to remove Cu(II) from water.

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第 85 篇

标　　题： Analysis Of Viscosity Test Conditions For Crumb-Rubber-Modified Asphalt

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通讯作者： Li, PL (corresponding author), Changan Univ, Key Lab Rd Struct & Mat, Minist Transport, Xian 710064, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Brookfield's rotational viscosity has been widely applied for characterizing the rheological behavior of crumb-rubber-modified asphalt (CRMA). However, the test conditions greatly influence the viscosity results of CRMA. Effectively choosing the rotor and rotational speed for CRMA remains unclear. The rotors with different specifications were selected to test 180 degrees C viscosity of CRMA with different rubber contents under different rotational speeds. Meanwhile, the viscosity corresponding to 50% was obtained by interpolation, and the test principles and variation law of asphalt viscosity were analyzed by applying rheological principles. This investigation analyzed the influence of rotors and speeds on CRMA viscosity and torque during viscosity testing and established the relation between torque and viscosity. Results show that rotor model and test speed significantly affect CRMA viscosity and that of the base asphalt is not affected. Torque and speed has a power- and quadratic-function relation with CRMA viscosity, respectively, whereas there is a linear relation between torque and speed. The rotor and speed recommendations for 180 -viscosity of CRMA with different test accuracy requirements are given, ensuring the effectiveness and comparability of the CRMA viscosity test results. (C) 2020 Published by Elsevier Ltd.

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第 86 篇

标　　题：Evolution Of The Hydrogeological Structure And Disaster-Generating Mechanisms Of Landslides In Loess Slopes Of The Southern Jingyang Plateau, Shaanxi, China

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期　　刊：HYDROGEOLOGY JOURNAL

摘　　要：Landslides in loess slopes are mainly triggered by heterogeneity in hydrogeology. The southern Jingyang Plateau (China) was selected to characterize the geological structure and groundwater synergetic mechanisms that trigger landslides through groundwater-soil interactions. The study investigated hydrogeological and irrigation factors, the groundwater-perching effect of paleosols, the groundwater-conducting effect of fissures, and the damming effect of slide mass accumulation. A two-dimensional steady unsaturated numerical seepage model of a vertical section was established to simulate landslide evolution induced by irrigation and fissures. Long-term irrigation causes springs and weak zones to develop when the water table rises above the slope foot. Perched groundwater can lead superfluous water to migrate to the slope edge. The downward expansion of fissures and water migration can mutually cause extension of weak zones beneath fissures. A slip zone may appear when the weak zone connects to weaknesses at the slope foot, which forms a larger foot along the slope. Landslides occur frequently under the combined action of hydrostatic pressure from water-filled cracks, dynamic water pressure from a rising water table, and depressed sliding resistance caused by water enrichment in soil. After sliding, the slide mass will accumulate at the slope foot, blocking the original groundwater drainage point, so the water level may rise again, leading to subsequent landslides developing with new fissures and continued irrigation. Investigations in areas irrigated by groundwater wells showed that pumping can lower the water table in the soil and eliminate weak zones at the slope foot, effectively reducing the occurrence of landslides.

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第 87 篇

标　　题：Novel All-Solid-State Z-Scheme Sno2/Pt/In2O3 Photocatalyst With Boosted Photocatalytic Performance On Water Splitting And 2,4-Dichlorophenol Degradation Under Visible Light

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通讯作者： Bai, B (corresponding author), Changan Univ, Sch Water & Environm, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian 710064, Peoples R China.; He, C (corresponding author), Xi An Jiao Tong Univ, Sch Energy & Power Engn, State Key Lab Multiphase Flow Power Engn, Xian 710049, Shaanxi, Peoples R China.

期　　刊： CHEMICAL ENGINEERING JOURNAL

摘　　要： Fabricating Z-scheme photocatalytic system is of great significance for water splitting and degradation of organic pollutants. However, it is highly challenging to select suitable materials to form Z-scheme photocatalysis systems due to the harsh requirement for band edge levels alignment and interfacial contact. In this work, a novel all-solid-state Pt-bridge SnO2/Pt/In2O3 Z-scheme photocatalyst was prepared by an ingenious in situ deposition and photo-reduction protocol. The physicochemical properties of prepared materials were characterized via SEM, TEM, BET, DRS, PL, and EIS. It is revealed that the visible light absorption capacity of prepared composites was remarkably enhanced due to the localized surface plasma resonance effect of Pt nanoparticles. Moreover, such Pt nanoparticles act as the electron mediator of photogenerated carriers, and the photogenerated electron hole pairs of SnO2/Pt/In2O3 Z-scheme photocatalysts can be effectively separated, which hence reserving the most favorable reductive and oxidative reaction sites. The photocatalytic degradation efficiency of 2,4-dichlorophenol (50 mg L-1) over SnO2/Pt/In2O3 under visible light reaches 90% in 180 min, and the optimal photocatalytic H-2 generation rate reaches 967.018 mu mol h(-1) g(-1), respectively more than 9.36 and 19.40 times higher than that of pure In2O3 (103.358 mu mol h(-1) g(-1)) and SnO2 (49.847 mu mol h(-1) g(-1)). In addition, the stability experiments showed that the H-2 generation rate of the SnO2/Pt/In2O3 Z-scheme photocatalyst after five cycles has only decreased by 8.96%. This work not only demonstrates a facile and eco-friendly strategy to prepare highly active and stable photocatalyst, but provides a new viewpoint about designing and constructing novel Z-scheme photocatalytic materials.

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第 88 篇

标　　题： Assessment Of Ecological Environment Impact In Highway Construction Activities With Improved Group Ahp-Fce Approach In China

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期　　刊： ENVIRONMENTAL MONITORING AND ASSESSMENT

摘　　要： Highway construction is time consuming and complicated. Various environmental issues can be encountered during this process. Therefore, it is necessary to assess the impact of ecologic environment in highway construction. However, the traditional assessment approaches paid more attention to the environmental factors rather than the ecological problems, and the weights of evaluation indexes were assigned with relatively average values, which cannot comprehensively and accurately to assess the impact of ecological environment in highway construction. In order to solve these problems, this paper established a new model to combine improved group AHP and FCE. A total of six main factors and 22 sub-factors from three aspects of social, ecological, and natural environment were identified. The model and index system were applied to the ecological environment impact assessment of the highway from the city of Hanzhong to Lueyang County section in Shaanxi Province, and compared with traditional fuzzy AHP approach to verify the feasibility of this model. The results showed that only the ranking of social and ecological factor changed when comparing with the traditional approach. The weight of social factor determined by the improved approach was 0.2835, while that of the traditional approach was only 0.2365, and the weight difference was 0.047. This improved approach highlighted the importance of social factor and overcame the equal weight distribution of traditional approach, which made the overall weight ratio distribution more reasonable and objective. The comprehensive assessment result was 0.3482, which was in line with the general impact level. This was consistent with the actual situation of highway construction. The improved group AHP-FCE model could be used successfully for assessing the impact of the ecological environment in highway construction, and it had good applicability and popularization value in ecological environment assessment.

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第 89 篇

标　　题： Regional Groundwater Cycle Patterns And Renewal Capacity Assessment At The South Edge Of The Junggar Basin, China

作　　者： [Qiao, Xiao-ying; Wang, Wen-ke; Duan, Lei; Xiao, Ping] Changan Univ, Sch Water & Environm, Xian 710054, Shaanxi, Peoples R China; [Qiao, Xiao-ying; Wang, Wen-ke; Duan, Lei] Changan Univ, Minist Educ, Key Lab Subsurface Hydrol & Ecol Effect Arid Reg, Xian 710054, Shaanxi, Peoples R China; [Wang, Yan-lin] Dept Nat Resources Shaanxi Prov, Xian 710068, Shaanxi, Peoples R China

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期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：The groundwater cycle pattern in the arid and semi-arid regions is drastically affected by both natural condition changes and human activities, resulting in serious eco-geological environmental problems. This paper selected the south edge of the Junggar basin as a pilot area for the basin-scale assessment of groundwater renewal capacity. Assessment indicator system was first established, assessment units were then constructed, and the Analytic Hierarchy Process method was used to identify the weights of the assessment indicators. The first three indicators are natural recharge ratio, groundwater residence time, and balance ratio between groundwater recharge and exploration, respectively. Two types of environmental assessment models, including the comprehensive index model and the fuzzy comprehensive model, were used and the results determine that low-lying intermountain areas and alluvial-proluvial piedmont plains have stronger groundwater renewal capacity, whereas that of the alluvial plain is much weaker. Second, at the typical watershed scale, the Manasi watershed was adopted as the study area, and numerical simulation method was used to assess the groundwater renewal capacities of intermountain low-lying land and the pediment alluvial-proluvial plain. They are found to have renewal periods of about 66.95 years and 25.05 years, respectively. These values are favorably compared to the results of isotopic analysis, which is corresponding to 46 years and 30 years, respectively. At last, four schemes were put forward to improve the regulation and storage capacity in different segment of Manasi River watershed. The results not only provide key guidance for reasonable groundwater resource exploitation and eco-environmental protection, but also offer a model for sustainable groundwater utilization for similar northwestern districts in China or other world similar districts.

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第 90 篇

标　　题：Evaluation Of The Contact Characteristics Of Graded Aggregate Using Coarse Aggregate Composite Geometric Indexes

作　　者：[Ding, Zhan] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Xian 710064, Shaanxi, Peoples R China; [Li, Peilong; Wu, Xu; Gao, Peng; Su, Jinfei; Sun, Shengfei] Changan Univ, Key Lab Rd Struct & Mat Minist Transport, Xian 710064, Peoples R China; [Wu, Xu] Survey & Design Inst Co Ltd, Gansu Prov Transportat Planning, Xian, Peoples R China

通讯作者：Li, PL (corresponding author), Changan Univ, Key Lab Rd Struct & Mat Minist Transport, Xian 710064, Peoples R China.

期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：The influence of the aggregate's geometric properties on its contact characteristics was investigated by testing the geometric parameters of three aggregates types using the aggregate imaging system (AIMS). The graded aggregate's composite geometric indexes were formulated to analyze and evaluate its contact characteristics; additionally, an aggregate contact-slip tester was developed to determine the contact characteristics of various graded aggregates. Results show that particle shape and angularity are

affected by mechanical processing; angularity and textural characteristics are influenced by the rock material's nature, and particle size has little effect on the aggregate's geometric characteristics. The values of the composite geometric parameters of graded aggregates with different nominal maximum aggregate sizes increase with the increasing specific gravity of the coarse aggregate. As the ratio of coarse to fine aggregate increases, the graded geometric index of the coarse aggregate in the aggregate increases. Higher the coarse aggregate in the gradation system, lesser is the fine aggregate, and hence, greater is the contact effect on the aggregate. CITX has a good correlation with the graded aggregate's contact characteristics. Thus, the particle contact effect of graded aggregate and the degree of skeletal interlocking can be effectively evaluated using CITX. (C) 2020 Published by Elsevier Ltd.

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第 91 篇

标　　题： Preparation And Modification Of Mullite Whiskers/Cordierite Porous Ceramics For Cu2+ Adsorption And Removing

作　　者： [Zhang, Yaoyao; Wei, Zhengwen; Wang, Wei] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian 710054, Peoples R China; [Zhang, Yaoyao; Wei, Zhengwen; Li, Mengyao; Wu, Xishe; Wang, Wei] Changan Univ, Sch Water & Environm, Xian 710054, Peoples R China

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期　　刊： ACS OMEGA

摘　　要： In this paper, mullite whiskers were prepared by a molten salt reaction method based on a porous cordierite ceramic substrate (MC), and the modified mullite whiskers/cordierite ceramic sample (MCK) was obtained via the silane coupling reaction with gamma-aminopropyl triethoxysilane (KH550). The structural morphology and phase compositions of the MC were characterized by X-ray diffraction and scanning electron microscopy. The surface functional groups of MCK were characterized using Fourier transform infrared spectroscopy, and the result showed that the amino group (-NH2) was successfully grafted onto the surface of cordierite ceramic. X-ray photoelectron spectroscopy analysis successfully showed inclusion of the amino and Cu2+ adsorption mechanism onto MCK. The adsorption properties of MCK were investigated using Cu2+ as the target pollutant by varying the experimental conditions such as pH, time, temperature, and initial Cu2+ concentration. The adsorption was found to be spontaneous, endothermic, and feasible, as indicated by the study of thermodynamic parameters. The adsorption kinetic analysis suggested that the pseudo-second-order kinetic model was best fitted for Cu2+ adsorption. The adsorption isotherm studies showed that the results of the Freundlich model are more suitable for experimental adsorption data than the Langmuir model. The adsorption-desorption cycle indicated that MCK had good reusability and stability. A novel porous

ceramic-based adsorbent with high Cu2+ adsorption and removal efficiency was fabricated and has potential applications for the metal ion removing field.

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第 92 篇

标　　题： Magnetic-Heteropolyacid Mesoporous Catalysts For Deep Oxidative Desulfurization Of Fuel: The Influence On The Amount Of Apes Used

作　　者： [Li, Si-Wen] Changan Univ, Sch Water & Environm, Dept Environm Engn, Key Lab Subsurface Hydrol & Ecol Arid Areas, Xian 710061, Peoples R China; [Wang, Wei] Changan Univ, Sch Water & Environm, Dept Chem Engn, Key Lab Subsurface Hydrol & Ecol Arid Areas,Minis, Xian 710054, Peoples R China; [Zhao, Jian-She] Northwest Univ, Coll Chem & Mat Sci, Key Lab Synthet & Nat Funct Mol Chem, Shaanxi Key Lab Physicoinorgan Chem,Minist Educ, Xian 710127, Shaanxi, Peoples R China

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期　　刊： JOURNAL OF COLLOID AND INTERFACE SCIENCE

摘　　要： Magnetic-heteropolyacid mesoporous catalysts have been obtained, in which magnetic Fe3O4 in the center of MCM-41 mesoporous materials and APES (3-aminopropyl-triethoxysilane) used to link heteropolyacid. To noted, for the various molar ratio APES used in the synthesized process, different numbers of -OCH 3 were exposed in the final products (zero, one and two), named Fe@MP-1, Fe@MP-2 and Fe@MP-3, respectively. Interestingly, the three kinds` of catalysts exhibited the various DBT removal efficiency during the oxidative desulfurization process, mainly due to their structure variance leading to be the research focus in this work. Among them, under the oxygen in air as oxidant, Fe@MP-1, with no -OCH3 exposed outside, showed the excellent desulfurization activity with 100% DBT conversion in 90 min and behaved nearly no obvious decrease after at least 8 recycling times. Thus, the certain amount of APES, used to link active components with supporters, is suggested as an effective aspect to increase the oxidative desulfurization efficiency and maybe the different types of linkage also show the various influence, which will be focused on in our further researches. (C) 2020 Elsevier Inc. All rights reserved.

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第 93 篇

标　　题： Hydrogeochemical Characterization And Quality Assessment Of Groundwater Based On Integrated-Weight Water Quality Index In A Concentrated Urban Area

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期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：Clean and safe groundwater is the basic guarantee for social and human sustainable development. With the increasing groundwater pollution, it is essential to characterize hydrogeochemistry and assess groundwater quality accurately for water supply purpose. In this study, investigation of groundwater was conducted in the urban area of Xi'an, which has a more than 3100 years glorious city history. 97 groundwater samples were collected from domestic tube wells for physical and chemical analysis. Results showed that groundwater in the study area was predominantly the HCO3-Ca and HCO3-Ca . Mg type, which were controlled by multiple processes of water-rock interaction, evaporation, cation exchange etc. Some samples fall in Zone 4 (mixed type) and Zone 2 (SO4-Na type) in Piper diagram, indicating the complex influence of both rock-water interactions and anthropogenic activities. To assess groundwater quality reasonably, an innovative integrated-weight water quality index (IWQI) was proposed by combining objective and subjective weights through additive model. The calculated weights showed that integrated weights balanced the relationship between subjective expertise about impacts of chemical components on human health risk and objective entropy information of ion concentration. The high integrated weight for F- (0.237), NO2-N (0.104) and HCO3- (0.103) indicated their significant influences on groundwater quality. According to the IWQI, overall situation of groundwater in the study area was described as good, while only 9.4% of groundwater samples was of medium to poor quality and unsuitable for drinking. Investigation and historical documents data showed that this poor groundwater quality in the city centre can be attributed to the low terrain, special characteristics of loess deposit, modern pollution in recent decades and the migration of ancient pollutants over one millennia. The sensitive analysis of IWQI indicated the innovative IWQI could describe the overall water quality reliably, stably and correctly, and have the potential suitability for extensive application. (C) 2020 Elsevier Ltd. All rights reserved.

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第 94 篇

标　　题：Preparation Of Bipo4 Nanosphere And Its Enhanced Photocatalytic Activity Under Simulated Solar Light Degradation Of Tetracycline

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期　　刊：DESALINATION AND WATER TREATMENT

摘　　要：As an effective and eco-friendly method, photocatalysis is a promising candidate for degrading tetracycline in aqueous solutions. In this work, a highly efficient BiPO4 nanosphere photocatalyst was successfully synthesized via a simple and facile hydrothermal method. The morphology, structure, optical properties, elemental composition, surface area and photoluminescence of the BiPO4 nanospheres were characterized by scanning electron microscopy, X-ray diffraction, UV-Vis, X-ray photoelectron spectroscopy and Brunauer-Emmett-Teller adsorption. Compared with the irregular BiPO4 particles, the BiPO4 nanospheres exhibited excellent photocatalytic activity for tetracycline (40 mg/L) degradation under simulated solar light irradiation. The rate constant was 0.00783 min(-1), which is up to 1.8 times as high as that of pure irregular BiPO4 particles. The improvement is ascribed to their unique morphology and smaller particle size. According to the electron spin resonance spectroscopy experiments, (OH)-O-center dot and O-center dot(2)- were testified to be the predominant active species. This work is expected to provide a possible design of BiPO4 nanosphere photocatalysts for the mitigation of environmental problems.

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第 95 篇

标　　题：Mechanism Of Hcb-Modified Asphalt And Dynamic Properties Of Mixtures

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：Hydroxymethyl carbon black (HCB) was prepared as an asphalt modifier with a high oxygen content and active surface chemical properties. The microstructure of HCB was analyzed by scanning electron microscopy, energy-dispersive X-ray spectroscopy, and Fourier-transform infrared spectroscopy. The improvement effect of HCB on asphalt's physical, dynamic shear, rheological, and aging properties was evaluated. To analyze the dynamic properties of the HCB-modified asphalt mixtures, a simple performance test (SPT) was conducted, and then the change laws of the dynamic modulus and phase angle for the HCB mixtures were clarified. The results showed that the surface of HCB is smooth and that the oxygen content increases with the generation of hydroxyl functional groups. Polar oxygen-containing functional groups and hydrogen bonds are helpful in improving the resistance to cracking and aging. The surface activity of HCB is susceptible to temperature and frequency, causing a slight influence of HCB on the viscoelasticity of asphalt mixtures at high and low frequencies. At low temperatures and

high frequencies, the HCB enhanced the elasticity characteristics and weakened the viscosity characteristics of asphalt mixtures.

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WOS 号： 000557560600001

第 96 篇

标　　题： Assessing Groundwater Quality And Health Risks Of Fluoride Pollution In The Shasler Vagu (Sv) Watershed Of Nalgonda, India

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期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要： The principal objectives of this study were to evaluate groundwater quality and human health risks of fluoride contamination in Shasler Vagu (SV) watershed of Nalgonda district, India. For this purpose, 107 groundwater samples were collected and analyzed various physcio-chemical parameters including fluoride, and Gibbs diagrams, Hill-Piper trilinear diagram, and groundwater quality index (GWQI) were applied to understand the groundwater chemistry and its suitability for drinking purpose. In addition to this, non-carcinogenic health risks of high fluoride intake were also evaluated using the US Environmental Protection Agency model for adults and children in the study region. Groundwater chemistry is mainly controlled by HCO3--Ca2+-Mg(2+)and Na+-HCO(3)(-)type, and rock weathering. Assessment of GWQI indicates that 76% of groundwater sources in the study region have poor quality for drinking uses. Results reveal that fluoride concentration ranged from 1.4 to 5.9 mg/L in the groundwater samples, which was significantly higher than the recommended limit of 1.5 mg/L for drinking uses. Results of hazard quotient (HQ) estimates are in the ranges of 0.90-3.78 and 1.21-5.11 in adults and children populations of the study region, respectively. About 98% of adults and 100% of children population of SV watershed are at very high risks of chronic toxicity by excess fluoride intake.

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第 97 篇

标　　题： Aminated Flower-Like Znin2S4 Coupled With Benzoic Acid Modified G-C3N4 Nanosheets Via Covalent Bonds For Ameliorated Photocatalytic Hydrogen Generation

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Peoples R China; [Liu, Hui] Cent South Univ, Chinese Natl Engn Res Ctr Control & Treatment Hea, Sch Met & Environm, Changsha 410083, Peoples R China

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期　　刊： APPLIED CATALYSIS B-ENVIRONMENTAL

摘　　要： To ameliorate the photocatalytic activity of g-C3N4 samples, through covalent bonds, we coupled aminated flower-like ZnIn2S4 (AZIS) with functionalized g-C3N4 nanosheets by benzoic acid (BCN) to establish an integral structure, BCN/AZIS. A series of photocatalytic tests and characterization results confirmed that the conjunct catalyst is able to give superior photocatalytic properties for H-2 generation (485.4 mu mol h(-1)), about 15.1 times that of pure g-C3N4 (32.1 mu mol h(-1)). The improvement in photocatalysis of BCN/AZIS could be ascribed to the intimately interfacial contact and well-matched band gaps structure between BCN and AZIS, both of which bring about effective photoinduced charge separation and migration.

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第 98 篇

标　　题： Reduction In Solar Photovoltaic Generation Due To Aerosol Pollution In Megacities In Western China During 2014 To 2018

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通讯作者： Zhao, M (corresponding author), China Northwest Architecture Design & Res Inst, Xian, Peoples R China.

期　　刊： INDOOR AND BUILT ENVIRONMENT

摘　　要： Installed solar photovoltaic generation is expanding fast in western China, with total capacity accounting for >15% of global photovoltaic capacity. However, severe aerosol pollution over western China has weakened the solar radiation reaching the panels. We assessed the impact of aerosol pollution on photovoltaic power generation at the city level in western China from 2014 to 2018. Over northwestern China, severe aerosol pollution regions, aerosols reduced annual average photovoltaic generation by 0.15-0.31 kWh/m(2)/day relative to clean air conditions, a decrease of 4.8-9.0%. The impact had significant seasonal variations. Aerosols can exert an influence even as important as clouds in winter in northwestern China, with the reduction of 11.2-17.4% in December. Photovoltaic generation can be benefited from the improvement of aerosol pollution and can further improve the air quality by providing clean power.

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第 99 篇

标　　题： Catalytic Oxidation Of Dbt For Ultra-Deep Desulfurization Under Moo3 Modified Magnetic Catalyst: The Comparison Influence On Various Morphologies Of Moo3

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期　　刊：APPLIED CATALYSIS A-GENERAL

摘　　要：In this work, deep oxidative desulfurization was attained using a new kind MoO3 modified magnetic catalysts, in which metal organic framework (MOF-199) as supports and the magnetic Fe3O4 added to provide the extra character for increasing practical use value. The characterization of the as-designed catalysts were assessed by FT-IR, XRD, SEM, TPR and XPS analyses. To be noted, various morphologies of MoO3 were used to form the final products and compared to discuss their influences on the ODS performance in this work. Among them, the Fe@ Mo-4@MOF, containing the fibroid MoO3, showed an excellent catalytic performance to the ultra-deep oxidative desulfurization in 45 min, which was mainly attributed to the special morphology of MoO3, providing the higher contact area with the DBT to increase the ODS efficiency. Moreover, the possible mechanism was proposed to illustrate the ODS process and only slight decrease of DBT removal was observed after 15 recycling times.

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第 100 篇

标　　题：Meeting The Environmental Challenges

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期　　刊：HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要：Environmental problems such as soil and water pollution, geohazards, land degradation, and desertification are seriously constraining the sustainable development of human society. Finding effective measures to meet these environmental challenges is critical. This article introduced the background of editing this special issue, and the main environmental challenges faced by human were briefly reviewed. Two large-scale scientific programs currently underway in China, the Yellow River Scientific Program and the Qinling Mountains Scientific Program were introduced, and finally building the community with a shared future was proposed as a potential way of meeting the environmental challenges.

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WOS 号： 000553344500001

第 101 篇
标　　题： Characteristics Of Microbial Activity In Atmospheric Aerosols And Its Relationship To Chemical Composition Of Pm2.5 In Xian, China
作　　者： [Wang, Beibei; Li, Yanpeng; Xie, Zhengsheng; Du, Shengli; Zeng, Xuelin; Hou, Junli; Ma, Tianfeng] Changan Univ, Sch Water & Environm, Xian 710054, Peoples R China; [Li, Yanpeng] Minist Educ, Key Lab Subsurface Hydrol & Ecol Arid Areas, Xian 710054, Peoples R China
通讯作者： Li, YP (corresponding author), Changan Univ, Sch Water & Environm, Xian 710054, Peoples R China.
期　　刊： JOURNAL OF AEROSOL SCIENCE
摘　　要： Microbial activity levels in atmospheric aerosols can affect human health, and ecosystem and atmospheric processes. However, information on the influence of microbial activity in atmospheric aerosols remains very limited. In this study, the characteristics of microbial activity in atmospheric aerosols in Xi'an, China, were determined using the fluorescein diacetate hydrolysis method. The influences of meteorological factors, height and water-soluble inorganic ions on microbial activity were examined. The results indicate that the levels of the atmospheric inorganic ions increased as the air quality index (AQI) increased. The microbial activity and concentration of PM2.5 were significantly positively correlated during sampling period ($p < 0.05$). Notably, microbial activity levels in PM2.5 and PM10 both increased with the AQI and decreased from ground level to 228 m. Additionally, higher microbial activity levels were detected during floating dust events and lower levels were found during periods of rainfall. Among the nine inorganic ions, microbial activity was significantly positively correlated with Nathorn, Mg-2+ and Ca2+ ($p < 0.05$). Correlation results indicate that microbial activity was greatly influenced by soil source in spring and summer. The present results improve our understanding of the correlations between airborne microbes and atmospheric chemical composition.
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WOS 号： 000538357000004

第 102 篇
标　　题： Assessing Groundwater Pollution And Potential Remediation Processes In A Multi-Layer Aquifer System
作　　者： [Qian, Hui; Chen, Jie] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Qian, Hui; Chen, Jie] Changan Univ, Sch Water & Environm, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Howard, Ken W. F.] Univ Toronto, Dept Phys & Environm Sci, Toronto, ON, Canada
通讯作者： Chen, J (corresponding author), Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China.
期　　刊： ENVIRONMENTAL POLLUTION

摘　　要：Pumping-induced leakage across aquitards may induce a deterioration of water quality in multi-layer aquifer systems. It is critical to understand long-term trends of water quality parameters when assessing the sustainability of groundwater abstraction. Daily drinking water needs of 2.2 million people in Yinchuan region of northwest China are solely met by groundwater resources, but long-term groundwater withdrawal has created an extensive cone of depression (294 km(2) in area) in confined aquifer causing increased vertical recharge. In this study, a model was established and calibrated with head data, then was incorporated with field tracer tests to provide key information on the hydro-dispersive characteristics of the contaminant for assessing both the current and future state of the aquifer system. The results confirmed a close association between water quality deterioration and high downward fluxes of high chloride groundwater, most notably near the center of the cone of depression. On a temporal scale, water quality degradation remains slow, largely due to the high, pre-existing storage of good quality water. Modeling suggests that the water quality in the upper confined aquifer will lose its potability over a 25 km(2) and 50 km(2) area within 200 years under the current and intensified pumping conditions, respectively. Elevated chloride values were also detected toward the east of the cone, highlighting the impact of hydrological settings on the vertical groundwater flow. Modeling of potential aquifer remediation shows an even slower response with a further 250 years or more required for potability to be restored in affected areas. The findings can provide valuable guidance to for decision makers and support the sustainable management of aquifer exploitation.

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WOS 号：000539426400028

第 103 篇

标　　题：Historical Assessment And Future Sustainability Challenges Of Egyptian Water Resources Management

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通讯作者：Lyu, JQ; Zhou, MM (corresponding author), Changan Univ, Minist Educ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Xian 710054, Peoples R China.; Sun, YT; Wang, ST (corresponding author), Changan Univ, Sch Water & Environm, Xian 710054, Peoples R China.

期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：The sustainable and efficient use of water is of vital importance, and the uneven distribution of water in the world means that it is especially important for water-scarce countries. Egypt is an arid country with an ancient civilization and a long history that was and remains dependent on the trans-boundary water resources of the Nile River.

Historically complicated, water resource management in Egypt is becoming more so in the face of urbanization and population growth. We present a comprehensive overview of the water management policies in Egypt to identify current trends and conditions. Under the population growth, the available water use for all the governorates is shown the decreasing trend in 2025 compared with that in 2012, but only the available water use in governorate of Red Sea is shown the increasing trend with 0.022 BCM(Billion Cubic Meter) in 2025 than that in 2012. Historical assessment of water resources management allows for the reconsideration of present conditions and planning for future sustainability challenges. Egypt's present national plan reflects a transition from traditional approaches to demand management. At the same time, responsibility for water resources management has shifted from the local to the national level. Sustainability of water resource systems will require consideration of the negative impacts of population growth as well as urban development and further coordination of national and local priorities. This study explores the changes and reforms of water policies in Egypt, as well as challenges and implications for sustainable water governance and management.

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第 104 篇

标　　题： Fabrication Of Refractory Materials From Coal Fly Ash, Commercially Purified Kaolin, And Alumina Powders

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通讯作者： Wang, W (corresponding author), Changan Univ, Sch Water Resources & Environm, Dept Chem Engn, Xian 710054, Peoples R China.; Wang, W (corresponding author), Changan Univ, Key Lab Subsurface Hydrol & Ecol Arid Areas, Minist Educ, Xian 710054, Peoples R China.

期　　刊： MATERIALS

摘　　要： Coal fly ash and kaolin are ceramic compounds utilized as raw materials in the production of refractories. Fly ash is an environmental pollutant that emanates abundantly from coal thermal power plants. The management of the large amounts of fly ash produced has been very challenging, with serious economic and environmental consequences. Kaolin, on the other hand, is a natural and synthetic clay material used in medicines, paper, plastics, and cosmetic preparations. In this research, refractory materials (cordierite (Mg2Al4Si5O18), mullite (3Al(2)O(3)Greek ano teleia2SiO(3)), and kyanite (Al2SiO5)) were fabricated in four different experiments, and an assessment was made of the strength of each of the materials. Coal fly ash and kaolin were each blended with alumina as starting materials. MgO and AlF(3)Greek ano teleia3H(2)O were each applied as additives to the reacting materials. The mixtures were molded and sintered at temperatures between 1000 degrees C and 1200 degrees C for three hours in a muffle furnace, and characterized by SEM and XRD. The analysis

revealed the evolution of cordierite, mullite, and kyanite alongside other crystalline compounds. The formation of kyanite in experiment C, due to the addition of AlF(3)Greek ano teleia3H(2)O, is unprecedented and phenomenal. The XRD figures show the corundum phases crystallize at 1100 degrees C in experiments A and B, and disappear at 1200 degrees C.

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第 105 篇

标　　题： Hydrochemical And Stable Isotope Characteristics Of Lake Water And Groundwater In The Beiluhe Basin, Qinghai-Tibet Plateau

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期　　刊： WATER

摘　　要： Thermokarst lakes are a ubiquitous landscape feature that impact the thermal state, hydrological process, ecological environment, and engineering stability of the permafrost. This study established the hydrochemistry and stable isotope (delta O-18 and delta D) variations of lake water and groundwater in a typical basin located in the central Qinghai-Tibet Plateau (QTP) of China. The results showed that most water samples could be classified as slightly alkaline, with high levels of salinity and hardness, while the dominant water types were HCO3-CO(3)and Cl types. Natural hydrochemical processes, such as mineral dissolution, cation exchange, and groundwater evaporation, had strong impacts on the groundwater chemistry in this region. Dissolution of halite and carbonate minerals causes the major reactions controlling water chemistry in this basin. Additionally, the calculation of the saturation index (SI) values suggested that aragonite, calcite, and dolomite are saturated, while halite is not. Based on the analysis of the stable isotope characteristics, atmospheric precipitation, groundwater, and meltwater from the permafrost are the major sources of thermokarst lakes. Moreover, the evaporation-to-inflow ratio (E/I) indicated that all of the lakes continuously expanded and rapidly developed. Overall, groundwater is an crucial source of lake recharge and its hydrochemical characteristics also have a certain impact on lake water quality.

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WOS 号： 000564816000001

第 106 篇

标　　题： Effects Of Non-Isothermal Flow On Groundwater Recharge In A Semi-Arid Region

作　　者：[Zhang, Zaiyong; Wang, Wenke; Gong, Chengcheng; Zhao, Ming; Wang, Zhoufeng; Ma, Haizhen] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian, Peoples R China; [Zhang, Zaiyong; Wang, Wenke; Gong, Chengcheng; Zhao, Ming; Wang, Zhoufeng; Ma, Haizhen] Changan Univ, Sch Water & Environm, Yanta Rd 126, Xian 710054, Shaanxi, Peoples R China

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期　　刊：HYDROGEOLOGY JOURNAL

摘　　要：Groundwater recharge is critical to water circulation in arid and semi-arid regions. The accurate determination of groundwater recharge is required for assessing water resources and effectively managing groundwater, especially in water-limited areas. Based on field experiments and numerical models in a semi-arid region, this study assessed the effect of non-isothermal flow on groundwater recharge. A lysimeter was used in the Mu Us Desert, northwestern China, to monitor groundwater recharge from 1 June to 30 September 2018. The numerical models (isothermal and non-isothermal models) were calibrated with the measured soil moisture and soil temperature. Groundwater recharge was found to take up nearly 29% of rainfall. The non-isothermal model was capable of accurately assessing groundwater recharge based on the accurate calculation of evaporation. The isothermal model, however, underestimated the groundwater recharge by 13.2% and overestimated the evaporation by 16.2%. The isothermal model overestimated evaporation during the drying process. In contrast, cumulative net recharge was underestimated after heavy rainfall events. It was therefore suggested that the non-isothermal flux should be considered in semi-arid regions, especially when assessing groundwater recharge.

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第 107 篇

标　　题：Nitric Oxide And Nitrous Oxide Production In Anaerobic/Anoxic Nitrite-Denitrifying Phosphorus Removal Process: Effect Of Phosphorus Concentration

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期　　刊：ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要：Nitric oxide (NO) and nitrous oxide (N2O) production in biological nutrient removal has been studied widely due to the strong negative effects on the environment.

Nitrite-denitrifying phosphorus removal (N-DPR), as a significant source of NO and N2O production, has received great attention. However, the mechanism of NO and N2O production at different phosphorus concentrations is not well understood. Therefore, this study was conducted to investigate the effect of phosphorus concentration on pollutant removal, as well as NO and N2O production during the N-DPR process. The results showed that the phosphorus removal efficiency was improved with the increase of phosphorus concentration, which is caused by the enrichment of denitrifying phosphorus accumulating organisms (DPAOs) at high phosphorus concentration. High NO production was observed at phosphorus concentration of 0.5 mg L-1, which is mainly attributed to the slow recovery of reductase activity and low abundance of DPAOs. The maximal N2O accumulation of 31.45 mg L(-1)was also achieved at phosphorus concentration of 0.5 mg L-1. The possible reason is that fewer poly-beta-hydroxyalkanoates (PHAs) were synthesized by glycogen accumulating organisms (GAOs) at low phosphorus concentration, which could intensify the electron competition among different reductases. In addition, free nitrous acid (FNA) inhibition was another significant reason for high N2O production.

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第 108 篇

标　　题： Ternary Fe3O4/Mos2/Bivo(4)Nanocomposites: Novel Magnetically Separable Visible Light-Driven Photocatalyst For Efficiently Degradation Of Antibiotic Wastewater Through P-N Heterojunction

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期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要： The noble metal-free ternary Fe3O4/MoS2/BiVO(4)p-n heterojunctions photocatalyst were prepared via a simply hydrothermal method, which possessed the unique nanospheres-on-microspheres heterostructure. The Fe3O4/MoS2/BiVO(4)composite photocatalyst exhibited higher photocatalytic degradation of tetracycline hydrochloride (TCH) than those of MoS2, BiVO(4)under visible light irradiation (lambda > 420 nm).

Especially, when the Bi/Mo molar ratio reached 30:1 (FMB3), the FMB3 displayed the highest photocatalytic activity, which can degrade 83% TCH (20 mg/L) within 90 min. The enhanced photocatalytic activity of the ternary photocatalyst could be attributed to the energy band matching and reduction of the charge transfer resistance to promote the spatial separation and reduce the recombination of photogenerated charge carriers due to the formation of built-in electric field by p-n heterojunctions between MoS(2)and BiVO4. Additionally, MoS(2)can be used as cocatalyst to enhance the separation efficiency of BiVO(4)catalyst carrier and thereby improving the photocatalytic activity. Furthermore, the photocatalyst displayed highly stable recycling performances, which can be separated rapidly with an external magnetic field and be reused for five cycles and remain 91.8% of the first time.

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第 109 篇

标　　题： Response Of Grain-Size Components Of Loess-Paleosol Sequence To Quaternary Climate In The Southern Loess Plateau, China

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期　　刊： ARABIAN JOURNAL OF GEOSCIENCES

摘　　要： A new, thick, and complete loess-paleosol sequence is a good response to climate changes. In this paper, the distribution and parameters of grain size in the Xiushidu (XSD) sequence in the southern Loess Plateau were systematically investigated. A comparative analysis of the sediment granularity with different areas was also conducted. The results show that the XSD sequence is primarily constituted by coarse silt (52.18%), clay (21.71%), and fine silt (20.27%), and the contents of colloidal particles (3.63%) and fine sand (2.21%) are relatively small. The contents of 1 similar to 5 mu m and < 5 mu m show a slight increase from S(9)to S-5, while the contents are clear downward from L(5)to L-0, indicating that the climate is gradually getting colder after S-5. Grain-size distribution curves show a bimodal pattern for loess/paleosol. The grain-size component and peak pattern illustrate that dust materials were not only transported by wind but also experienced pedogenesis. Moreover, the changes of grain-size indicatorM(z)values indicate climatic instability. Comparing with the Beglitsa, Oitak (AYTK), Lanzhou (LZ), Pengyang (PY), Luochuan (LC), and XSD sequences, we can infer that the XSD sequence not only has experienced the strong pedogenesis and the warm and humid climate but also has influenced by the Himalayas, the Tibetan Plateau, the QM, and the LPM. These analyses help to clarify the climatic and environmental context of loess-paleosol sequence deposition phases and regional

environmental evolutions.

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第 110 篇

标　　题： Check A Consecutive 4-Year Elevated Air Temperature Shaped Soil Bacterial Community Structure And Metabolic Functional Groups In The Rhizosphere Of Black Locust Seedlings Exposed To Lead Pollution

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期　　刊： SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要： Global warming may influence the bioavailability and mobility of heavy metals by stimulating or inhibiting plant growth, thereby influencing rhizosphere soil chemistry and microbial characteristics. Black locust has been widely planted in China as a promising species for afforestation programs, farmland shelterbelt projects, and soil restoration in mined areas because of its rapid growth and adaptability to environmental stressors. Here, we examined soil bacterial community structure and predicted bacterial metabolic function in the rhizosphere of black locust exposed to elevated temperature (+1.99 degrees C) and Pb for 4 years. Elevated temperature significantly ($p < 0.05$) reduced total carbon (TC), total nitrogen (TN), and total sulfur (TS) contents in above-ground parts but increased TC and TN contents in roots and seedling height under Pb exposure. Elevated temperature significantly ($p < 0.05$) increased Pb availability and raised pH, TC, TN, TS and water-soluble organic carbon (WSOC) contents, and the C:H ratio in rhizosphere soils under Pb exposure. The interactive effects between Pb and temperature on pH, TC, TH, TS, WSOC, and the C:H ratio were significant ($p < 0.05$). Elevated temperature significantly ($p < 0.05$) reduced the diversity and the richness of bacterial community, altered genus-level bacterial community composition, and improved ($p < 0.05$) the relative abundances of some bacteria involving in terpenoids and polyketides and xenobiotics biodegradation metabolism under Pb exposure. Canonical correspondence analysis indicated that pH, WSOC, C:N ratio, and soluble Pb were significant ($p < 0.05$) factors on the relative abundance of bacterial genera, such as Ochrobactrum and Sphingomnas. Overall, long-term elevated temperature resulted in changes in rhizosphere soil characteristics and Pb availability, thus affecting the bacterial community structure and metabolic functional groups. The conclusion helps us understand the response mechanism of soil bacteria in the rhizosphere to heavy metals under global warming scenarios.

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第 111 篇

标　　题：Elucidating The Potential Neurotoxicity Of Chiral Phenthoate: Molecular Insight From Experimental And Computational Studies

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期　　刊：CHEMOSPHERE

摘　　要：Chiral organophosphorus pollutants are existed ubiquitously in the ecological environment, but the enantioselective toxicities of these nerve agents to humans and their molecular bases have not been fully elucidated. Using experimental and computational approaches, this story was to explore the neurotoxic response process of the target acetylcholinesterase (AChE) to chiral phenthoate and further decipher the microscopic mechanism of such toxicological effect at the enantiomeric level. The results showed that the toxic reaction of AChE with chiral phenthoate exhibited significant enantioselectivity, and (R)-phenthoate (K= 1.486 x 10(5) M-1) has a bioaffinity for the nerve enzyme nearly three times that of (S)-phenthoate (K= 4.503 x 10(4) M-1). Dynamic research outcomes interpreted the wet experiments, and the inherent conformational flexibility of the target enzyme has a great influence on the enantioselective neurotoxicological action processes, especially reflected in the conformational changes of the three key loop regions (i.e. residues His-447, Gly-448, and Tyr-449; residues Gly-122, Phe-123, and Tyr-124; and residues Thr-75, Leu-76, and Tyr-77) around the reaction patch. This was supported by the quantitative results of conformational studies derived from circular dichroism spectroscopy (alpha-helix: 34.7%30.2%/ 31.6%; beta-sheet: 23.6%19 -> 5%/20.7%; turn: 19.2%22 -> 4%/21.9%; and random coil: 22.5%27 -> 9%/25.8%). Meanwhile, via analyzing the modes of toxic action and free energies, we can find that (R)-phenthoate has a strong inhibitory effect on the enzymatic activity of AChE, as compared with (S)-phenthoate, and electrostatic energy (-23.79/ - 17.77 kJ mol(-1)) played a critical role in toxicological reactions. These points were the underlying causes of chiral phenthoate displaying different degrees of enantioselective neurotoxicity. (C) 2020 Elsevier Ltd. All rights reserved.

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第 112 篇

标　　题：Optimization Allocation Of Irrigation Water Resources Based On Crop Water Requirement Under Considering Effective Precipitation And Uncertainty

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期　　刊：AGRICULTURAL WATER MANAGEMENT

摘　　要：Today, water resources shortage becomes more and more serious. In reality, uncertainties are inevitable due to the complex of irrigation system. Therefore, an inexact interval programming model was developed for optimizing irrigation water resources, which was also applied to a case study in Jinghuiqu irrigation district, Shaanxi Province, China. In the case study, maximum economic benefit was made as planning objective and crop evapotranspiration and effective precipitation were took under consideration, which have significant influence on optimization allocation of irrigation water resources. Different optimal irrigation and planting structure schemes, which have the ability to conjunctive use of surface water and groundwater, were obtained under different representative hydrological year. From the results, water resources shortage is very serious which have made great negative influence on the development of Jinghuiqu irrigation district. In addition, a lot of water resources has been saved by introducing effective precipitation in the model, such as 47.36% of total water consumption was saved in maize when P = 25%. Furthermore, the decision makers can choose the desired optimal scheme according to the actual situation.

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第 113 篇

标　　题：Airborne Phthalates In Indoor Environment: Partition State And Influential Built Environmental Conditions

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期　　刊：CHEMOSPHERE

摘　　要：Exposure to phthalates has recently become a major public health concern. The information of indoor airborne phthalates and their air-particle partition in real indoor environmental condition is still limited. In this study, the gas- and PM2.5 -concentrations of 7 phthalates in 40 residences were concurrently measured in summer

and winter. The major phthalates (median concentration in the summer and winter, respectively) in indoor air were DMP (2442.3 and 2403.4 ng/m(3)), DiBP (801.0 and 640.0 ng/m(3)) and DnBP (5173.2 and 1379.6 ng/m(3)), whereas the major phthalates in PM2.5 were DiBP (1055.1 and 585.9 ng/m(3)) and DnBP (1658.5 and 1517.0 ng/m(3)) and DEHP (215.1 and 344.9 ng/m(3)). Air-PM2.5 partition coefficients (K-p) of DiBP, DnBP and DEHP were calculated: the summer and winter median values (m(3)/mu g) were 0.053 and 0.011 for DiBP, 0.010 and 0.004 for DnBP, 0.021 and 0.025 for DEHP, respectively. Air-PM2.5 partition of DiBP and DnBP approached equilibrium, while that of DEHP did not reach equilibrium in either season. The impacts of built environmental conditions on phthalate concentrations were characterized. Elevated temperature resulted in accumulation of airborne phthalates. Higher air humidity led to more water absorption of aerosols in summer, facilitated mass transfer of phthalates from air to PM2.5, and resulted in greater k(p), of DiBP and DnBP in the summer. Any factors such as proximity to local traffic highway and indoor smoking activities, which can increase indoor PM2.5 concentrations, resulted in significantly higher airborne phthalate concentrations. Improving ventilation was not an effective measure to reduce indoor airborne phthalate concentrations.

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第 114 篇

标　　题： Surface Water Pollution In The Middle Chinese Loess Plateau With Special Focus On Hexavalent Chromium (Cr6+): Occurrence, Sources And Health Risks

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期　　刊： EXPOSURE AND HEALTH

摘　　要： Due to the combined influence of unique natural environment and increasing human activities, water quality in the Chinese Loess Plateau is deteriorating. Hexavalent chromium (Cr6+) contamination is a critical water environmental issue in the loess areas. In this study, surface water, spring water, Quaternary phreatic water, and soil and rock samples were collected in the middle Chinese Loess Plateau to quantify the surface water pollution and its main affecting factors. Particularly, the occurrence and potential sources of Cr(6+)as well as associated health risks in surface water were thoroughly investigated. The results show that Cr(6+)is widely found in Luo River, Xingzi River,

Wuding River and Bali River. The upper reaches of the Luo River are the main high-Cr(6+)water distribution area. For Bali River, Wuding River, Xingzi River and the downstream of the Luo River, the values of Cr(6+)in surface water were below the WHO drinking water limit (0.05 mg/L). The high Cr values in the soil and rock samples indicate that the loess and mudstone are important sources of high-Cr(6+)water in the area. Groundwater which is characterized by high Cr(6+)concentration is also an important factor affecting Cr(6+)concentration in surface water which receives recharge from groundwater. In addition to Cr6+, TDS and nitrate are also important pollutants in surface water. The hydrochemical evolution of the surface water is controlled by rock weathering and evaporation crystallization. The health risk assessment results suggest that the inhabitants in the study area face high carcinogenic risks induced by Cr6+.

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第 115 篇

标　　题： Preparation Of Lignin Containing Cellulose Nanofibers And Its Application In Pva Nanocomposite Films

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期　　刊： INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES

摘　　要： Lignin containing cellulose nanofibers (LCNFs) were successfully prepared from wheat straw using an acid hydrotrope of p-toluene sulfonic acid (p-TsOH) combined with ultrasonication. p-TsOH pretreatment was applied below 80 degrees C to selectively remove hemicellulose and lignin and generate purified cellulose fibers containing approximately 15% lignin. Subsequently, high-intensity ultrasonication was used for <6 min to effectively defibrillate the p-TsOH-pretreated cellulose fibers to nanoscale fibers. AFM and TEM analyses showed that the diameter distribution of the resultant nanofibers decreased with the increase in ultrasonic intensity. The FTIR and XRD results indicated that the molecular structures and cellulose crystallinity were not changed during the ultrasonic process. An amount of 5 wt% of the obtained LCNFs was introduced into a polyvinyl alcohol (PVA) matrix. The resulting nanocomposite products exhibited improved thermal performance and surface properties compared with the pure PVA matrix. The mechanical properties, including the tensile stress and Young's modulus, were enhanced significantly, although the elongation at the break was slightly decreased. PVA composites with the addition of LCNFs are expected to be used in a variety of fields, such as biodegradable plastics, pharmaceutical carrier, filtration media and packaging materials.

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第 116 篇

标　　题：Discussion On Nonlinear Behaviors In Reservoir Flood Routing Modeling And Derived Uncertainties

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期　　刊：WATER RESOURCES

摘　　要：In existing studies, external factors, such as hydrologic, hydraulic, and decision-making uncertainties, have been widely recognized as major risk source in reservoir flood routing. There are few researches focused on the intrinsic uncertainties which rooted in the reservoir flood routing modeling, for instance, the sensitivity of the water level to the initial condition in the passage of flood routing. The governing equation of the reservoir flooding routing is a first-order Ordinary Differential Equation, which can be simplified as a water balance equation. A deterministic mathematical model can be set up by combining the governing equation with the flood operating rules and the water level-storage relationship functions of reservoirs. As far as the deterministic model is concerned, nonlinear behaviors and their characteristics in different stages of flood routing were discussed for the reservoir with multistage operating rule by simulations in this paper. The results showed that the state variables (i.e., water level and discharge rate) of the system are not sensitive to initial small perturbations in the free overflow stage. However, in the confined outflow stage, which usually appears in segmented flood operating rules designed for multi-purpose flood control, a small initial disturbance can grow gradually over time with the evolution of the system, as a result, a large deviation of the water level and discharge rate of the reservoir could developed at the end of the simulation. Additionally, some case studies were conducted in this paper to demonstrate this nonlinear response of flood routing to the initial disturbance. Although the nonlinear behaviors in reservoir flood routing are still subject to further study, once again, it proves that uncertainties appear there indeed in a deterministic system according to this research. The results of this paper indicate that the nonlinear responses and the corresponding uncertainties rooted in it may have to be considered deliberately in different stages of flood routing, because this could has potential impacts not only on reservoir flood control but also on the reliability of the risk assessment.

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第 117 篇

标　　题：Interaction Between Surface Water And Groundwater In Yinchuan Plain

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期　　刊： WATER

摘　　要： The interaction of surface water (SW) and groundwater (GW) is becoming more and more complex under the effects of climate change and human activity. It is of great significance to fully understand the characteristics of regional SW-GW circulation to reveal the water circulation system and the effect of its evolution mechanism to improve the rational allocation of water resources, especially in arid and semi-arid areas. In this paper, Yinchuan Plain is selected as the study area, where the SW-GW interaction is intensive. Three typical profiles are selected to build two-dimensional hydrogeological structure models, using an integrated approach involving field investigation, numerical simulation, hydrogeochemistry and isotope analysis. The SW-GW transformation characteristics are analyzed with these models, showing that geological structure controls the SW-GW interaction in Yinchuan Plain. The SW-GW flow system presents a multi-level nested system including local, intermediate and regional flow systems. The runoff intensity and renewal rate of different flow systems are evidently different, motivating evolution of the hydro-chemical field; human activities (well mining, agricultural irrigation, ditch drainage, etc.) change the local water flow system with a certain impacting width and depth, resulting in a variation of the hydrological and hydro-chemical fields. This study presents the efficacy of an integrated approach combining numerical simulation, hydrogeochemistry and isotope data, as well as an analysis for the determination of GW-SW interactions in Yinchuan Plain.

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第 118 篇

标　　题： Microwave Treatment Combined With Wetting Agent For An Efficient Flotation Separation Of Acrylonitrile Butadiene Styrene (Abs) From Plastic Mixtures

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期　　刊： JOURNAL OF MATERIAL CYCLES AND WASTE MANAGEMENT

摘　　要： Acrylonitrile butadiene styrene (ABS), as a main component of plastics of waste electrical and electronic equipment (WEEE), shows high potential for recycling, which is restricted by the absence of an efficient separation method. Herein, a novel surface treatment method, microwave treatment combined with a wetting agent, was proposed

to selectively change the hydrophilicity of the mixed waste plastics, which efficiently separated ABS from the WEEE plastics by flotation. The results of this approach provided the following optimal conditions, i.e., microwave power 700 W, microwave irradiation time 3 min, concentration of wetting agent carboxymethylcellulose sodium (CMC) 25 mg/L, treatment time with CMC 5 min, stirring rate 1800 rpm, frother concentration 40 mg/L, and flotation time 4 min. Under these optimal conditions, the recovery and the purity of ABS reached 97.70% and 99.86%, respectively. The mechanism of the surface treatment was examined by means of contact angle, Fourier transform infrared spectroscopy (FT-IR), and adsorption kinetics. The results showed that the selective wetting mechanism can be attributed to the physisorption of CMC on the surface of plastics. In conclusion, this surface treatment method is expected to provide technological insights for the separation and recovery of waste ABS from WEEE plastics.

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第 119 篇

标　　题： Investigation Into Microscopic Mechanisms Of Anisotropic Saturated Permeability Of Undisturbed Q(2)Loess

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通讯作者： Qian, H (corresponding author), Changan Univ, Sch Water & Environm, Xian 710054, Shaanxi, Peoples R China.; Qian, H (corresponding author), Changan Univ, Minist Educ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Xian 710054, Shaanxi, Peoples R China.

期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： The anisotropic permeability of loess is an important engineering property. To explore the microscopic mechanisms of anisotropic saturated permeability of undisturbed loess, a series of laboratory tests, including constant-head saturated permeability test, particle size analysis, and scanning electron microscope imaging, were carried out for twelve Q(2)loess samples. The results show that with increasing burial depth, the saturated permeability decreases. Increasing the hydraulic gradient leads to an increase in permeability without changing the anisotropy of permeability. The spatial variability of the vertical permeability is more obvious than that in the horizontal direction. In addition, the permeability is negatively correlated with the clay particle content, and the uniformity coefficient of the particles. The area of the pores is the dominant factor controlling the permeability, especially the extra-large pores. Moreover, the direction and morphology of pores also affect the permeability of undisturbed loess. These findings are helpful for better understanding the water infiltration process in undisturbed loess and for investigating the stability of loess slopes.

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WOS 号： 000566744800001

第 120 篇

标　　题：Photoinduced Superhydrophilicity Of Anatase Tio2 Surface Uncovered By First-Principles Molecular Dynamics

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期　　刊：JOURNAL OF PHYSICAL CHEMISTRY LETTERS

摘　　要：TiO2 is a prototype of photocatalyst materials. Interfacial water structure is critical to understand the chemical reactivity of TiO2. By performing first-principles molecular dynamics simulations on the TiO2(001)/water interface were performed, we found that the presence of a photogenerated hole at the interface increases the coverage of both the molecular and dissociative water adsorption by increasing the surface acidity and then shapes the layered and ordered water structure by enhancing the interfacial hydrogen bond network. The enhanced attachment of water in contact with the TiO2 surface rationalizes the increase in the intensity of the sum frequency generation spectrum under ultraviolet illumination reported in the experiment. These findings provide a novel interpretation of the electronic effect for the photoinduced hydrophilic conversion of the TiO2 surface at the atomistic level.

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第 121 篇

标　　题：An Efficient And Stable Fluorescent Sensor Based On Aptes-Functionalized Cspbbr3 Perovskite Quantum Dots For Ultrasensitive Tetracycline Detection In Ethanol

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期　　刊：JOURNAL OF MATERIALS CHEMISTRY C

摘　　要：In recent years, all-inorganic halide perovskite quantum dots (IPQDs) have received a lot of attention as a new fluorescent material with excellent fluorescence properties. But their instability in polar solvents is the major factor that obstructs their applications in

analysis. In this work, a novel fluorescent sensor was simply synthesized by room temperature synthesis for the detection of tetracycline (TC) in highly polar ethanol. At room temperature, a silicon layer was easily modified by in situ hydrolysis of 3-aminopropyltriethoxysilane (APTES) on the surface of IPQDs to synthesize a new type of fluorescent sensor without adding water or an initiator, which can be stably present in ethanol. The novel method has shown high selectivity and sensitivity to TC in ethanol, and the detection limit can even reach 76 nM. The mechanism of fluorescence quenching is mainly the electron transfer between TC and IPQDs. Furthermore, the sensor was successfully applied to the detection of trace TC in actual samples. Our research has laid the foundation for improving the stability of perovskite quantum dots and their development in the field of analytical chemistry.

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WOS 号： 000570400200017

第 122 篇

标　　题： Soil Microbial Communities In The Rhizosphere Of Robinia Pseudoacacia L. After Being Exposed To Elevated Atmospheric Co 2 And Cadmium For 4 Years

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期　　刊： APPLIED SOIL ECOLOGY

摘　　要： Elevation of atmospheric CO2 combined with heavy metals can affect rhizosphere soil characteristics by altering the allocation of roots and its availability in the rhizosphere to the microbial community. The aim of study was to investigate the community structure of bacteria, fungi, ammonia oxidizing bacteria (AOB), and ammonia oxidizing archaea (AOA) in the rhizosphere of Robinia pseudoacacia L. seedlings after being exposed to elevated CO2 and cadmium (Cd) for 4 years. Elevated CO2 increased pH, total carbon, water-soluble organic carbon, and the carbon-to-nitrogen ratio under Cd exposure relative to Cd alone and led to a decrease in total and soluble Cd contents in rhizosphere soils. Elevated CO2 increased the richness of bacterial and AOA communities estimated by Abundance-based Coverage Estimator index by 17.463.2% and by 1.42.8%, respectively, and decreased fungal communities by 2.212.0% under Cd exposure. Elevated CO2 combined with Cd at 1.0 mg Cd kg(-1) dry soil increased the diversity of bacterial, fungi, AOB, and AOA communities estimated by Shannon indexes, while at 5.0 mg Cd kg(-1) dry soil, the diversity of these taxa decreased with the exception of bacterial. Elevated CO2 led to increased abundance of phyla Acidobacteria, Chloroflexi, Ascomycota, and Thaumarchaeota and to decreased abundance of phyla Proteobacteria and Actinobacteria in rhizosphere soils under Cd exposure; and the abundance of dominant taxa changed dramatically. NMDS and heat-map analysis of the relative abundance of genera indicated that elevated CO2 had a greater effect on microbial community structure when combined with Cd exposure.

Additionally, elevated CO2 significantly affected microbial communities by increasing pH, TC, WSOC, and the C/N ratio and by decreasing total and soluble Cd contents in rhizosphere soils. Overall, elevated CO2 combined with Cd exposure increased the abundance of most microorganisms and changed microbial diversity in gene level as a result of increased nutrients in rhizosphere soils.

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第 123 篇

标　　题： Synthesis And Characterization Of Dopamine-Modified Ca-Alginate/Poly (N-Isopropylacrylamide) Microspheres For Water Retention And Multi-Responsive Controlled Release Of Agrochemicals

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期　　刊： INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES

摘　　要： The multi-responsive controlled-release system could enhance crop yield while improving utilization efficiency of agrochemicals, and minimize environmental pollution caused by agrochemicals overuse. This work reports a novel Ca-alginate/Poly(N-isopropylacrylamide)@polydopa mine (Ca-alginate/PN1PAm@PDA) microsphere to control the agrochemicals release. Microsphere with a semi-interpenetrating network, which contained pH-sensitive Ca-alginate, temperature-sensitive poly(N-isopropylacrylamide) (PNIPAm), and sunlight-sensitive polydopamine (PDA), was characterized by thermogravimetric analysis, zeta potential, Fourier transform infrared spectroscopy, and scanning electron microscopy to prove the successful synthesis. Moreover, the comprehensive performances, including photothermal conversion, water absorbency, water retention, and controlled-release agrochemicals behaviors, were systematically investigated. The results indicated that the composite microsphere was a prosperous water and agrochemicals manager to effectively retain water and control the release of agrochemicals by external stimulation. Consequently, the Ca-alginate/PNIPAm@PDA microsphere with outstanding water-retention and controlled-release capacities is economical and eco-friendly and thus is promising for utilization as water and agrochemicals controlled-release carrier material in agriculture applications.

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第 124 篇

标　　题：Preparation Of Biocl0.9I0.1/Beta-Bi2O3 Composite For Degradation Of Tetracycline Hydrochloride Under Simulated Sunlight

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期　　刊：CHINESE JOURNAL OF CATALYSIS

摘　　要：A novel and effective BiOCl0.9I0.1/x%beta-Bi2O3 composite catalyst was synthesized through a precipitation method. The structure, morphology, and optical properties of the samples were certified by X-ray diffraction, UV-Vis diffuse reflectance, scanning electron microscopy, and X-ray photoelectron spectroscopic characterizations. Photocatalytic experiments demonstrated that the synthesized BiOCl0.9I0.1/x%beta-Bi2O3 composite catalyst exhibited excellent photocatalytic performance toward the degradation of tetracycline hydrochloride (TCH) under simulated sunlight. Furthermore, the TCH degradation rate of BiOCl0.9I0.1/15%beta-Bi2O3 increased by 27.6% and 61.4% compared with those of the pure BiOCl0.9I0.1 and pure beta-Bi2O3, respectively. Due to the multiple vacancies and valence states possessed by BiOCl0.9I0.1/x%beta-Bi2O3, namely Bi5+, Bi(3-x)+, Bi5+-O, Bi3+-O, I- and I-3(-), the charge separation in photocatalysis reactions can be effectively promoted. The Mott-Schottky measurements indicate that the conduction band (CB) level of BiOCl0.9I0.1/15%beta-Bi2O3 becomes more negative relative to that of BiOCl0.9I0.1, guaranteeing an advantageous effect on the redox ability of the photocatalyst. This study provides a new bright spot for the construction of high-performance photocatalysts. (c) 2020, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. Published by Elsevier B.V. All rights reserved.

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第 125 篇

标　　题：Coincidence Probability Of Streamflow In Water Resources Area, Water Receiving Area And Impacted Area: Implications For Water Supply Risk And Potential Impact Of Water Transfer

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期　　刊： HYDROLOGY RESEARCH

摘　　要： Under changing environment, the feasibility and potential impact of an inter-basin water transfer project can be evaluated by employing the coincidence probability of runoff in water sources area (WSA), water receiving area (WRA), and the downstream impacted area (DIA). Using the Han River to Wei River Water Transfer Project (HWWTP) in China as an example, this paper computed the coincidence probability and conditional probability of runoff in WSA, WRA and DIA with the copula-based multivariate joint distribution and quantified their acceptable and unfavorable encounter probabilities for evaluating the water supply risk of the water transfer project and exploring its potential impact on DIA. Results demonstrated that the most adverse encounter probability (dry-dry-dry) was 26.09%, illustrating that this adverse situation could appear about every 4 years. The acceptable and unfavorable probabilities in all encounters were 44.83 and 55.17%, respectively, that is the unfavorable situation would be dominant, implying flood and drought risk management should be paid greater attention in project operation. The conditional coincidence probability (dry WRA & dry DIA if dry WSA) was close to 70%, indicating a requirement for an emergency plan and management to deal with potential drought risk.

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第 126 篇

标　　题： Geospatial Distribution And Potential Noncarcinogenic Health Risk Assessment Of Nitrate Contaminated Groundwater In Southern India: A Case Study

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期　　刊： ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY

摘　　要： Groundwater nitrate pollution is a serious threat to human health in many regions of the world. The present study was performed to assess the nitrate contamination in groundwater in the region ofNirmal province, South India, where people purely depend on groundwater for drinking purposes. The associated human health risks for different age groups (male, female, and children) also were evaluated based on the United States Environmental Protection Agency model. Results indicate that nitrate concentration in groundwater is in the range of 0.8-130 mg/L with a mean of 36.51 mg/L. Furthermore, 26.47% of groundwater samples exceeded the WHO drinking water guidelines for

NO(3)(-)in the study region. The contribution of oral ingestion is very higher than the dermal contact in the total hazard quotient or noncarcinogenic health risk. The total hazard quotient values ranged from 0.02 to 3.13 for adult males, 0.02 to 3.70 for adult females, and 0.03 to 4.32 for children. The health risk assessment highlights that children are more exposed to the noncarcinogenic health risks of nitrate than adult females and males in the study region. Therefore, specific groundwater quality measures should be formulated to address the health risk problems for children in the study region.

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WOS 号： 000574791800001

第 127 篇

标　　题： Potentially Toxic Elements (Ptes) Pollution In Surface Soils In A Typical Urban Region Of South India: An Application Of Health Risk Assessment And Distribution Pattern

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期　　刊： ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY

摘　　要： The pollution level of potentially toxic elements (PTEs) in surface soils is detrimental to the ecosystem and human health. In this research, various indices such as an index of geo-accumulation (I-geo), contamination factor (CF), degree of contamination (DC), and principal component analysis (PCA) were implemented to identify and evaluate the soil PTEs pollution; and then human health risk assessment model used to establish the link between heavy metals pollution and human health in the urban region of south India. Results exhibited that the mean concentration of Cr, Cu, Ni and Zn were found to be 1.45-6.03 times greater than the geochemical background values. Cr and Cu were the most profuse PTEs measured in the soils. The pollution indices suggest that soil of the study region is mainly moderate to highly polluted. The non-carcinogenic health risk assessment proposed by the United States Environmental Protection Agency (USEPA) suggested the mean hazard indices (HIs) were below one which denotes no significant of non-carcinogenic risks to both children and adults. Furthermore, carcinogenic risk assessment results advised similar to 80% of cancer risk was caused by Cr contents, while other heavy metals indicate that neither children nor adults in the study region were of carcinogenic risks.

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第 128 篇

标　　题： Evaluating The Distribution And Potential Ecological Risks Of Heavy Metal In Coal

Gangue

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期　　刊：ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要：The heavy metals, which derived from accumulated coal gangue, are important source of environmental pollution. In this study, coal gangue dumps, collected in Shaanxi Province, China, were used to evaluate the potential ecological risks and release characteristics of heavy metals, including the chemical forms, release characteristics, and potential ecological risks by using the methods of Tessier's sequential extractions, leaching experiments, gray GM (1, 1) forecasting mode, and potential ecological risk index. The results indicated that gangue samples contained high levels of metals, especially of Pb, which was the 20-31 times of the background value, whereas the sum of exchangeable and carbonate fractions in Co and Cu was a large proportion (4-11%) of the total. Potential ecological risks were at strong level regardless of the type of the coal gangue because of Mo and Pb and the comprehensive ecological risk index of 351.51-412.27. Weathering promotes the release of heavy metals in the gangue. Furthermore, the contents of Cu and Pb in leaching solution and their release times in weathered gangue were significantly higher than those of the fresh one. This research provides a scientific basis for the prevention and control of heavy metal pollution in coal-containing areas.

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WOS 号：000578015200004

第 129 篇

标　　题：A Study Of Soil Seed Banks Across One Complete Chronosequence Of Secondary Succession In A Karst Landscape

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期　　刊：PEERJ

摘　　要：Anthropogenic disturbance and distinctive geochemistry have resulted in rocky desertification in many karst regions of the world. Seed banks are crucial to vegetation regeneration in degraded karst ecosystems characterized by a discontinuous distribution of soil and seasonal drought stress. However, the dynamics of seed banks across one

complete series of secondary succession and the underlying mechanisms remain unclear. We selected eight typical stages during secondary succession, conducted aboveground vegetation survey and collected 960 soil samples in the Guiyang karst landscape of China. Seed density, species richness and plant life forms in seed banks were determined via the germination method. The results indicated that the seed density in seed banks before and after field seed germination was significantly different among most succession stages. Community succession had impacts on the seed density of seed banks before and after field seed germination. Seed density ranged from 1,042 seedlings.m(-2) in evergreen broadleaf forests to 3,755 seedlings.m(-2) in the herb community, which was a relatively high density. The seed density and similar species composition between the seed banks and vegetation declined with succession from early to later stages. Species richness in seed banks was highest in middle succession stages and increased with increasing species richness of aboveground vegetation. The species richness of the five life forms in the seed banks showed different variations across these succession stages. The conservation of diverse aboveground vegetation can maintain the diversity of seed banks for restoration.

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第 130 篇

标　　题： Impact Of Temporal Rainfall Patterns On Flash Floods In Hue City, Vietnam

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期　　刊： JOURNAL OF FLOOD RISK MANAGEMENT

摘　　要： Urban flooding is a perennial problem, especially in developing countries with relatively weak infrastructure under ever-increasing stress due to climate change and human activities. We simulate the temporally variable flood-water depth and inundation area under four designed rainfall patterns in the typical tropical rainforest city of Hue, Vietnam. The four rainfall types are R1 (peak at fifth hour), R2 (peak at 20th hour), R3 (peak at first hour), and R4 (peak at 13th hour). Results show that temporal rainfall pattern R4 with peak rainfall in the middle of the total period yielded the maximum water depth of 1.88 m. R3, with peak rainfall in the first hour, yields the shallowest maximum water depth and the largest inundation extent. When the water depth for R3 is

0.1-0.2 m, the inundated area caused by R3 is 3-4 times that of the other three patterns. Analysis of urban flood inundation in Hue provides a management tool to facilitate flood risk management in the context of extreme rainfall.

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WOS 号： 000582299900001

第 131 篇

标　　题： Synthesis Of Ni-Silicate Superficially Modified Cds And Its Highly Improved Photocatalytic Hydrogen Production

作　　者： [Chen, Kaiyi; Wang, Qizhao] Changan Univ, Sch Water & Environm, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian 710054, Peoples R China; [Wang, Lei; Gao, Ziqian; Wang, Qizhao] Northwest Normal Univ, Coll Chem & Chem Engn, Lanzhou 730070, Peoples R China; [Wang, Qizhao] Harbin Normal Univ, Sch Phys & Elect Engn, Key Lab Photon & Elect Bandgap Mat, Minist Educ, Harbin 150025, Peoples R China

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期　　刊： APPLIED SURFACE SCIENCE

摘　　要： Development of photocatalytic hydrogen production through water splitting is promising due to its practical application in converting solar energy into chemical energy. Herein, we report a facile surface decoration of Ni-silicate nanosheet onto CdS nanorods (denote as CdS NRS) to establish an excellent visible-light-driven photocatalyst for hydrogen evolution. The as-synthesized CdS NRS@Ni-silicate exhibits an impressively ameliorated performance in the subsequent photocatalysis, engendering 401.7 mu mol.h(-1) hydrogen, which is 8.9 times higher than that conducted by pure CdS. The improvement in catalytic activity primarily owes much to two contributors: The embedded Ni2+ act as cocatalyst in silicate that enhance the separation efficiency of photoinduced carriers; the silicate layer greatly scatters the Ni2+ ion and consequently keeps it from aggregation on the CdS surface.

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第 132 篇

标　　题： Hydrogeochemistry And Fluoride Contamination In Jiaokou Irrigation District, Central China: Assessment Based On Multivariate Statistical Approach And Human Health Risk

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期　　刊： SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要： Too little and too much fluorine are potentially hazardous for human health. In the

Jiaokou Irrigation District, ionic concentrations, hydrogeochemistry, and fluoride contaminations were analyzed using correlation matrices, principal component analysis (PCA), and health risk assessment. The patterns for the average cation and anion concentrations were Na+> Mg2+ > Ca2+> K+ and SO42- > HCO3- > Cl- > NO3- > CO32-. The fluoride concentrations ranged between 0.29 and 8.92 mg/L (mean = 2.4 mg/L). 5% of the samples displayed lower than the recommended limit of 0.5 mg/L fluoride content, while 69% exceeded the allowable limits of 1.5 mg/L for drinking. The low F-content is distributed in a small part of the southeast, while elevated F-mainly in the central area of the study region. The PCA results indicated three principal components (PC), PC1 having the greatest variance (45.83%) and affected by positive loadings of TDS, Cl-, SO42-, Na+, and Mg2+, PC2 accounting for 17.03% and dominated by Ca2+, pH, HCO3-, and K+, and PC3 representing 12.17% and mainly comprising of CO32-. High fluoride groundwater is of the SO4-Cl-Na type, followed by HCO3-Na type. Evaporation and ion exchange play important roles in producing high fluoride groundwater. Furthermore, saturation index and anthropogenic activities also promote the high fluoride concentrations. The values of the total hazard quotient of 93% groundwater samples were greater than 1 for infants, followed by 85% for children, 68% for teenagers, and 57% for adults. Noncarcinogenic health risks to infants may occur over the entire study area, while for adults, health risks are mainly found in Weinan and Pucheng. High fluorine may have a potential negative influence on neurodevelopment, especially for infants and children. Adults in this region have serious dental fluorosis and skeletal fluorosis because of long-term drinking of high fluoride groundwater. Therefore, measures, including using organic fertilizers, strengthening defluoridation process, and optimizing water supply strategies, are necessary in this area.

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WOS 号： 000568812200010

第 133 篇

标　　题： Comparison Of Field Methods For Estimating Evaporation From Bare Soil Using Lysimeters In A Semi-Arid Area

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期　　刊： JOURNAL OF HYDROLOGY

摘　　要： Evaporation from bare soil is an important component of a catchment water balance. However, it is arguably one of the most challenging hydrological processes to estimate and measure accurately. Several approaches to estimate soil evaporation exist, but their performance for specific water table conditions remains unclear. This study investigated

the performance of four commonly used approaches and several ways on how to implement them: the energy-balanced based FAO-56 method with the skin evaporation enhancement (FAO-56 skin), hydraulic methods based on groundwater level fluctuation (GLF), Darcy's law, and the maximum entropy production (MEP) method based on non-equilibrium thermodynamics theory. Three lysimeters with different water table depths were used at a research site in the Guanzhong Basin of China. The lysimeters were equipped with soil moisture probes. Water table fluctuations were also measured. The data allow us to accurately estimate evaporation rates using a water balance approach and are used to assess the performance of the analysed methods. The results show that: (1) The MEP method performed best for all water table conditions, but tends to overestimate evaporation if the water table is below the extinction depth. The extinction depth is the depth of the water table were there the contribution of groundwater to bare-soil evaporation is zero. In our case, the extinction depth was 78 cm. (2) The FAO-56 skin method underestimated evaporation where the water table was above the extinction depth, and vice versa. (3) The groundwater level fluctuation method significantly overestimated the evaporation if the specific yield was estimated using hydraulic methods. The groundwater level fluctuation method should be combined with a soil water balance, independent of water table conditions. The method can only be applied if the water table is above the extinction depth. (4) Conceptually, Darcy's law was suitable for estimating evaporation. However, the estimation of the required parameters is challenging. A good fit could only be obtained through calibration to measured evaporation rates.

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WOS 号： 000599754500081

第 134 篇

标　　题： Potential Evaporation Dynamics Over Saturated Bare Soil And An Open Water Surface

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期　　刊： JOURNAL OF HYDROLOGY

摘　　要： Actual evaporation (E-a) can be calculated as a fraction of potential evaporation (PE), which refers to the evaporation rate if supply water is unlimited. Potential evaporation depends on the available energy and the underlying material, and different approaches to estimate potential evaporation exist nowadays. This study provides a detailed analysis of the evaporation dynamics over fully saturated, sandy soil (PEs) and an open water surface (PEw). Moreover, the performance of commonly used methods to

estimate PE is assessed. At the basis of these analyses is a lysimeter experiment in the Guanzhong Basin, China, which allowed a precise measurement of PE with a very high temporal resolution. Temperature profiles in lysimeters and meteorological data were also measured during the experiment. A comparison of PEs and PEw was carried out for seven consecutive days (August 11th to 17th, 2016). Results show that PEw is smaller than PEs on a daily scale, with PEw rates being bigger than PEs at night but smaller during daytime. Furthermore, the temporal dynamics of PEw lags 4-5 h behind PEs. In accordance with the energy balance equation, PE dynamics are mainly governed by available energy. The PE rates calculated by Penman-Monteith (PM) and Priestly-Taylor (PT) based on these measurements were also evaluated. The measured PE is relatively well reproduced by PM and PT equations. Finally, the effect of using different approaches to estimate PE on calculating E-a was tested by an integrated hydrological model that calculates water flow in the unsaturated zone by solving the Richards equation. The relative differences were up to 17.5%.

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WOS 号： 000599754500004

第 135 篇

标　　题： Monitoring And Modeling The Coupled Movement Of Water, Vapor, And Energy In Arid Areas

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期　　刊： JOURNAL OF HYDROLOGY

摘　　要： In arid areas, vapor flow has been recognized to contribute significantly to the mass and energy transfers and to play a critical role in maintaining surface vegetation and ecosystems. To better understand the continuous spatial and temporal variations in liquid water and water vapor contents under different climatic conditions, soil water contents, temperatures, and micrometeorological variables were observed in-situ in the Mu Us Desert of northwestern China. The collected data were then used to calibrate and validate the Hydrus-1D model simulating either the coupled movement of water, vapor, and energy or only isothermal water flow in soils (the latter as a reference). The results of the coupled model were not only in better agreement with observed data, but also advanced our understanding of underlying mechanisms of soil water flow. For the coupled model, the isothermal liquid flux was the most significant component of the total water flux. Three diurnal stages were identified for thermal liquid and vapor fluxes on dry days, while the vapor flux became almost negligible during rainfall events. The results indicate that isothermal liquid, thermal liquid, and thermal vapor fluxes should be considered simultaneously when evaluating soil water flow in arid regions, while the

isothermal vapor flux can be neglected. Vapor flow contributed, on average, about 13% of the total water flux in the uppermost soil layer during the analyzed period at the study area, and this ratio often exceeded 20%.

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WOS 号： 000599754500226

第 136 篇

标　　题： Remote Sensing Monitoring Method For Groundwater Level On Aeolian Desertification Area

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期　　刊： JOURNAL OF WATER CHEMISTRY AND TECHNOLOGY

摘　　要： Groundwater is one of the most important natural resources. Regional groundwater depth is an important parameter for understanding groundwater resources and maintaining sustainable development of water resources and environment. The middle reaches of the Tarim River in Xinjiang are the most primitive and well-preserved place in the world, which provides valuable resources in studying the response mechanism of surface vegetation to the groundwater level. The ecological environment of Tarim River Basin has been deteriorating, and Populuseuphratica forest has died, which is directly related to the decrease of water inflow and groundwater level around the Tarim River. To obtain the spatial distribution of the groundwater level, this study uses the MODIS satellite remote sensing image data and the remote sensing-mathematical-model of a fusion science research methods, based on the field investigation of the groundwater level, soil moisture, and other supporting information on Aeolian desertification area in the middle reaches of Tarim River in Xinjiang. Through the experimental equation of the soil moisture and groundwater level, a simple and effective remote sensing method was proposed. This method is used to evaluate the spatial distribution of groundwater level based on the MODIS image data when there is capillary supply in the soil. This model was field-proven on the desertification area in the middle reaches of Tarim River. The results indicate that the correlation coefficient between the inversion of groundwater depth and the measured groundwater level is 0.89, which are realistic with small errors. So it is feasible to monitor and assess the spatial distribution of groundwater table depth in desertification areas with a large groundwater depth of 6 m or less. This study is helpful to provide critical area for the ecological environment monitoring and restoration, and ultimately serve the sustainable development of water and environment.

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WOS 号： 000613489100012

第 137 篇
标　　题： Hydrogeochemical Processes Affecting Groundwater Chemistry In The Central Part Of The Guanzhong Basin, China
作　　者： [Ren, Xiaofei; Li, Peiyue; He, Xiaodong; Su, Fengmei] Changan Univ, Sch Water & Environm, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Ren, Xiaofei; Li, Peiyue; He, Xiaodong; Su, Fengmei] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Elumalai, Vetrimurugan] Univ Zululand, Dept Hydrol, ZA-3886 Durban, South Africa
通讯作者： Li, PY (corresponding author), Changan Univ, Sch Water & Environm, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China.; Li, PY (corresponding author), Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China.
期　　刊： ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY
摘　　要： Groundwater is essential for the sustainable development of the Guanzhong Basin, China, and its quality is mainly controlled by hydrogeochemical processes and anthropogenic pollution. This study used statistical and multivariate statistical analysis approaches to recognize the hydrogeochemical processes and affecting factors of groundwater in the central part of the Guanzhong Basin. Correlations among 14 hydrochemical parameters were statistically examined. Principal component analysis (PCA), factor analysis (FA), and hierarchical cluster analysis (HCA) techniques were applied to analyze the physicochemical variables to understand the affecting factors of groundwater quality in the study area. The correlation analysis results indicate that cation exchange is the dominant process affecting the concentration of Na+ and Ca2+ in the groundwater. Both the PCA and FA indicate that minerals dissolution/precipitation and human activities are the key factors that affect groundwater quality. All parameters except CO32- and pH increase from C1 to C4 obtained through the Q mode HCA. C4 has a hydrochemical type of SO4-Na center dot K, indicating that the sample of this cluster is primarily influenced by anthropogenic processes.
DOI： 10.1007/s00244-020-00772-5
WOS 号： 000585896100002

第 138 篇
标　　题： Investigating Variations Of Precipitation Concentration In The Transitional Zone Between Qinling Mountains And Loess Plateau In China: Implications For Regional Impacts Of Ao And Wpsh
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期　　刊： PLOS ONE

摘　　要： Changes in precipitation patterns greatly impact regional drought/flood risk management and utilization of water resources. The main purpose of this paper was to investigate spatio-temporal variability of precipitation concentration in the transitional zone between Qinling Mountains (QDM), Guanzhong Plain (GZP) and the Loess Plateau (LPNS) in China, using monthly-scale precipitation concentration index (PCI) and daily-scale concentration index (CI) from daily rainfall records. The Mann-Kendall method was employed to illustrate the change in trend of PCI and CI, the Kriging interpolation method was adopted to measure spatial distribution, and the Wavelet transforms were used to explore their spatio-temporal correlation with the Arctic Oscillation (AO) & Western Pacific Subtropical High (WPSH) for revealing the potential attribution of precipitation concentration variation. Also, the regional implication of CI was investigated in the zone to provide local knowledge of the index application. Results showed that annual precipitation demonstrated a north-south increasing layered spatial distribution in the zone, representing a generally decreasing trend. The CI change generally exhibited a more significant decreasing trend than did PCI in LPNS and GZP due to AO slowly increasing over time, with a spatially weak layered or radial north-south decay, and an insignificant increasing trend in QDM impacted by the enhancing WPSH, with an obvious layered or radial spatial distribution. The spatiotemporal pattern of PCI variation represented similar characteristics in attribution with CI, but an inverse spatial distribution due to the phase difference (positive and negative effects) of AO and WPSH influencing seasonal precipitation. Regional analysis of CI showed that the CI value with over 0.62 indicated that approximately 80% of precipitation was contributed by 25% of the rainiest days in this zone. Fortunately, the area with this high CI has been getting smaller, implying a positive trend toward regional flash flood and debris flow control.

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WOS 号： 000591376200108

第 139 篇

标　　题： Highly Effective Oxidative Desulfurization With Magnetic Mof Supported W-Moo3 Catalyst Under Oxygen As Oxidant

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期　　刊： APPLIED CATALYSIS B-ENVIRONMENTAL

摘　　要： An effective process to remove sulfur compounds from fuel has been explored. The tungsten atoms modified MoO3 as active species was used to enhance the desulfurization activities, and MOF materials to provide a stable place. Meanwhile, the successful introduction of magnetic Fe3O4 could lead to an easily separation after the reaction with simple external magnet to achieve the catalyst recycling use and the final catalyst was named as Fe3O4@W-MoO3@MOF. To noted, various W contents in catalyst system showed a different influence on the ODS process and the ultra-deep desulfurization result could be obtained once the 30 % W loading amount was introduced. Under the optimal reaction conditions, DBT could be completely oxidized in 60 min and there is no apparent losing of activity after at least 18 times of recycling. As for the actual diesel, it was demonstrated that an excellent reactivity was also achieved.

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第 140 篇

标　　题： Removal Of Cadmium From Contaminated Groundwater Using A Novel Silicon/Aluminum Nanomaterial: An Experimental Study

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通讯作者： Li, PY (corresponding author), Changan Univ, Sch Water & Environm, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China.; Li, PY (corresponding author), Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China.

期　　刊： ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY

摘　　要： Cadmium (Cd) is a harmful element to human health and biodiversity. The removal of Cd from groundwater is of great significance to maintain the environmental sustainability and biodiversity. In this work, a novel low-temperature roasting associated with alkali was applied to synthesize an eco-friendly adsorbent using coal fly ash. Scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray fluorescence, and X-ray photoelectron spectroscopy were applied to analyze the physical and chemical characteristics of the adsorbent. The experiments show that a significant improvement in specific surface area and activity of adsorbent was observed in this study. The functional groups of Na-O and Fe-O were verified to be beneficial in the removal of Cd2+. The material capacity to adsorb Cd2+ was considerably improved, and the maximum uptake capacity was 61.8 mg g(-1) for Cd2+ at 25 degrees

C. Furthermore, pH and ionic strength play critical roles in the adsorption process. The Langmuir and pseudo-second-order models can appropriately describe the adsorption behavior, and the enhanced adsorption ability of Cd2+ by modified coal fly ash was attributed to ion-exchange, co-precipitation, and complexation. Higher sorption efficiency was maintained after two regeneration cycles. These results offer valuable insights to develop high-performance adsorbent for Cd2+ removal.

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第 141 篇

标　　题： Groundwater Quality Delineation Based On Fuzzy Comprehensive Assessment Method (Fcam): A Case Study

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期　　刊： ARABIAN JOURNAL OF GEOSCIENCES

摘　　要： Groundwater is the primary source for drinking purposes in all over the world. The present study is carried out to evaluate the groundwater suitability for drinking purposes. For this purposes, thirty groundwater samples were collected from active boreholes in the investigated region and analyzed for concentrations of various physico-chemical parameters. Chadha diagram was used to better understand the hydro-geochemistry, while fuzzy comprehensive assessment method (FCAM) was introduced to delineate the overall groundwater quality for drinking purposes. Groundwater is slightly alkaline in nature in this study region, and the dominant hydrochemical facie is HCO3--Na+ which is a reflection of the predominant rock-water interaction in the region. Results of FCAM demonstrated that 73% of groundwater samples were most suitable for drinking purposes and remaining 27% were poor in quality which were unsuitable for drinking purposes in the investigated region.

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WOS 号： 000595717700003

第 142 篇

标　　题： Seasonal Variations Of The Impact Of Urban Aerosol Pollution On Distributed Solar Photovoltaic Generation Of Nine Megacities In China

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期　　刊： URBAN CLIMATE

摘　　要： Distributed solar photovoltaic (DSPV) generation is the most important component of renewable energy in cities. Due to the severe aerosol pollution, solar energy resources in central and eastern China have been lower than theoretical values for decades, resulting in lower efficiency of DSPV generation. The current DSPV design standards for building surfaces implemented in China are based on surface solar radiation data over the past three decades, which can no longer accurately reflect the current radiation intensity. In this study, multivariate regression analysis was conducted, and it was found that the solar radiation reduction by aerosol in nine megacities in China in winter was 0.3-0.4 kWh/m(2)/day. Due to the rapid decline of aerosol concentration since 2013, the average annual radiation value was 7.0%similar to 21.8% higher than the standard value. The annual loss of DSPV generation caused by aerosol pollution may be as high as (7.4 similar to 13.5).10(9) kWh in China. Low-level design criteria will lead to excessive design redundancy, the reduced utilization rate of DSPV and higher construction cost of buildings. The research results will provide data reference and theoretical support for the evaluation of energy loss from aerosol pollution and the revision of related building codes.

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WOS 号： 000594385700002

第 143 篇

标　　题： Integrated Numerical Model For Irrigated Area Water Resources Management

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期　　刊： JOURNAL OF WATER AND CLIMATE CHANGE

摘　　要： The likelihood of future global water shortages is increasing and further development of existing operational hydrologic models is needed to maintain sustainable development of the ecological environment and human health. In order to quantitatively describe the water balance factors and transformation relations, the objective of this article is to develop a distributed hydrologic model that is capable of simulating the surface water (SW) and groundwater (GW) in irrigation areas. The model can be used as a tool for evaluating the long-term effects of water resource management. By coupling the Soil and Water Assessment Tool (SWAT) and MODFLOW models, a comprehensive hydrological model integrating SW and GW is constructed. The hydrologic response

units for the SWAT model are exchanged with cells in the MODFLOW model. Taking the Heihe River Basin as the study area, 10 years of historical data are used to conduct an extensive sensitivity analysis on model parameters. The developed model is run for a 40-year prediction period. The application of the developed coupling model shows that since the construction of the Heihe reservoir, the average GW level in the study area has declined by 6.05 m. The model can accurately simulate and predict the dynamic changes in SW and GW in the downstream irrigation area of Heihe River Basin and provide a scientific basis for water management in an irrigation district.

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WOS 号： 000599948400007

第 144 篇

标　　题： Water Use Of Salix In The Variably Unsaturated Zone Of A Semiarid Desert Region Based On In-Situ Observation

作　　者： [Zhao, Ming; Wang, Wenke; Wang, Zhoufeng; Chen, Li; Ma, Zhitong; Wang, Qiangmin] Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian, Shaanxi, Peoples R China; [Zhao, Ming; Wang, Wenke; Wang, Zhoufeng; Chen, Li; Ma, Zhitong; Wang, Qiangmin] Changan Univ, Sch Water & Environm, Xian, Shaanxi, Peoples R China

通讯作者： Wang, WK (corresponding author), Changan Univ, Key Lab Subsurface Hydrol & Ecol Effects Arid Reg, Minist Educ, Xian, Shaanxi, Peoples R China.

期　　刊： JOURNAL OF HYDROLOGY

摘　　要： Soil water and groundwater are important water resources for vegetation survival and growth in arid and semiarid regions, and their contributions to water use over a whole growth period are difficult to quantify with limited observations. Additionally, the root water uptake (RWU) processes of groundwater-dependent xeric vegetation are specific and aggravate the complexity of these issues. In this paper, Salix is selected to study the interaction among atmosphere, soil water, groundwater, and RWU from the sprout to withered stage based on an observation within the 'In situ Monitoring Lysimeter System of the Atmosphere-Plant-Unsaturated Zone-Groundwater Continuum'. Two lysimeters with a diameter of 2 m and depths of 1.2 m and 4.2 m were implemented with Salix. The initial water table depth was 0.7 m in case 1 and 2.2 m in case 2. The results show that: Water use of Salix is the main contribution to actual evapotranspiration (ETa), no less than 80%. ETa was 462.75 mm in case 1 with a shallower soil layer and limited groundwater, during the entire growth period, 2016. Contrastively, it was 619.70 mm in case 2 with relatively abundant soil water and groundwater. The soil water and groundwater contribution were 89.6% and 10.4%, 74.3% and 25.7% for both cases. The selective water use by Salix in different soil layers was subject to temporal moisture availability. Salix extended to utilize groundwater in drought period and shifted back to wetter upper layers in case of rainfall. The access to groundwater significantly alleviates water stress, although rainfall replenishment can also play a part. Salix can not only intercept rainfall infiltration in the root zone, but also cause the decrease of water level, implying that the replanting of Salix should be carried out in a reasonable mode to ensure rainfall infiltration and reduce the ineffective loss of groundwater. Our

results provide a practical reference for groundwater management and ecology restoration in semiarid desert regions.

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WOS 号： 000599757800085

第 145 篇

标　　题： Schiff Bases Containing P-Phenylenediamine And P-Phenylenedicarbaldehyde And Their Complexes: Preparation And Electrochemical Properties

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期　　刊： CHINESE JOURNAL OF INORGANIC CHEMISTRY

摘　　要： The polymeric Schiff base (PT) was synthesized by the condensation reaction of p-phenylenediamine and terephitalaldehyde, and electrochemical properties of PT with different molar ratios of monomers were investigated. The lone pair electron of the nitrogen atom in the PT can coordinate with various metal ions (PT-M), and the results measured indicate that PT-M possesses better electrochemical performance compare with PT. The asprepared samples were characterized by X-ray diffraction (XRD), infrared spectrum (IR), thermogravimetry-differential scanning calorimetry (TG - DSC), scanning electron microscope (SEM) and energy spectrum (EDS). The intensity of XRD peaks of PT-M decreased in comparison with the PT, indicating that the tendency of molecular chain arrangement from order to disorder because metal ions entering polymer molecular skeleton through coordination chemical bonds. Electrochemical properties of PT and PT-M were evaluated by means of cyclic voltammetry (CV), galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS). The results show that the polymeric Schiff base aluminum complex (PT - Al) exhibits outstanding electrochemical performance, and its capacitance can reach 649.6 F.g(-1) at a current density of 0.5 A.g(-1), together with remaining 80.9% after 1 000 GCD cycles at the current density of 8 A.g(-1).

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第 146 篇

标　　题： Distribution Of Nitrate Content In Groundwater And Evaluation Of Potential Health Risks: A Case Study Of Rural Areas In Northern China

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Nitrate pollution is considered to be one of the most common environmental problems in groundwater, especially in areas affected by human mining, such as the arid region of northern China. However, the human health risk assessment of nitrate pollution in this area has not yet been carried out. In this study, groundwater samples were taken in the Selian mining area in Inner Mongolia to conduct a full analysis of water quality. On this basis, the groundwater quality, the distribution range of nitrate pollution, and human health risks were evaluated. The results show that the groundwater in the Selian mining area is neutral to alkaline, with high salinity and hardness. The concentration of nitrate ions in groundwater generally exceeds the standard, and the maximum exceeds 5.48 times the value specified in the Chinese national standard, indicating that groundwater nitrate pollution needs to be controlled urgently. Groundwater is polluted by large amounts of nitrogen fertilizer used by humans in agricultural activities. At the same time, mining activities have accelerated the severity and spread of pollution. Groundwater is not recommended for direct human life and irrigation use in the study area unless purification measures are taken. Nitrate pollution is more harmful to children through groundwater, about 1.54 times that of adults. Excess nitrate is transported into the body through drinking groundwater, so proper drinking water control will reduce the health risks of nitrate, such as centralized water supply. This study will provide a scientific basis for the rational use of groundwater and nitrate pollution control in the area.

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WOS 号： 000602986500001

第 147 篇

标　　题： Entropy Water Quality Index And Probabilistic Health Risk Assessment From Geochemistry Of Groundwaters In Hard Rock Terrain Of Nanganur County, South India

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期　　刊：GEOCHEMISTRY

摘　　要：Sixty-one groundwater samples collected from the hard rock terrain of Nanganur region in South India, were evaluated for hydrogeochemistry as well as groundwater quality for drinking and irrigation purposes. Additionally, the probabilistic non-carcinogenic human health risks associated with fluoride and nitrate concentrations were assessed using the US Environmental Protection Agency (USEPA) mathematical model. The hydrogeochemical facies, i.e. Ca2+-Mg2+-SO42- and Na+-Cl-SO42-, are result of weathering and dissolution of rocks, ion exchange between Ca2+ and Na+, and precipitation of CaCO3, and influences of anthropogenic sources. Molar ratio Na+/Cl-, and distributions of Ca2++Mg2+ versus HCO3-+SO42-, Ca2++Mg2+ versus total cations (TC), and Na++K+ versus TC indicate that silicate weathering is the prime source for the ions. Gibbs diagram also suggests that rock-water interaction is the primary process of ionic concentrations in this groundwater system. About 18% groundwater samples show medium salinity and low sodium hazards and 73% of them, however, have high salinity and low sodium hazards. Wilcox diagram indicates that most groundwater samples (92%) are suitable for irrigation. However, 66% of them exceeded the prescribed limits of nitrate (45 mg/L) and 62% these groundwater samples exceeded limit of fluoride (1.5 mg/L) for drinking purpose. Hazard quotient of nitrate (HQ(Nitrate)) and HQ(Fluoride) as well as total non-carcinogenic health risk of fluoride and nitrate (HITotal) indicates that infants and children are more vulnerable to non-carcinogenic risk than adults. Based on these results, we recommend regulation of fertilizer application and appropriate remediation for defluoridation of drinking water to prevent the further health risk.

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WOS 号：000617623900005

第 148 篇

标　　题：Spatial Distribution And Health Risk Assessment Of Fluoride Contamination In Groundwater Of Telangana: A State-Of-The-Art

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期　　刊：GEOCHEMISTRY

摘　　要：The groundwater of Telangana province is well known for its very high fluoride concentration. The main aim of this review is to assess the fluoride contamination, understand the spatial distribution pattern and also evaluate the potential human health risk for adults and children in the Telangana. Fluoride contamination in groundwater is the principal threat to public health in Telangana state in India. It is observed that the mean fluoride concentration in groundwater of ten districts in Telangana showed a decreasing trend: Nalgonda > Warangal > Ranga Reddy > Adilabad > Medak > Khammam > Karimnagar> Hyderabad > Mahabubnagar > Nizamabad. The high

fluoride concentration is observed in Nalgonda where the mean fluoride is 5.76 times higher than the recommended limit of 1.5 mg/L for drinking purposes. The fluoride concentration in groundwater derives mainly from the weathering and dissolutions of fluoride bearing minerals. Nalgonda region, the hazard quotient (HQ(Fluoride)) for adults and children ranged from 0.79 to 6.54 and 1.07 to 8.84 with an average of 3.01 and 4.07, respectively. In Warangal region, the non-carcinogenic health risk in terms of HQ(Fluoride) was found in the range of 0.77 to 2.63 and 1.04 to 3.55 with a mean of 1.46 and 1.97 for adults and children, respectively. Furthermore, children are at highly prone to health risk when compared to adults in the Telangana. Therefore, special care and pure drinking water should be supplied to the rural regions of Telangana.

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WOS 号： 000617623900004

第 149 篇

标　　题： A Matlab Based Graphical User Interface (Gui) For Quickly Producing Widely Used Hydrogeochemical Diagrams

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期　　刊： GEOCHEMISTRY

摘　　要： Hydrogeochemical diagrams are powerful tools facilitating hydrogeochemical research, among which Piper diagram, Gibbs diagrams, USSL diagram, Wilcox diagram and PI classification diagram are widely applied. However, it is usually tedious and time-consuming to draw these diagrams, not only because of the complex procedures to treat input data, but also due to the different software used. It is always required that several pieces of software should be used for a single hydrochemical study. Therefore, this study reported a MATLAB based graphical user interface (GUI) to overcome these shortages. Three simple steps are included in the GUI to draw a diagram. The frame of the diagram to be drawn is first selected from the database of the GUI, after which the input data (water sample data) are imported into the GUI and the properties of the points such as the sizes, colors and shapes are set. Finally, the diagrams produced can be exported from the GUI as images. This MATLAB based GUI is capable of generating quickly five types of diagrams that are commonly used in hydrogeochemical research. The codes of the GUI and related functions can be adjusted according to the user's needs. It is helpful to reduce the time spent in drawing these hydrochemical diagrams.

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WOS 号： 000617623900013

第 150 篇

标　　题：Groundwater Chemistry And Groundwater Quality Index Incorporating Health Risk Weighting In Dingbian County, Ordos Basin Of Northwest China

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期　　刊：GEOCHEMISTRY

摘　　要：Groundwater is essential to secure the safety of water supply in the Ordos basin, China. In this study, 35 groundwater samples were collected from part of the Dingbian County, a significant part of the Ordos energy base in China, and were analyzed for 17 physicochemical parameters. The health risk was quantified through the model recommended by the United States Environmental Protection Agency (USEPA). In addition, water quality index (WQI), which is incorporated with human health risk weighting, was adopted to evaluate the overall groundwater quality. The results show that groundwater in the study area is slightly alkaline water, and the hydrochemical types of groundwater is mainly HCO3-Na, HCO3-Na center dot Mg center dot Ca and mixed SO4 center dot Cl-Na types. The noncarcinogenic health risks follow the order: NO3->F->Cr6+>As>NO2->Mn, and the carcinogenic risks is mainly contributed by Cr6+. Children face higher risks than adults, and most groundwater samples are associated with unacceptable health risks for both adults and children. WQI results show that poor quality water and very poor quality water account for 11.43 % and 17.14 % of all sampled groundwater, respectively, which are not suitable for drinking. In terms of sodium hazard, nearly half of the groundwater samples are not suitable for irrigation. The results of this study will be helpful in groundwater management and protection in this area, and the health risk weighting method can be referenced by international scholars.

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第 151 篇

标　　题：Z-Scheme Snfe2O4/Alpha-Fe2O3 Micro-Octahedron With Intimated Interface For Photocatalytic Co2 Reduction

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期　　刊：CHEMICAL ENGINEERING JOURNAL

摘　　要：Interface engineering is a very important issue in achieving high efficiency in heterojunction photocatalysts. Herein, we report an originally designed heterojunction photocatalyst with seamless contact. Its novelty includes the following two respects: (1) two Fe-based oxides, i.e., SnFe2O4 and hematite Fe2O3 (alpha-Fe2O3), with suitable band structures were selected to promote charge separation, and (2) a seamless contact was achieved at the interface taking advantage of the commonly shared Fe element, i.e., converting partial of the Fe ions on the surface of micro-octahedrons SnFe2O4 nanocrystals into alpha-Fe2O3 through thermal treatment (Octa-SnFe2O4/alpha-Fe2O3). Characterization results confirmed the formation of seamless contact with large area at the interface, and the significantly enhanced Z-scheme charge separation efficiency. The seamless Octa-SnFe2O4/alpha-Fe2O3 heterojunction could deliver a higher CO2 photocatalytic reduction activity with production rates of 2.87 mu mol/g/h for CO and 0.64 mu mol/g/h for CH4, which is 13.7 times and 6.4 times higher than Octa-SnFe2O4, and 2.3 times and 5.3 times than those of conventionally prepared SnFe2O4/alpha-Fe2O3 composite counterparts. This work indicated that the ferrite-based close-contacted heterojunctions can be further investigated as promising photocatalysts in the environmental and energy applications.

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第 152 篇

标　　题：Groundwater Chemistry Integrating The Pollution Index Of Groundwater And Evaluation Of Potential Human Health Risk: A Case Study From Hard Rock Terrain Of South India

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期　　刊：ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY

摘　　要：Groundwater is an important resource for drinking and irrigation purposes and also the significant route of human exposure in most of the arid and semi-arid regions of the world. In view of this, 43 groundwater samples were collected and analyzed for various physico-chemical parameters. Particularly, this study integrates the groundwater contamination by comparing it to national guidelines and the impact of fluoride and nitrate on health risk were quantified through the model recommended by the United States Environmental Protection Agency (USEPA). The groundwater of the investigated region is slightly alkaline in nature with hydrochemical facies of groundwater is predominantly characterized by Ca2+-Mg2+-HCC3- and Ca2+-Mg2+-CT water types. The results show that the concentrations of groundwater nitrate and fluoride range from

2.2 to 165 mg/L and 0.84 to 4.3 mg/L, and 55.81% and 65% of groundwater exceed the national guidelines for drinking purposes, respectively. The pollution index of the groundwater (PIG) method unveiled that low quality and moderate quality of water account for 40% and 4.65% of collected groundwater samples, respectively. The results of non-carcinogenic health risk ranged from 0.63 to 5.31 +/- 2.59 for adults, 0.85 to 7.18 +/- 3.50 for children and 0.98 to 8.29 +/- 4.04 for infants, indicating health risk was higher in infants and children as compared to the adults in the study region.

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WOS 号： 000582222400047

第 153 篇

标　　题： Hydrological Analysis Of Loess Plateau Highland Control Schemes In Dongzhi Plateau

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期　　刊： FRONTIERS IN EARTH SCIENCE

摘　　要： Gully Consolidation and Highland Protection (GCHP) Project is a major soil and water conservation and land remediation project implemented in the Chinese Loess Plateau (CLP). As the connection between the mechanisms of erosion and practical applications for addressing it is not clear, the implementation of engineering measures to combat the problem has been insufficient to date. This study used field investigation and descriptive statistics, together with hydrological analysis modeling to gain an understanding of the impact of the Loess Plateau Highland Control Schemes on the evolution of the Dongzhi Plateau as the largest, most well-preserved, and the thickest loess deposit region in China. A remote sensing image was introduced to hydrological modeling to prove the analysis results of the Dongzhi Plateau. According to these investigations and analysis, four major schemes of gully head retrogressive erosion control were summarized and a comprehensive theory and technology based on a watershed were proposed. After hydrological analysis, the Dongzhi Plateau was divided into 1225 watersheds. It was found that GCHP should be implemented in the catchment area based on hydrological analysis to solve the problem of retrogressive erosion, and it is recommended that a scientific and rational drainage system should be designed based on the roads and pipe networks in the whole watershed area. Findings from this paper provide insights into the evolution of CLP and it can give a good suggestion on the

future implementation of GHCP.

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WOS 号： 000612801200001

地质工程与测绘学院

第 1 篇

标　　题： Influences Of Anthropogenic Factors On Lakes Area In The Golmud Basin, China, From 1980 To 2015

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： Lakes play a vital role in keeping the balance of regional ecosystems and biodiversity. In regions such as the Qinghai-Tibet Plateau with the fragile natural environment, lakes appear to be highly sensitive to climate changing. In the Golmud Basin, which is situated on the north edge of the Qinghai-Tibet Plateau, the interactions among lakes area variations, climate change and anthropogenic interference have not been thoroughly investigated. In this study, we analyzed lakes area variations in the Golmud Basin using Landsat-TM/ETM image data from 1980 to 2015. Within the study period, the lakes in the area have undergone two cycles with four stages: expansion in 1980-1990, shrinkage in 1990-2005, expansion in 2005-2010, and shrinkage in 2010-2015 again. In 2009, the Qarhan Salt Lake was basically enlarged and connected to the neighboring small lakes, while Dabuxun Lake had its maximum area in 2010. From 2011 to 2015, East Taijinaier Lake was shrinking and nearly dried up due to excessive water, mineral exploitation, and human blocking the connection among rivers and lakes. Climatic data were analyzed via the Mann-Kendall trend test, and both annual temperature and precipitation in the Golmud City increased considerably. The Landsat-TM/ETM images showed that the mountain glaciers around the basin retreated from 1980 to 2015, resulting in the expansion of the lake area. The land use transfer matrix was used to obtain the changes in land use types; increasing water consumption and population growth are the main factors associated with decreased lakes area and vegetation cover. As an essential part of the ecological environment, lakes have a direct impact on the change of the ecological environment. This study provides a scientific basis for the evaluation of the ecological environment quality of the Golmud Basin.

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WOS 号： 000502759700002

第 2 篇

标　　题：Can X-Ray Computed Tomography (Ct) Be Used To Determine The Pore-Size Distribution Of Intact Loess?

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期　　刊：ENVIRONMENTAL EARTH SCIENCES

摘　　要：Given that micro-CT scanners have started being used for loess investigation, this study examines the reliability of the micro-CT technique for characterizing intact loess, aiming at the pore-size distribution (PSD) that is the most basic quantitative parameter of the soil structure. Intact loess from Xi'an, China was scanned with a micro-CT scanner at two resolutions, 40 and 10 mu m. ImageJ software was used to process the image stacks to construct the three-dimensional (3D) pore networks and compute the sizes of 3D pores. The PSD determined by micro-CT was compared with that determined using mercury intrusion porosimetry (MIP) for the same loess. In addition, the microstructure of the same intact loess was observed using scanning electron microscopy to facilitate the discussion. The results show that the structure of intact loess is macroporous and macropores with the dimensions up to a few hundred microns are not rare and unevenly distributed. The micro-CT technique underestimates the loess porosity, because the pores with the dimensions smaller than the resolution cannot be identified. Intra-aggregate pores cannot be detected by this technique at present. The estimation accuracy may be improved a little by increasing the scanning resolution, while lack of representativeness of the aggregate-scale specimen and the resolution limit can still result in great underestimation of porosity and significant misrepresentation of the intact loess PSD. In summary, the PSD that covers a wide range and reveals the essentials of the pore structure of intact loess could not be accurately obtained by micro-CT. A combination of MIP and micro-CT is expected for a thorough evaluation of the pore structure of intact loess. In addition, a combination of CT systems with different resolution capabilities can serve for a multi-scale investigation of the pore network of intact loess.

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WOS 号：000511847200006

第 3 篇

标　　题：Evaluation On Activation Energy Of Deposited Clay Based On Thermo-Gravimetric Analysis (Tga) And Four Kinetics Models

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期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：In order to evaluate and compare the accurate activation energy variations of two kinds of deposited clays (i.e. non-organic clay and organic clay), thermo-gravimetric analysis (TGA) was firstly conducted to study the reaction characteristics of the two clay samples. Two periods of weight losses were observed according to each TGA curve for both clay samples. The first period happened due to water evaporation, while the second period was mainly caused by the composition reactions of clay minerals, especially influenced by the de-hydroxylation of kaolinite. An obvious phenomenon is that the organic clay with a high soil organic matter (SOM) has a higher activity energy. Then, four common kinetics models [i.e. the Coats-Redfern method, the Doyle integral method, the maximum rate method, and the distributed activation energy model (DAEM)] were used to calculate and compare the activation energy values. And the Doyle integral method and the DAEM method are considered as two recommended models to analyze the activation energy performance during thermal treatment. Some interesting conclusions can be summarized as: (1) The multi-period reactions of deposited clays during the heating process are common, especially for organic clay. It would be beneficial knowing its biomass resource feasibility concerning the second weight loss; (2) The high SOM has a significant influence on the potential energy unitization of deposited clays, while the variations of activity energy for deposited clays are influenced by the mineral compositions and microstructure features; (3) It is possible to evaluate the accurate activity energy of deposited clays combined with TGA tests and two recommended models (i.e. the Doyle integral method and DAEM method).

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第 4 篇

标　　题：Integrated Experiments On Field Monitoring And Hydro-Mechanical Modeling For Determination Of A Triggering Threshold Of Rainfall-Induced Shallow Landslides. A Case Study In Ren River Catchment, China

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期　　刊： BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要： Understanding the hydrological mechanism of rainfall-induced shallow landslides is critical to make reliable predictive assessments and to reduce risks of economic loss and fatalities. An integrated approach was identified by combining the field-based monitored hydrological data with a hydro-mechanical analysis, which can be utilized to better understand seasonal hydrological features in shallow soils and the corresponding triggering mechanism of rainfall induced shallow landslides, with the aim of setting up an improved landslide early warning system. A hydrological monitoring system on a representative slope that was experiencing frequent local shallow failures in the Ren River catchment was constructed to provide available seasonal hydrological features with regard to time trends in volumetric water content and pore water pressure in shallow soils. A transition of vertical downward flow from unsaturated to near-saturated conditions has been fully detected since the significant saturation degree and associated pore pressure varies with vertical depths. Consequently, the triggering mechanism of shallow landslides should be associated with the combined effects of dissipation of matrix suction in the upper unsaturated zone and increased positive pore pressure due to the generation of a temporal perched water table in the deeper saturated zone. This process was confirmed through the field evidence and a back analysis on the long-term hydrological evolution of slope soil using a calibrated one-dimensional hydrological model. Antecedent hydrological conditions were also found to have an effect on rainfall intensity-duration thresholds in the landslide early warning system based on a hydro-mechanical analysis, with the aim of improving the accuracy of the model's predictive ability. The results indicated that this research promoted the effectiveness of a landslide early warning system through a hydro-mechanical analysis based on capturing the real hydrological features of a landslide.

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第 5 篇

标　　题： Heifangtai Loess Landslide Type And Failure Mode Analysis With Ascending And Descending Spot-Mode Terrasar-X Datasets

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期　　刊： LANDSLIDES

摘　　要： The Heifangtai loess terrace in northwest China is a well-known area to study loess

landslides because of its frequent occurrence, various types, and complex trigger factors. The determination of loess landslide type and failure mode is of great significance for the landslide risk assessment, hazard mitigation, and prevention. In this study, ascending and descending Spot-mode TerraSAR-X datasets are employed to analyze the deformation patterns and failure modes of loess landslides in Xinyuan landslide group, Heifangtai terrace, by using multidimensional small baseline subsets (MSBAS) technique. First, the locations of three active landslides are delineated by independent InSAR observations from both ascending and descending TerraSAR-X datasets. Then, two-dimensional deformation rates and time series results in both vertical and horizontal east-west directions of the identified landslides are calculated using MSBAS technique. Finally, the deformation types and failure modes of landslides in the study sites are analyzed by jointly using the two-dimensional deformation rates and time series results, topographic map, remote sensing images, and previous studies on the loess landslide failure modes. With the aid of complementary data including topographic map, remote sensing image, previous studies on the loess landslide failure modes, and field investigations, two-dimensional deformation results derived from ascending and descending SAR images are compatible with three typical failure modes of loess landslide including loess-bedrock planar slide, retrogressive failure, and loess slide. Furthermore, the two-dimensional deformation derived from InSAR technique can give much detailed deformation characteristics and movement of loess landslide.

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WOS 号： 000512067600015

第 6 篇

标　　题： The 2014 Mw 6.1 Ludian Earthquake: The Application Of Radarsat-2 Sar Interferometry And Gps For This Conjugated Ruptured Event

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期　　刊： REMOTE SENSING

摘　　要： Although the Zhaotong-Ludian fault is a seismically active zone located in the boundary between the Sichuan-Yunnan block and the South China block, it has not experienced a large earthquake greater than Mw 7 since at least 1700. On 3 August, 2014, an Mw 6.1 earthquake (the Ludian earthquake) ruptured the Zhaotong active belt in Ludian County, Yunnan province, China. This earthquake was the largest earthquake recorded in the region since 2000, and it provides us with a unique opportunity to study the active tectonics in the region. The analysis of the aftershocks showed that two conjugate faults could have been involved in the event. We first used Global Positioning System (GPS) data and C-band RADARSAT-2 imagery to map the coseismic surface deformation. We then inverted the derived coseismic deformation for the slip

distribution based on the constructed conjugate fault model. Finally, the coulomb failure stress due to the Ludian earthquake was estimated to investigate the potential seismic hazards in this region. Our investigations showed that the Ludian earthquake was mainly a bilateral rupture event. The major slip of the main shock was located at depths of 0-5 km, which is close but does not superpose with the aftershocks that are mostly located at depths of 5-20 km. Interestingly, the seismic moment released by the aftershocks (6.9 x 10(18) N.m) was greater than that of the main shock (2.6 x 10(18) N.m). This evidence suggests that the accumulated elastic strain at depths of 0-20 km could have been fully released by the Ludian earthquake and its subsequent aftershocks. Furthermore, our analysis of the coulomb failure stress changes due to the main shock showed that the aftershocks could be the result of dynamic triggering rather than static triggering.

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第 7 篇

标　　题： Advantages Of Uncombined Precise Point Positioning With Fixed Ambiguity Resolution For Slant Total Electron Content (Stec) And Differential Code Bias (Dcb) Estimation

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期　　刊： REMOTE SENSING

摘　　要： The determination of slant total electron content (STEC) between satellites and receivers is the first step for establishing an ionospheric model. However, the leveling errors, caused by the smoothed ambiguity solutions in the carrier-to-code leveling (CCL) method, degrade the performance of ionosphere modeling and differential code bias (DCB) estimation. To reduce the leveling errors, an uncombined and undifferenced precise point positioning (PPP) method with ambiguity resolution (AR) was used to directly extract the STEC. Firstly, the ionospheric observables were estimated with CCL, PPP float-ambiguity solutions, and PPP fixed-ambiguity solutions, respectively, to analyze the short-term temporal variation of receiver DCB in zero or short baselines. Then, the global ionospheric map (GIM) was modeled using three types of ionospheric observables based on the single-layer model (SLM) assumption. Compared with the CCL method, the slight variations of receiver DCBs can be obviously distinguished using high precise ionospheric observables, with a 58.4% and 71.2% improvement of the standard deviation (STD) for PPP float-ambiguity and fixed-ambiguity solutions, respectively. For ionosphere modeling, the 24.7% and 27.9% improvements for posteriori residuals were achieved for PPP float-ambiguity and fixed-ambiguity solutions, compared to the CCL method. The corresponding improvement for residuals

of the vertical total electron contents (VTECs) compared with the Center for Orbit Determination in Europe (CODE) final GIM products in global accuracy was 9.2% and 13.7% for PPP float-ambiguity and fixed-ambiguity solutions, respectively. The results show that the PPP fixed-ambiguity solution is the best one for the GIM product modeling and satellite DCBs estimation.

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WOS 号： 000515569800103

第 8 篇

标　　题： Geo-Object-Based Land Cover Map Update For High-Spatial-Resolution Remote Sensing Images Via Change Detection And Label Transfer

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期　　刊： REMOTE SENSING

摘　　要： Land cover (LC) information plays an important role in different geoscience applications such as land resources and ecological environment monitoring. Enhancing the automation degree of LC classification and updating at a fine scale by remote sensing has become a key problem, as the capability of remote sensing data acquisition is constantly being improved in terms of spatial and temporal resolution. However, the present methods of generating LC information are relatively inefficient, in terms of manually selecting training samples among multitemporal observations, which is becoming the bottleneck of application-oriented LC mapping. Thus, the objectives of this study are to speed up the efficiency of LC information acquisition and update. This study proposes a rapid LC map updating approach at a geo-object scale for high-spatial-resolution (HSR) remote sensing. The challenge is to develop methodologies for quickly sampling. Hence, the core step of our proposed methodology is an automatic method of collecting samples from historical LC maps through combining change detection and label transfer. A data set with Chinese Gaofen-2 (GF-2) HSR satellite images is utilized to evaluate the effectiveness of our method for multitemporal updating of LC maps. Prior labels in a historical LC map are certified to be effective in a LC updating task, which contributes to improve the effectiveness of the LC map update by automatically generating a number of training samples for supervised classification. The experimental outcomes demonstrate that the proposed method enhances the automation degree of LC map updating and allows for geo-object-based up-to-date LC mapping with high accuracy. The results indicate that the proposed method boosts the ability of automatic update of LC map, and greatly

reduces the complexity of visual sample acquisition. Furthermore, the accuracy of LC type and the fineness of polygon boundaries in the updated LC maps effectively reflect the characteristics of geo-object changes on the ground surface, which makes the proposed method suitable for many applications requiring refined LC maps.

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第 9 篇

标　　题： Using The Effective Void Ratio And Specific Surface Area In The Kozeny-Carman Equation To Predict The Hydraulic Conductivity Of Loess

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期　　刊： WATER

摘　　要： Many modified Kozeny-Carman (KC) equations have been used to predict the saturated permeability coefficient (K-s) of porous media in various fields. It is widely accepted that the KC equation applies to sand but does not apply to clay. Little information is available to clarify this point. The effectiveness of the KC equation will be evaluated via laboratory penetration tests and previously published data, which include void ratio, specific surface area (SSA), liquid limit (LL), and permeability coefficient values. This paper demonstrates how to estimate the SSA of cohesive soil from its LL. Several estimation algorithms for determining the effective void ratio (e(e)) of cohesive soil are reviewed. The obtained results show that, compared to the KC equation based on porosity and geometric mean particle size (D-g), the KC equation based on the SSA and the e(e) estimation algorithm can best predict the K-s of remolded loess. Finally, issues associated with the predictive power of the KC equation are discussed. Differences between measured and the predicted K-s values may be caused by the uniformity of the reconstructed specimen or insufficient control of the test process and errors in the SSA and e(e).

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第 10 篇

标　　题： An Integrated Multiscale Geometric Analysis Approach For Automatic Extraction Of Power Lines From High Resolution Remote Sensing Images

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期　　刊： IEEE ACCESS

摘　　要： High resolution remote sensing systems provide cheaper and fast way of acquiring

images of power lines. However, such images depicting the details of other complex background objects, noises, and complicated brightness measurements, make separate extraction of the power lines challenging. This paper addresses the problem of automatic extraction of power lines from high resolution remote sensing images obtained from different sources. In order to automatically extract the power lines, we proposed an integrated Multiscale Geometric Analysis (MGA) approach. First, complementary Gabor and matched filters (MF) were employed over an image to suppress unnecessary background and noises, and initial discrimination of the power lines. Then, the filtering output was decomposed in to scale and orientation based subband coefficients using the Fast Discrete Curvelet Transform (FDCT) so as to access and modify different image features separately. By employing selective modification operations, well-established power line structures ready for extraction were derived. Finally the powerlines were extracted with hysteresis thresholding. The approach was successful in extracting power lines from high resolution images captured in any orientation. It is robust even when the source image is cluttered, and degraded due to noise and brightness effects. Power lines represented by weak intensities, crossing bright image regions, changing direction, closer power lines and those crossing each other, disconnected/broken power lines due to noise and occlusions were all inferred and extracted successfully. The approach was validated using real test images and the performance measures showed over 90% average accuracy fitting the ground truth.

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第 11 篇

标　　题： Loess Mechanics Analysis Of The Performance And Structure Characteristics Based On Scanning Electron Microscope

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期　　刊： ACTA MICROSCOPICA

摘　　要： The mechanical and structural characteristics of loess in Yan'an, Shannxi province were analyzed. Based on the field mechanical characteristics of loess, the effects of different water content, confining pressure and initial stress field on the strength of loess were considered, the mechanical properties of loess under loading and unloading were compared, and the corresponding stress-strain curves were drawn. Through fitting calculation and statistical analysis, it is concluded that the loess in Yan'an region has its regional characteristics, which are affected by climate and precipitation, and the compactness of saturated loess in different periods is different. The loess strength in Yan'an area is affected by water content, loess depth, mineral composition and cementation strength. When the optimal water content of loess exceeds the

experimental statistics, the strength decreases with the increase of water content. The loess strength increases with the increase of clay content. Because of the pressure of overlying loess, the strength of loess increases with the increase of depth. In order to improve the loess strength in Yan'an area, the optimum water content should be kept within 1% of the optimum water content.

WOS 号： 000526079400031

第 12 篇

标　　题： Disaggregating County-Level Census Data For Population Mapping Using Residential Geo-Objects With Multisource Geo-Spatial Data

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期　　刊： IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING

摘　　要： Accurate spatialization of socioeconomic data is conducive to understand the spatial and temporal distribution of human social development status and, thus, effectively support future scientific decision-making. This study focuses on population mapping, which is a classical spatialization of macroeconomic data of the social economy. Traditional population mapping based on rough grids or administrative divisions such as townships often has deficiencies in the accuracy of spatial pattern and prediction. In this article, hence, we employ residential geo-objects as basic mapping units and formalize the problem as a spatial prediction process using machine-learning (ML) methods with high-spatial-resolution (HSR) satellite remote sensing images and multisource geospatial data. The indicators of population spatial density, including residential geo-objects' area, building existence index, terrain slope, night light intensity, density of point of interest (POI) and road network from Internet electronic maps, and locational factors such as the distances from road and river, are jointly applied to establish the relationship between these multivariable factors and quantitative index of population density using ML algorithms such as Random Forests and XGBoost. The predicated values of population density from the mined nonlinear regression relation are further used to calculate the weights of disaggregation of each unit, and then the population quantity distribution at the scale of residential geo-objects is obtained under the control of the total amount of population statistics. Experiments with a county area show that the methodology has the ability to achieve better results

than the traditional deterministic methods by reproducing a more accurate and finer geographic population distribution pattern. Meanwhile, it is found that the optimization of mapping results may benefit from the multisources geospatial data, and thus the methodological framework can be recommended to be extended to other spatialization areas of socioeconomic data.

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WOS 号： 000528937400001

第 13 篇

标　　题： Cloud Extraction Scheme For Multi-Spectral Images Using Landsat-8 Oli Images With High Brightness Reflectivity Covered

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期　　刊： IEEE ACCESS

摘　　要： Cloud extraction is a vital step in remote sensing image processing. Although many advanced cloud extraction methods have been proposed and confirmed to be effective in recent years, there are still difficulties in cloud extraction in areas of high brightness reflectivity covered. High brightness reflectivity cover can have similar spectral characteristics as clouds, and thus, it is easily confused with clouds in cloud extraction schemes. This work presents a novel scheme designed to extract clouds in satellite imagery with high brightness reflectivity covered. The fractal summation method and spatial analysis are used to extract the clouds in the Landsat 8 Operational Land Imager (OLI) images containing high brightness reflectivity covered. The scheme consists of three main steps: cloud extraction based on pixel values, Anselin Local Moran's I value, and anisotropy. Pixel values were applied to extract the clouds associated with anomalies, and the last two steps were conducted to eliminate false anomalies. The findings showed that the cloud-associated anomaly pixel-values well approximate a power-law function, but both the real and fake anomaly patches (e.g., snow/ice, desert, etc.) routinely coexist within the same (fractal) scaleless segments, and that the latter seems to be more significant than the former. Consequently, these results indicate that the diagnostic difference between true and false anomalies must lie in their spatial distribution patterns. Furthermore, experiments confirmed that the fractal dimension and spatial distribution (i.e. Anselin Local Moran's I index and anisotropy) difference between the real and false anomalies displayed a certain universality. The proposed scheme effectively reduces the confusion and misclassification caused by cloud, snow and the highlighted underlying surface. It is of great significance for cloud restoration processing, image analysis, image matching, target detection and extraction, and effective extraction and utilization of remote sensing data.

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第 14 篇

标　　题：Space Debris Detection Using Feature Learning Of Candidate Regions In Optical Image Sequences

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期　　刊：IEEE ACCESS

摘　　要：Space debris detection is important in space situation awareness and space asset protection. In this article, we propose a method to detect space debris using feature learning of candidate regions. The acquired optical image sequences are first processed to remove hot pixels and flicker noise, and the nonuniform background information is removed by the proposed one dimensional mean iteration method. Then, the feature learning of candidate regions (FLCR) method is proposed to extract the candidate regions and to detect space debris. The candidate regions of space debris are precisely extracted, and then classified by a trained deep learning network. The feature learning model is trained using a large number of simulated space debris with different signal to noise ratios (SNRs) and motion parameters, instead of using real space debris, which make it difficult to extract a sufficient number of real space debris with diverse parameters in optical image sequences. Finally, the candidate regions are precisely placed in the optical image sequences. The experiment is performed using the simulated data and acquired image sequences. The results show that the proposed method has good performance when estimating and removing background, and it can detect low SNR space debris with high detection probability.

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第 15 篇

标　　题：Numerical Study On Performance Of A Pcm-Based Solar Thermoelectric Energy-Harvesting Device In Alpine Region

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期　　刊：JOURNAL OF ENHANCED HEAT TRANSFER

摘　　要：Stable and reliable energy supply units are important components of micropower wireless monitoring systems intended for alpine regions. In this work, a phase change material (PCM)-based solar thermoelectric energy-harvesting device was proposed, and a corresponding coupled heat transfer numerical model was built. The temporal thermal distribution and output power characteristics of the device were calculated and analyzed. Next, the influences of the PCM module and vacuum glass cover on the device's thermal and electrical power performance were examined. The average output power of the developed device in the focal alpine region was 12.94, 74.51, 97.39, and 33.86 mW on January 15, April 15, July 15, and October 15, respectively; these values meet the energy requirements of many micropower wireless sensors in alpine regions. The average output power of a none-PCM unit was only 7.82 mW and 26.0 mW as well as the average output power of a none-vacuum glass cover unit was 0.85 mW and 2.66 mW on January 15 and July 15 respectively, which were of 39.57%, 73.3%, 93.43%, and 97.27% reduction compared with comprehensive model. Thus, the PCM and vacuum glass cover module were deemed important for the entire system, namely by increasing the device's working temperature and ensuring the continuity of the system's power supply to enhance system performance.

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第 16 篇

标　　题：Application Of Vacuum Decay Tester In Measuring Air Permeability Of Loess In The Chinese Loess Plateau, Northwest China

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期　　刊：HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要：Soil air permeability (k(a)) is an important parameter to characterize gas transport and exchange in soil. In-situ air permeability tests of loess at different depths in three sites (Xi'an, Yan'an and Heifangtai) were carried out with a vacuum attenuation air permeometer in this study. Two sizes of sleeve probes (phi 8 x 4 cm and phi 6.18 x 4 cm) were tested in the laboratory on undisturbed loess samples to assess the dependence of air permeability on sample size. Results showed that the permeability of the three sites tested in-situ decreased when depth increased. Xi'an loess has the best air permeability, and Heifangtai has the worst. The influence of the initial state on in-situ air permeability was analyzed. Laboratory tests showed that the air permeability values of the two sizes are essentially the same, and the scale effect is small. In-situ and in-lab air permeability were compared, and results of the two probes have a good 1:1 relationship. We also evaluated the validity of the YO model for the determination of the permeability of undisturbed loess in the laboratory. The vacuum attenuation air permeameter can be used to measure the permeability of loess quickly and portable.

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第 17 篇
标　　题： Study On The Permafrost Heat Transfer Mechanism And Reasonable Interval Of Separate Embankment For The Qinghai-Tibet Expressway
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通讯作者： Cui, FQ (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian 710054, Shaanxi, Peoples R China.
期　　刊： COLD REGIONS SCIENCE AND TECHNOLOGY
摘　　要： Separate embankment is an important subgrade structure in the future Qinghai-Tibet expressway (QTE) construction. In this work, the comprehensive earth-atmosphere coupled heat transfer numerical model of the 26 m width embankment and the different spacing separate embankment had been built. To make the analysis more general, 12 typical computation cases which consider the distribution pattern of upper soil type and external environment conditions along the QTE have been developed. In the computation, the spatial and temporal temperature distribution characteristics of 26 m width embankment and the separate embankment under the given working condition are calculated and compared. Then heat transfer characteristic, freeze-thaw feature, and reasonable interval of separate embankment are investigated. The computation results show that compared with the prominent heat absorption and heat collection effect of the 26 m width embankment, the separate embankment contributes greatly to reducing the subgrade thermal disturbance and protecting the underlying permafrost, thus the separate embankment should be a reasonable choice for the future Qinghai-Tibet expressway. The maximum thaw depth and thaw plate are influenced by parameters such as ambient temperature and water content of frozen soil. The increase of subgrade interval also reduces the influence of subgrade on underlying permafrost and the maximum thaw depth. And above decreasing trend becomes negligible when the interval of separate embankment reaches to a certain value, therefore there is an optimal spacing between the permafrost subgrade on the heat transfer perspective.
DOI： 10.1016/j.coldregions.2019.102952
WOS 号： 000506666000021

第 18 篇
标　　题： Characterization Of The Collapsible Mechanisms Of Malan Loess On The Chinese Loess Plateau And Their Effects On Eroded Loess Landforms
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通讯作者： Li, XA (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian 710054, Shaanxi, Peoples R China.
期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要：Collapsible loess soils are widely distributed in semiarid and arid regions. The eroded landforms formed by the unique collapsibility of loess may cause environmental damage that puts lives and property at risk. In this work, the collapse potential, quantitative analyses, and qualitative characterization of the microstructures of loess samples were investigated using double oedometer tests, scanning electron microscopy (SEM), and the digital image analysis method to probe the fundamental mechanisms of loess collapsibility. A large number of field investigations have been carried out to study the role of loess collapsibility during the formation of eroded landforms. The results show that the collapse potential of loess first increases and then decreases in response to increasing vertical pressure. Loess from the different study regions exhibits different microstructure types. Loess collapse is mainly caused by the destruction of large and medium pores, although the contribution of the middle pores on the collapse is more significant. The microtopography formed by loess collapse is conducive to surface runoff concentration and infiltration. The eroded landforms resulting from loess collapse are categorized into four different models based on the catchment area and the discharge area. These results and analyses are important to land use planners and engineers and will aid in controlling and mitigating disaster-prone landforms.

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WOS 号：000512814900001

第 19 篇

标　　题：Influence Of The Unified Strength Theory Parameters On The Failure Characteristics And Bearing Capacity Of Sand Foundation Acted By A Shallow Strip Footing

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通讯作者：Deng, LS; Fan, W (corresponding author), ChangAn Univ, Sch Geol Engn & Geomat, Xian 710054, Peoples R China.

期　　刊：ADVANCES IN MECHANICAL ENGINEERING

摘　　要：The unified strength theory can account for the influence of intermediate principal stress using a specified parameter b, with which the determination of the values and influences of b is significant. In this research, a physical model test was carried out in combination with the numerical simulations to explore the effect of b on a sand foundation loaded by a shallow strip footing. Variation of parameter b would produce significant effect on the deformation characteristics, stress response, failure model, as well as bearing capacity of the sand foundation. In general, a larger b could be adopted to yield smaller magnitudes of stress. The calculated ultimate bearing capacity P-ult increases linearly with increase in b, and an increment of 470% can be obtained using b = 1.0 relative to b = 0.0. The comparison of the bearing capacities of physical model test and numerical simulation suggests that b = 0.89-0.99 is the appropriate value for the experimental sand foundation, that ultimately results in a capacity increase in 420%-465% relative to the result of Mohr-Coulomb failure law.

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WOS 号： 000514710400001

第 20 篇

标　　题： Experimental Investigation On Time-Frequency Characteristics Of Microseismic Signals In The Damage Evolution Process Of Coal And Rock

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期　　刊： ENERGIES

摘　　要： The deformation and failure of coal and rock materials is the primary cause of many engineering disasters. How to accurately and effectively monitor and forecast the damage evolution process of coal and rock mass, and form a set of prediction methods and prediction indicators is an urgent engineering problems to be solved in the field of rock mechanics and engineering. As a form of energy dissipation in the deformation process of coal and rock, microseismic (MS) can indirectly reflect the damage of coal and rock. In order to analyze the relationship between the damage degree of coal and rock and time-frequency characteristics of MS, the deformation and fracture process of coal and rock materials under different loading modes was tested. The time-frequency characteristics and generation mechanism of MS were analyzed under different loading stages. Meanwhile, the influences of properties of coal and rock materials on MS signals were studied. Results show that there is an evident mode cutoff point between high-frequency and low-frequency MS signals. The properties of coal and rock, such as the development degree of the original fracture, particle size and dense degree have a decisive influence on the amplitude, frequency, energy and other characteristic parameters of MS signals. The change of MS parameters is closely related to material damage, but has no strong relation with the loading rate. The richness of MS signals before the main fracture depends on the homogeneity of materials. With the increase of damage, the energy release rate increases, which can lead to the widening of MS signals spectrum. The stiffness and natural frequency of specimens decreases correspondingly. Meanwhile, the main reason that the dominant frequency of MS detected by sensors installed on the surface of coal and rock materials is mainly low-frequency is friction loss and the resonance effect. In addition, the spectrum and energy evolution of MS can be used as a characterization method of the damage degree of coal and rock materials. Furthermore, the results can provide important reference for prediction and early warning of some rock engineering disasters.

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WOS 号： 000522492700037

第 21 篇

标　　题： The Three-Dimensional Finite Element Forward Modelling Of Complex Excitation Source Nmr

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期　　刊： JOURNAL OF GEOPHYSICS AND ENGINEERING

摘　　要： Traditional nuclear magnetic resonance (NMR) is mainly applied to horizontal ground and one-dimensional electrical structures. However, calculations of the excitation fields rarely consider the three-dimensional electrical changes of the subsurface medium and undulating terrain, or the deformations caused by emission sources. Therefore, to analyse the influences of terrain fluctuations, emission source deformations and three-dimensional electrical changes on NMR, three-dimensional finite element forward modelling of undulating terrain NMR was conducted in this study. First, based on a scalar finite element method, the direct calculations of the excited magnetic fields of a three-dimensional electrical medium were realised, which improved calculation accuracy by avoiding the finite element calculations of magnetic vector potential and vector on the magnetic field. During the source loading process, the equivalent thin wire source of the pseudo.. function was used to load the source function directly into the equation for the purpose of achieving total field calculations. This was completed to enable the calculations to be applied to any shape of the transmitting loop and undulating terrain. Then, the components of the excitation magnetic fields perpendicular to the geomagnetic fields were calculated using the rotation matrix. Finally, the NMR sensitivity function and 3D responses were calculated. The calculations of the excitation magnetic fields were verified using a uniform half-space model. The overall algorithm was tested by the nuclear magnetic responses of the layered medium. Also, a typical undulating terrain model was adopted and the complex excitation source NMR was simulated using the algorithm proposed in this study. The algorithm provided a three-dimensional forward basis for the NMR inversion in the cases of determining the electrical medium for the subsequent undulating terrain.

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WOS 号： 000524513000010

第 22 篇

标　　题： Comparison Of Different Approaches And Development Of Improved Formulas For Estimating Gsi

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通讯作者： Song, YH (corresponding author), Changan Univ, Sch Geol Engn & Geometr, Xian 710054, Peoples R China.; Song, YH (corresponding author), Minist Educ, Key Lab Western Mineral Resources & Geol Engn, Xian 710054, Shaanxi, Peoples R China.

期　　刊： BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要： The Geological Strength Index (GSI) is an important parameter for estimating rock mass properties and can be estimated either through direct observations or by using a

quantitative GSI chart or equations. This study aims to discuss the applicability of the RMR89 method and the latest version of GSI|(2013) by applying them to a case study and to the data published in the earlier papers. The relevant rock mass properties, including blockiness and discontinuity conditions, of the walls of 15 exploratory adits with a total length longer than 1100 m in a hydropower project in China have been assessed to provide data for the analysis. In addition, a repeat analysis of the earlier published data has been conducted to validate the results derived from the case study. The results show that the GSI values calculated with the RMR89 are generally larger than those obtained from the qualitative GSI chart, with an average magnitude of about five. The GSI values predicted from the values of JCond89 and RQD are consistent with those derived through the qualitative observational method for a medium-quality rock mass but are relatively smaller or larger for a poor-quality (i.e., GSI<45) or a high-quality (i.e. GSI>65) rock mass, respectively. By comparing the results of the RMR89 method and the qualitative GSI chart method and analyzing the classification factors considered by the two methods, two new equations based on the RMR89 system have been developed for estimating the GSI. Their application to the case study and the published data prove that these two equations have higher predictive accuracy than the original RMR89 method and the latest version of GSI|(2013). It is expected that the acquisition of more engineering examples will enable the two formulas to be further verified and improved.

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WOS 号： 000516158400001

第 23 篇

标　　题： A Pseudodynamic Approach Of Seismic Active Pressure On Retaining Walls Based On A Curved Rupture Surface

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通讯作者： Deng, YH (corresponding author), Changan Univ, Dept Geol Engn, Xian 710064, Peoples R China.; Deng, YH (corresponding author), Key Lab Mine Geol Hazards Mech & Control, Xian 710054, Peoples R China.

期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Reasonable determination of the magnitude and distribution of dynamic earth pressure is one of the major challenges in the seismic design of retaining walls. Based on the principles of pseudodynamic method, the present study assumed that the critical rupture surface of backfill soil was a composite curved surface which was in combination with a logarithmic spiral and straight line. The equations for the calculation of seismic total active thrusts on retaining walls were derived using limit equilibrium theory, and earth pressure distribution was obtained by differentiating total active thrusts. The effects of initial phase, amplification factor, and soil friction angle on the distribution of seismic active earth pressure have also been discussed. Compared to pseudostatic and pseudodynamic methods for the determination of planar failure surface forms, the proposed method receives a bit lower value of seismic active earth pressures.

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WOS 号： 000527370400001

第 24 篇
标　　题： Spatio-Temporal Variations Of Afterslip And Viscoelastic Relaxation Following The M-W 7.8 Gorkha (Nepal) Earthquake
作　　者： [Tian, Zhen; Yang, Zhiqiang] Changan Univ, Sch Geol Engn & Geomat, Xian, Shaanxi, Peoples R China; [Freymueller, Jeffrey T.] Michigan State Univ, Dept Earth & Environm Sci, E Lansing, MI 48824 USA
通讯作者： Yang, ZQ (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian, Shaanxi, Peoples R China.
期　　刊： EARTH AND PLANETARY SCIENCE LETTERS
摘　　要： We use 4 years of 3D GPS data from Nepal and southern Tibet to investigate the postseismic deformation caused by the 2015 Mw 7.8 Gorkha (Nepal) earthquake. We first model afterslip and viscoelastic relaxation separately, but find that this approach results in an overestimate of the total postseismic deformation. We then use an integrated model to simultaneously extract the contributions from afterslip and viscoelastic relaxation by assessing the misfit between observed and simulated displacements during different periods. The results show that the near-field postseismic displacements are dominated by downdip afterslip during the first 2 years, and then viscoelastic relaxation plays the leading role in the following years. In the far-field, however, the observed deformation is mainly controlled by viscoelastic mechanism throughout the postseismic period. The best model supports a laterally heterogeneous rheology: the Tibetan lower crust is viscoelastic with a transient viscosity 5 x 10(17) Pa s, steady-state viscosity 5 x 10(18) Pa s; we assume in our model that India has an elastic lithosphere 50 km thick with a high viscosity upper mantle (10(20) Pa s), and that the same mantle viscosity applies beneath Tibet. We further predict that viscoelastic deformation will be observed in the near-field for similar to 12 years and the displacements caused by afterslip for similar to 6 years. Given the afterslip following the earthquake and the possible untapped strain inherited from historical events, the regions to the west and south of Kathmandu have the potential to suffer a large earthquake rupture in the future.
DOI： 10.1016/j.epsl.2019.116031
WOS 号： 000513291400015

第 25 篇
标　　题： Quantifying The Transient Landscape Response To Active Faulting Using Fluvial Geomorphic Analysis In The Qianhe Graben On The Southwest Margin Of Ordos, China
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通讯作者： Han, L (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian

710064, Peoples R China.

期　　刊：GEOMORPHOLOGY

摘　　要：River morphology has been widely used to record and track the transient landscape response to active faulting. Here we evaluate the landscape response to active faulting in the Qianhe Graben of southwest Ordos, China. In this region, it has been difficult to determine the activity of mapped faults because of the presence of thick Quaternary Loess; however, by analysing the presence and distribution of slope-break knickpoints in river longitudinal profiles, the ongoing tectonic uplift of the Qianhe Graben can be investigated. The alignment of vertical-step knickpoints gives a new insight into the location of an active fault on the southern margin of Qianhe Graben. Additionally, slope-break knickpoints, typical of fault controlled landscape change, were identified from 24 river longitudinal profiles that drain across normal faults along both graben margins. Along strike from north to south, the knickpoints varied systematically with relief, and the height of the knickpoints also decrease to the southeast. Indicating that the rate of motion on the faults, likely is greater in the northwest and decays southeastwards. The horizontal knickpoint retreat rates range from 03 to 27.3 mm/yr, constraining the landscape response time with fault initiation at 1.2-1.4 Myr. In comparison with other studies, the knickpoint recession triggered by base-level fall as a result of faulting is relatively lower than when the base-level fall is the result of sea-level fall potentially the result of different mechanism of retreat. Finally, the potential for earthquakes along the Taoyuan-Guichuansi Fault (TGF) before and after fault linkage was assessed, indicating the potential for earthquakes of M-W of 63-6.7 and 6.8-7.0, respectively. These observations not only suggest the knickpoints are recording fault evolution in Qianhe Graben, but also provide information on seismic hazard in this populous region.

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第 26 篇

标　　题：Deformation Of The Baige Landslide, Tibet, China, Revealed Through The Integration Of Cross-Platform Alos/Palsar-1 And Alos/Palsar-2 Sar Observations

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期　　刊：GEOPHYSICAL RESEARCH LETTERS

摘　　要：Twenty-eight ALOS/PALSAR-1 and ALOS/PALSAR-2 images acquired from January 2007 to August 2018 were exploited to characterize the deformation history and temporal evolution of the Baige landslide, China, which successively occurred on 11 October and 3 November 2018. To mitigate the errors caused by the topographic relief

and to conduct offset estimates between the SAR images from different platforms, a novel offset-tracking method is proposed. The SAR images were ortho-rectified firstly. Then two-dimensional deformations were retrieved successfully from SAR images acquired at an identical platform and different platforms. Our results indicate that the maximum cumulative deformation in the line-of-sight direction of the Baige landslide reached about -60 m between January 2007 and August 2018. Furthermore, correlation between time series deformation and monthly precipitation and soil moisture derived from SAR intensity images suggests that the failure of the Baige landslide was closely related to the heavy rainfall in the summer of 2018.

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WOS 号： 000529107400051

第 27 篇

标　　题： Satellite Selection Methods For Multi-Constellation Advanced Raim

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通讯作者： Tu, R (corresponding author), Chinese Acad Sci, Natl Time Serv Ctr, Xian 710600, Peoples R China.

期　　刊： ADVANCES IN SPACE RESEARCH

摘　　要： The increased number of potential threat modes under multi-constellation advanced receiver autonomy integrity monitoring (ARAIM) requires an increase in the number of subsets and a correspondingly high computational load. A new satellite selection method based on integrity support message (ISM) parameters is proposed and compared with GDOP-based selection. The performance was tested on five days of data measurements from 21 multi-global navigation satellite system experiment (MGEX) stations distributed around the world, as well as simulation using the broadcast ephemeris. The results show that the proposed ISM-based satellite selection method is highly compatible with the baseline ARAIM. This method could reduce the computational times by about 60-70% quickly, with minimising vertical protection level (VPL) loss, which was consistently within 1 m, even a reduced VPL value in some epochs, and resulting in an improved availability. The simulation results were similar to the MGEX data. It appears that the application of ISM based satellite selection can effectively reduce computational burden with a minimal impact on availability.

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WOS 号： 000515215000015

第 28 篇

标　　题： Water Flow In Unsaturated Soils Subjected To Multiple Infiltration Events

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期　　刊：CANADIAN GEOTECHNICAL JOURNAL

摘　　要：In this paper, water flow in a 4 m height column with an unsaturated soil that is subjected to multiple infiltration events for a 62 day period is investigated. One-dimensional (1D) numerical analysis is also undertaken to analyze the flow, extending the seepage theory for unsaturated soils. Results highlight the formation of two wetting fronts; namely, wetting front I and wetting front II that are induced by the first and subsequent infiltration events, respectively. There is a stable zone where the water content is approximately constant; it forms between the two fronts. A conceptual model of the suction profile is proposed for interpreting in situ water flow by dividing the unsaturated zone into four distinct zones; namely, active, steady, transition, and capillary fringe zones. This division is helpful for providing a rational explanation of water flow in different zones. Novel contributions from this study include a relationship between the hydraulic properties in the steady zone and the flow velocity, which is determined by an average influx rate. In addition, the rate of groundwater recharge can also be estimated using the average influx rate. Results of the present study are useful to understand and interpret the relationship between water infiltration and suction or water content profile in the unsaturated zone as well as variation of groundwater table level.

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WOS 号：000516740600005

第 29 篇

标　　题：Asynchronous Rtk Method For Detecting The Stability Of The Reference Station In Gnss Deformation Monitoring

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通讯作者：Huang, GW (corresponding author), Changan Univ, Coll Geol Engn & Geomat, 126 Yanta Rd, Xian 710054, Peoples R China.

期　　刊：SENSORS

摘　　要：The real-time kinematic (RTK) positioning technique of global navigation satellite systems (GNSS) has been widely used for deformation monitoring in the past several decades. The RTK technique can provide relative displacements in a local reference frame defined by a highly stable reference station. However, the traditional RTK solution does not account for reference stations that experience displacement. This presents a challenge for establishing a near real-time GNSS monitoring system, as since the displacement of a reference station can be easily misinterpreted as a sign of rapid movement at the monitoring station. In this study, based on the reference observations in different time domains, asynchronous and synchronous RTK are proposed and applied together to address this issue, providing more reliable displacement

information. Using the asynchronously generated time difference of a reference frame, the proposed approach can detect whether a measured displacement has occurred in the reference or the monitoring station in the current epoch. This allows for the separation of reference station movements from monitoring station movements. The results based on both simulated and landslide monitoring data demonstrate that the proposed method can provide reliable displacement determinations, which are critical in deformation monitoring applications, such as the early warning of landslides.

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WOS 号： 000525271500082

第 30 篇

标　　题： Mechanical And Electrical Properties Of Coarse-Grained Soil Affected By Cyclic Freeze-Thaw In High Cold Regions

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期　　刊： JOURNAL OF CENTRAL SOUTH UNIVERSITY

摘　　要： To evaluate the geotechnical properties of coarse-grained soil affected by cyclic freeze-thaw, the electrical resistivity and mechanical tests are conducted. The soil specimens are prepared under different water contents, dry densities and exposed to 0-20 freeze-thaw cycles. As a result, the stress-strain behavior of the specimen (w =14.0% and rho(d)=1.90 g/cm(3)) changes from strain-hardening into strain-softening due to the freeze-thaw effect. The electrical resistivity of test specimen increases with the freeze-thaw cycles change, but the mechanical parameters (the unconfined compressive strength q(u) and the deformation modulus E) and brittleness index decrease considerably at the same conditions. All of them tend to be stable after 7-9 cycles. Moreover, both the dry density and the water content have reciprocal effects on the freeze-thaw actions. The failure and pore characteristics of specimens affected by freeze-thaw cycles are discussed by using the image analysis method. Then, an exponential function equation is developed to assess the electrical resistivity of specimens affected by the cyclic freeze-thaw. Linear relations between the mechanical parameters and the electrical resistivity of specimens are established to evaluate the geotechnical properties of the soil exposed to freeze-thaw actions through the corresponding electrical resistivity.

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第 31 篇

标　　题： Moisture Content Effect On The Ring Shear Characteristics Of Slip Zone Loess At

High Shearing Rates

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通讯作者：Wang, XG (corresponding author), Northwest Univ, Dept Geol, State Key Lab Continental Dynam, Xian 710069, Peoples R China.

期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：The residual strength of slip zone loess is strongly affected by the moisture content. To explore such an effect, slip zone loess obtained from Baqiao landslide was used in ring shear tests under moisture content ranging from 6% to 29%. Laboratory tests were utilized for the determination of the stress-displacement relationship and residual strength parameters for the effect of moisture content in loess. The experimental results showed that the residual strength generally decreases with increasing moisture content. In addition, for a given shearing rate, the residual strength at any moisture content is approximately proportional to the normal stress. The stress fluctuation of shear stress was found to be greater with high shearing rates. Furthermore, the effect of moisture content on the residual strength parameters (cohesion and friction angle) was presented: the residual cohesion of slip zone loess was observed to increase with moisture content to a certain limit that approaches the plastic limit, above which it decreases. Also, the friction angle of slip zone loess was found to decrease with increasing moisture content. Additionally, due to the increase of the moisture content, the scratch color on the shear surface changed from the original color yellow to brown and the thickness of the shearing band of samples reduced. Finally, the mechanism of the influence of moisture content on the macroscopic morphology of the shear surface was also analyzed and illustrated. The study may provide a basis for understanding the shear behavior of slip zone loess under different moisture contents, as well as guidelines for loess landslide stability prevention and prediction.

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WOS 号：000526054700028

第 32 篇

标　　题：A Synthetic Aperture For Land Controlled-Source Electromagnetic Surveys

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期　　刊：JOURNAL OF APPLIED GEOPHYSICS

摘　　要：A controlled-source electromagnetic method with a synthetic aperture is proposed to improve the ability to detect a deep target body in the subsurface. First, we deduced the formulas of three-dimensional diffusion equations in the frequency domain, and gave the expression of synthetic aperture of the controlled-source electromagnetic array. An amplitude weighting coefficient, a phase shift coefficient, and a synthetic aperture range

are selected based on model tests, and then, the optimum value of the error range is determined. A typical geo-electrical model is established, and the electric response, the normalized amplitude of the background field, and the apparent resistivity with and without a synthetic aperture are compared. The results show that a synthetic aperture can focus electromagnetic energy and enhance the electromagnetic response of the target body. This is beneficial when extracting weak anomaly information for a deep geo-electrical body, especially for a resistive target object. Finally, we apply the synthetic aperture to field data for gold ore in northern China, and the amplitude of a deep resistive anomaly is strengthened. This demonstrates that our method can be effectively applied to real field data processing using a synthetic aperture. (C) 2020 Elsevier B.V. All rights reserved.

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WOS 号： 000527303000005

第 33 篇

标　　题： Pre-Event Deformation And Failure Mechanism Analysis Of The Pusa Landslide, China With Multi-Sensor Sar Imagery

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期　　刊： REMOTE SENSING

摘　　要： The Pusa landslide, in Guizhou, China, occurred on 28 August 2017, caused 26 deaths with 9 missing. However, few studies about the pre-event surface deformation are provided because of the complex landslide formation and failure mechanism. To retrieve the precursory signal of this landslide, we recovered pre-event deformation with multi-sensor synthetic aperture radar (SAR) imagery. First, we delineated the boundary and source area of the Pusa landslide based on the coherence and SAR intensity maps. Second, we detected the line-of-sight (LOS) deformation rate and time series before the Pusa landslide with ALOS/PALSAR-2 and Sentinel-1A/B SAR imagery data, where we found that the onset of the deformation is four months before landslide event. Finally, we conceptualized the failure mechanism of the Pusa landslide as the joint effects of rainfall and mining activity. This research provides new insights into the failure mechanism and early warning of rock avalanches.

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第 34 篇

标　　题： Mitigation Of Short-Term Temporal Variations Of Receiver Code Bias To Achieve Increased Success Rate Of Ambiguity Resolution In Ppp

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期　　刊：REMOTE SENSING

摘　　要：Ambiguity resolution (AR) is critical for achieving a fast, high-precision solution in precise point positioning (PPP). In the standard uncombined PPP (S-UPPP) method, ionosphere-free code biases are superimposed by ambiguity and receiver clock offsets to be estimated. However, besides the time-constant part of the receiver code bias, the complex and time-varying term in receivers destroy the stability of ambiguities and degrade the performance of the UPPP AR. The variation of receiver code bias can be confirmed by the analysis in terms of ionospheric observables, code multipath (MP) of the Melbourne-Wubbena (MW) combination and the ionosphere-free combination. Therefore, the effect of receiver code biases should be rigorously mitigated. We introduce a modified UPPP (M-UPPP) method to reduce the effects of receiver code biases in ambiguities and to decouple the correlation between receiver clock parameters, code biases, and ambiguities parameters. An extra receiver code bias is set to isolate the code biases from ambiguities. The more stable ambiguities without code biases are expected to achieve a higher success rate of ambiguity resolution and a shortened convergence time. The variations of the receiver code biases, which are the unmodeled errors in measurement residuals of the S-UPPP method, can be estimated in the M-UPPP method. The maximum variation of the code biases is up to 16 ns within two-hour data. In the M-UPPP method, the averaged epoch residuals for code and phase measurements recover their zero-mean features. For the ambiguity-fixed solutions in the M-UPPP method, the convergence times are 14 and 43 min with 17.7% and 69.2% improvements compared to that in the S-UPPP method which are 17 and 90 min under the 68% and 95% confidence levels.

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WOS 号：000531559300051

第 35 篇

标　　题：Recovering Missing Trajectory Data For Mobile Laser Scanning Systems

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期　　刊：REMOTE SENSING

摘　　要：Trajectory data are often used as important auxiliary information in preprocessing and

extracting the target from mobile laser scanning data. However, the trajectory data stored independently may be lost and destroyed for various reasons, making the data unavailable for the relevant models. This study proposes recovering the trajectory of the scanner from point cloud data following the scanning principles of a rotating mirror. Two approaches are proposed from different input conditions: Ordered three-dimensional coordinates of point cloud data, with and without acquisition time. We recovered the scanner's ground track through road point density analysis and restored the position of the center of emission of the laser based on plane reconstruction on a single scanning line. The validity and reliability of the proposed approaches were verified in the four typical urban, rural, winding, and viaduct road environments using two systems from different manufacturers. The result deviations of the ground track and scanner trajectory from their actual position were a few centimeters and less than 1 decimeter, respectively. Such an error is sufficiently small for the trajectory data to be used in the relevant algorithms.

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WOS 号： 000526820600001

第 36 篇

标　　题： Experimental Study On Distribution Of Landslide Thrust In Pile-Anchor Structure Based On Photoelastic Technique

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期　　刊： MATERIALS

摘　　要： This paper aimed to perform systematical study on the distribution of landslide thrust in pile-anchor support system, which has been a widely applicable treatment method in landslide control with safety, highly efficiency and adaptation. The advantage of photoelastic technique is visualization of strain and stress fields, therefore photoelastic model tests are conducted to show the distribution of landslide thrust in pile-anchor structure before failure in landslide. The effects of different materials and pile lengths are investigated by 6 photoelastic test cases under different loading conditions. It can be found from quantitative analysis of experimental results that load proportion of anchor would increase gradually with the decrease of pile embedded depth or the increase of landslide thrust force. Meanwhile, landslide thrust distribution in pile-anchor structure is directly affected by the stiffness of piles. The pile-anchor structure is significantly better at reducing bending moment value and optimizing bending moment distribution of pile. Finally, some theoretical analysis and design suggestions are proposed based on the experimental study.

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WOS 号： 000529208000097

第 37 篇

标　　题： Characteristics And Mechanisms For Origin Of Earth Fissures In Fenwei Basin, China

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期　　刊：ENGINEERING GEOLOGY

摘　　要：The most serious earth fissure disasters in China occur in the Fenwei basin. Since the late 1950s, earth fissure disasters have widely occurred in the Weihe, Yuncheng, Linfen, Taiyuan, and Datong sub-basins in the Fenwei basin, and such disaster has increased progressively in recent years. The current paper summarizes the characteristics of earth fissures in the Fenwei basin. Earth fissures usually occur in an extensional faulted basin, along an active fault zone, and within an area of land subsidence. Earth fissures often have a similar trend, with many branches that intermittently appear along their strike. The main and secondary earth fissures at a shallow depth form rupture belts of different widths, but they merge into a single shear belt and stay connected with the underlying active fault. The throw of two blocks increases with depth along a sedimentary fault. Earth fissures usually show the characteristic of three-dimensional movement. Vertical dislocation is the primary aspect of earth fissure movement. The horizontal tension is smaller and the horizontal twist is the smallest, which is consistent with the movement pattern of underlying active faults. Earth fissures have exhibited activity three or four times since the late Pleistocene. In the past half-century, earth fissures formed during four or five periods of peak activity were influenced strongly by groundwater fluctuation. Our research also indicates that cluster formation of earth fissures is polygenetic and results from a combination of tectonic and human activities. Earth fissures are driven by deep tectonic motions beneath the basin and are controlled by the local tectonic stress of the local fault zones. One of the most important factors contributing to earth fissure formation is groundwater overexploitation. This paper provides a scientific basis for proposed administrative means, mitigation measures and engineering solutions in the field of engineering geology.

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第 38 篇

标　　题：Seismic Response Of Soil Slope Reinforced By Compression Anchor And Frame Beam Based On Shaking Table Test

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期　　刊：ARABIAN JOURNAL OF GEOSCIENCES

摘　　要：Compression anchor is a good anchorage structure in the slope and landslide project. Compared with tension anchor, it is a relatively new retaining structure, and the studies on compression anchor under seismic loadings are very limited. To investigate the seismic behavior of compression anchor under earthquake and get it to work much better in an earthquake-prone area, based on the shaking table test, a soil model slope reinforced with compression anchor and frame beam was carried out. In the test, the smooth steel bar and Q235 steel plate ring were used to simulate the anchor tendon and bearing plate of the compression anchor. The testing results indicate that the anchoring slope shows an obvious amplification effect on input seismic waves in both time domain and frequency domain, and the amplification effect of the acceleration response increases along the slope height. The axial force of the compression anchor is relatively uniform along the length of the anchor. As for different anchors in the same column, at 0.05 similar to 0.2 g, the axial forces of all anchors show tiny values, and the axial force of the bottom anchor is slightly greater than that of other anchors. The axial force of the bottom anchor is about 2.1 similar to 2.8 times that of the other anchors. At 0.3 similar to 0.6 g, the axial forces of the upper two anchors and the bottom anchor increase rapidly, while the axial forces of the other two middle anchors increase a little. The axial force ratio of the five rows of anchors from the bottom to the top at 0.3 g, 0.4 g, and 0.6 g is 4.2:1:1:2.1:2.9, 4.2:1:0.9:3.1:3.4, and 3.6:1:0.8:3.2:3.8, respectively. As for different beams, at 0.05 similar to 0.2 g, the bending moments of all beams show tiny values, and the bending moment of the bottom beam is slightly greater than that of other four beams. At 0.3 similar to 0.6 g, the bending moment of the top beam plays a more and more vital role, while the bending moment of the other four beams shows little variation.

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第 39 篇

标　　题：Comparison And Quantitative Analysis Of Microstructure Parameters Between Original Loess And Remoulded Loess Under Different Wetting-Drying Cycles

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期　　刊：SCIENTIFIC REPORTS

摘　　要：The microstructural evolution of loess had a significant impact on the collapsibility of loess during wetting-drying cycles. Based on the analysis of scanning electron

microscope (SEM) images by using Image-Pro Plus, the present study quantitatively compared the microstructural parameters of original loess and remoulded loess with different moisture content before and after wetting-drying cycles in size, shape, and arrangement. In size, the average diameter of both original loess particles and remoulded loess particles increased with the increasing of initial moisture content. However, the average diameter of original loess particles was slightly larger than that of remoulded loess particles before wetting-drying cycles. In contrast, the average diameter of both original loess particles and remoulded loess particles were very close to each other after three wetting-drying cycles. In shape, before wetting-drying cycles, the average shape factor of original loess particles was higher than that of remoulded loess particles. After three wetting-drying cycles, the difference in the average shape factor of both two loess samples with 5% initial moisture content is similar to that before wetting-drying cycles. Nevertheless, the average shape factor of both original loess particles and remouled loess particles with 15% initial moisture content were very close to that with 25% initial moisture content. In the arrangement, directional frequency indicated remoulded loess appeared to be more vertically aligned than original before and after three wetting-drying cycles. Furthermore, the directed anisotropy rate of remoulded loess was higher than that of the original loess before and after three wetting-drying cycles. In summary, the size, shape, and arrangement of both original loess particles and remoulded loess particles varied in different degrees before and after three wetting-drying cycles. Combined with the water retention curve of the loess, we analyzed the microstructural evolution mechanism of two loess particles during wetting-drying cycles. It is an excellent significance to study the engineering properties of original loess and remoulded loess.

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WOS 号： 000563342300006

第 40 篇

标　　题： Erosion Characteristics Of Loess Tunnels On The Loess Plateau: A Field Investigation And Experimental Study

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期　　刊： EARTH SURFACE PROCESSES AND LANDFORMS

摘　　要： Loess tunnels are a common geo-hazard in the Loess Plateau and not only cause considerable soil and water loss, but also aggravate and even induce the occurrence and development of other disasters such as ground fissures, mudflows, collapses, and landslides. To date, research on the hydrological characteristics and erosion behaviour of loess tunnel systems has focused on field investigation data and limited river basin observation data, whereas field test information and data are very scarce. In this study, field surveys, observations, field scouring experiments, and laboratory-based sediment percentage tests were conducted to analyse the erosion characteristics, spatial distribution, and hydrological characteristics of a large-scale loess tunnel system in the

hilly Loess Plateau southeast region of northern China. The results showed that the loess tunnel erosion exhibited periodicity. Tunnel erosion in each period shows a similar erosion process, that is, thin-layer water flow erosion and lateral expansion, tunnel wall collapse and deposit due to the loss of support from the lateral erosion, and erosion and transport of deposits by water flow. Waterfall erosion, lateral erosion, headward erosion, and the resulting collapses were the main forms of tunnel erosion. Besides this, the base level of erosion significantly affects the erosion characteristics of the loess tunnel. The hydrological characteristics during field scouring experiments exhibited three different stages: a lag effect, attributed to the temporary loss of water velocity in the first stage; small water flow fluctuations in the second stage; and an increase in total seepage loss with increased water injection flow in the third stage. The erosion rate was positively correlated with the flow quantity. The results of this study not only provide valuable reference data for research on the mechanism and velocity of erosion events in loess, but also provide a theoretical basis for the prevention of loess tunnel disasters in engineering construction. (c) 2020 John Wiley & Sons, Ltd.

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第 41 篇

标　　题： Effect Of Randomly Distributed Fibre On Triaxial Shear Behavior Of Loess

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期　　刊： BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要： Soil reinforcement using randomly distributed fibres to improve the shear strength has been identified as an effective and environment-friendly technique in engineering applications. Loess used in geotechnical constructions can suffer from cracking due to shear failure. To increase loess shear strength, triaxial compression tests were carried out to evaluate the effect of randomly distributed fibre reinforcement on the mechanical response of loess soil to load. In the present investigation, five groups of loess specimens were prepared with three fibre contents (i.e., 0.5%, 0.75%, and 1% by weight of dry loess) and two different fibre lengths (i.e., 9 mm and 18 mm). The experimental results indicate that the addition of fibre to soil significantly improves the failure stress and shear strength parameters of the loess compared with unreinforced loess specimens. As fibre content increases up to 0.75%, the cohesion of reinforced soil is greatly improved, whereas the amount of increase of the internal friction angle is much less significant. However, the cohesion decreases with the fibre content exceeding 0.75%, as the excessive fibre content may influence the formation of homogeneous mixture, resulting in interfacial mechanical interactions between the fibre surface and

soil to be impaired. Loess specimens reinforced with longer fibre exhibited a greater cohesion than those reinforced with shorter fibre, while the internal friction angle is nearly insensitive to the fibre length. As the fibre length increases from 9 to 18 mm, the cohesion increases by 23.2%. In addition, the macro-morphology of fibre-reinforced specimens after triaxial shear tests suggests that an appropriate choice of fibre has the potential to increase soil cracking resistance capacity.

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第 42 篇

标　　题： A New Recognition Method For Source Locations And Attributes Based On Correlation Analysis Of Gravity And Magnetic Anomalies

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期　　刊： CHINESE JOURNAL OF GEOPHYSICS-CHINESE EDITION

摘　　要： The traditional gravity and magnetic correspondence analysis tends to be highly correlated outside the field source area. In order to overcome this weakness, we propose a new identification method for source positions and attributes based on similarity and vertical derivative of the potential field and put forward a new gravity and magnetic correlation parameter (GMCP), which can effectively reduce the range of the potential field source to be identified and indicate the field intensity information. The distribution of the non-zero areas of GMCP reflects the size of the source. GMCP discriminant parameter values of positive and negative reflect the source attributes. When GMCP is greater than zero, it is a positive correlation indicating that there are high-density and high-magnetization or low-density and low-magnetization homologous bodies in this region. When GMCP is less than zero, it is negative correlation indicating that there are high-density and low-magnetic or low-density and high-magnetic density homologous bodies in this region. When GMCP tends to zero, it means no gravity-magnetic homologous geological body. Tests on complex models with different noise levels and actual data processing of South China Sea Basin prove the correctness and validity of the identification method proposed in this paper.

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WOS 号： 000524071300032

第 43 篇

标　　题： The Effect Of Topography On Landslide Kinematics: A Case Study Of The Jichang Town Landslide In Guizhou, China

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期　　刊： LANDSLIDES

摘　　要： On July 23, 2019, a large-scale landslide occurred in Jichang town, Shuicheng County, Liupanshui City, Guizhou Province in China. The landslide, which moved along two gullies, resulted in strong punching-shear, induced scarping on vegetation and large destruction of houses, and finally formed a deposit with a volume of 2 x 10(6) m(3). This research aims to understand the effect of topography on landslide kinematics. To achieve this aim, a detailed field investigation was first carried out with an unmanned aerial vehicle (UAV) aerial photography survey, resident interviews, and field sampling. The rainfall analysis indicates the effective rainfall within 7 days before landslides was 70.14 mm which exceeded the rainfall threshold of 54.3 mm in this region, which finally triggered the landslide. Traditional soil mechanic tests were then performed to identify the soil properties of the source material. Combined with numerical simulation using the nonlinear shallow water equation, the whole process of landslides was divided into four stages: instability stage, acceleration stage, transformation stage, and impact and accumulation stage. The simulations results show the landslide block slid with a low velocity of 8 m/s for about 100 m. Then, Froude number of landslide increases from 2 to 3 when passing the high and steep terrain, indicating that landslide change to inertial dominated with potential same Froude behavior of classic debris flow. The rupture mass slid with the peak velocity of 23 m/s and diverged in two gullies and ran out for about 600 m. The maximum velocity is 23 m/s in east gully while only 15 m/s in west gully. Compared with deep and incised valleys in the west, shallow and straight valley in the east decreases the deposit depth and further increases the velocity of landslide material with increased runout distance. This research may provide a fast flow path of back analyzing geo-hazards on complex terrain and serve as a basis for future research on long runout landslides.

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第 44 篇

标　　题： Laser Spot Center Location Method For Chinese Spaceborne Gf-7 Footprint Camera

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期　　刊：SENSORS

摘　　要：The Gaofen-7 (GF-7) satellite is equipped with two area array sensor footprint cameras to capture the laser altimeter spot. In order to establish a direct correspondence between the laser data and the stereo image data, a new method is proposed to fit the center of the spot using the brightness difference between the spot image and the footprint image. First, the geometric registration between the spot image and the footprint image is completed based on feature matching or template matching. Then, the brightness values between the two images are extracted from the corresponding image position to form a measurement, and the least squares adjustment method is used to calculate the parameters of the brightness conversion model between the spot image and the footprint image. Finally, according to the registration relationship, the center of the identified spots is respectively positioned in the footprint images, so that the laser spots are accurately identified in the along-track stereo footprint images. The experimental results show that the spot error of this method is less than 0.7 pixel, which has higher reliability and stability, and can be used for a GF-7 satellite footprint camera.

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第 45 篇

标　　题：Spatial-Temporal Characteristics Of Coastline Changes In Indonesia From 1990 To 2018

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期　　刊：SUSTAINABILITY

摘　　要：As a valuable resource in coastal areas, coastlines are not only vulnerable to natural processes such as erosion, siltation, and disasters, but are also subjected to strong pressures from human processes such as urban growth, resource development, and pollution discharge. This is especially true for reef nations with rich coastline resources and a large population, like Indonesia. The technical joint of remote sensing (RS) and geographic information system (GIS) has significant advantages for monitoring coastline changes on a large scale and for quantitatively analyzing their change mechanisms. Indonesia was taken as an example in this study because of its abundant coastline resources and large population. First, Landsat images from 1990 to 2018 were used to obtain coastline information. Then, the index of coastline utilization degree (ICUD) method, the changes in land and sea patterns method, and the ICUD at different

scales method were used to reveal the spatiotemporal change pattern for the coastline. The results found that: (1) Indonesia's total coastline length has increased by 777.40 km in the past 28 years, of which the natural coastline decreased by 5995.52 km and the artificial coastline increased by 6771.92 km. (2) From the analysis of the island scale, it was known that the island with the largest increase in ICUD was Kalimantan, at the expense of the mangrove coastline. (3) On the provincial scale, the province with the largest change of ICUD was Sumatera Selatan Province, which increased from 100 in 1900 to 266.43 in 2018. (4) The change trend of the land and sea pattern for the Indonesian coastline was mainly expanded to the sea. The part that eroded to the land was relatively small; among which, Riau Province had the most significant expansion of land area, about 177.73 km(2), accounting for 23.08% of the increased national land area. The worst seawater erosion was in the Jawa Barat Province. Based on the analysis of population and economic data during the same period, it was found that the main driving mechanism behind Indonesia's coastline change was population growth, which outweighed the impact of economic development. However, the main constraint on the Indonesian coastline was the topographic factor. The RS and GIS scheme used in this study can not only provide support for coastline resource development and policy formulation in Indonesia, but also provide a valuable reference for the evolution of coastline resources and environments in other regions around the world.

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WOS 号： 000535598700175

第 46 篇

标　　题： Improving Phenological Monitoring Of Winter Wheat By Considering Sensor Spectral Response In Spatiotemporal Image Fusion

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期　　刊： PHYSICS AND CHEMISTRY OF THE EARTH

摘　　要： Multisensor image fusion results may deviate from accurately reflecting the phenological stages of winter wheat because different responses of satellite sensors to the spectrum lead to the radiometric inconsistency between different remote sensing images. To reduce the effect of the difference in the physical electromagnetic spectrum responses between sensors on monitoring the phenological stages of winter wheat by fusion results, Sensor Spectral Response (SSR) should be considered in spatiotemporal fusion methods. This paper proposes a novel image fusion model by introducing SSR into the Spatial and Temporal Adaptive Reflectance Fusion Model (STARFM). The

contribution of SSR in minimizing the effect of the system difference between sensors on image fusion products is parameterized as a calibration factor by matrixing operation, which is able to offset the systematic inconsistency between different sensor images. Linear regression equation for different land cover type and spectral band is established to calculate the weights needed in STARFM for improving the selection of neighboring spectrally similar pixels. This proposed method is evaluated using one satellite datasets including four ZY-3 (5.8 m) and Landsat 8 OLI (30 m) scenes which are acquired during the growth stages of winter wheat from seedling to harvest. Qualitative and quantitative evaluation shows that the proposed method can better monitor the phenology of winter wheat with an improved spatial and temporal consistency with the observations than STARFM.

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WOS 号： 000538138500014

第 47 篇

标　　题： Experimental Test And Prediction Model Of Soil Thermal Conductivity In Permafrost Regions

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Soil thermal conductivity is a dominant parameter of an unsteady heat-transfer process, which further influences the stability and sustainability of engineering applications in permafrost regions. In this work, a laboratory test for massive specimens is performed to reveal the distribution characteristics and the parameter-influencing mechanisms of soil thermal conductivity along the Qinghai-Tibet Engineering Corridor (QTEC). Based on the measurement data of 638 unfrozen and 860 frozen soil specimens, binary fitting, radial basis function (RBF) neural network and ternary fitting (for frozen soils) prediction models of soil thermal conductivity have been developed and compared. The results demonstrate that, (1) particle size and intrinsic heat-conducting capacity of the soil skeleton have a significant influence on the soil thermal conductivity, and the typical specimens in the QTEC can be classified as three clusters according to their thermal conductivity probability distribution and water-holding capacity; (2) dry density as well as water content sometimes does not have a strong positive correlation with thermal conductivity of natural soil samples, especially for multiple soil types and complex compositions; (3) both the RBF neural network method and ternary fitting method have favorable prediction accuracy and a wide application range. The maximum determination coefficient (R-2) and quantitative proportion of relative error within +/- 10% (P-+/- 10%) of each prediction model reaches up to 0.82, 0.88, 81.4% and 74.5%, respectively. Furthermore, because the ternary fitting method can only be used for frozen soils, the RBF neural network method is considered the optimal

approach among all three prediction methods. This study can contribute to the construction and maintenance of engineering applications in permafrost regions.

DOI： 10.3390/app10072476

WOS 号： 000533356200275

第 48 篇

标　　题： Multi-Scale And Multi-Dimensional Time Series Insar Characterizing Of Surface Deformation Over Shandong Peninsula, China

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Shandong peninsula, the largest peninsula of China, is prone to severe land subsidence hazards along the coastline. In this paper, we provide, for the first time, multi-scale and multi-dimensional time series deformation measurements of the entire Shandong peninsula with advanced time series Interferometric Synthetic Aperture Radar (InSAR) techniques. We derive the spatiotemporal evolutions of the land subsidence by integrating multi-track Sentinel-1A/B and RADARSAT-2 satellite images. InSAR measurements are cross validated by the independent deformation rate results generated from different SAR tracks, reaching a precision of less than 1.3 cm/a. Two-dimensional time series over the Yellow River Delta (YRD) from 2017 to 2019 are revealed by integrating time series InSAR measurements from both descending and ascending tracks. Land subsidence zones are mainly concentrated on the YRD. In total, twelve typical localized subsidence zones are identified in the cities of Dongying (up to 290 mm/a; brine and groundwater exploitation for industrial usage), Weifang (up to 170 mm/a; brine exploitation for industrial usage), Qingdao (up to 70 mm/a; aquaculture and land reclamation), Yantai (up to 50 mm/a; land reclamation) and Rizhao (up to 60 mm/a; land reclamation). The causal factors of localized ground deformation are discussed, encompassing groundwater and brine exploitation, aquaculture and land reclamation. Multi-scale surveys of spatiotemporal deformation evolution and mechanism analysis are critical to make decisions on underground fluid exploitation and land reclamation.

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WOS 号： 000533356200093

第 49 篇

标　　题： Cyclic Behavior Of Steel Frame Joints In The Offshore Atmospheric Environment

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期　　刊： INTERNATIONAL JOURNAL OF STEEL STRUCTURES

摘　　要： The natural deterioration of mild steel elements exposed to offshore atmospheric environments compromises the long-term safety of existing steel buildings. An experimental study was conducted to investigate the effect of the offshore atmospheric environment on the seismic performance of steel frame joints. An indoor accelerated corrosion test was conducted to simulate the degradation of the mechanical properties of the materials and steel frame joints in the offshore atmospheric environment. After determining the corrosion rate by weighing after rust removal, the yield strength, ultimate strength, modulus of elasticity, and elongation of three test specimen with different thicknesses were obtained by regression of the tensile failure test, which demonstrated a linear decay relationship with the corrosion rate. Under four different corrosion degrees and three different low-cycle reciprocating loads, the failure modes of 12 steel frame joints were all plate-tearing at welded through holes. However, the difference is that the joints had ductile failure under equal-amplitude 90 mm loading and brittle failure under variable-amplitude loading. The effects of corrosion on the hysteresis behavior, deformation degradation, strength degradation, and energy dissipation capacity of steel frame joints were analyzed. The test results indicate that corrosion has significant effects on the seismic performance of steel frame joints. With the increase in corrosion degree, the energy dissipation capacity of steel frame joints declines more significantly than other performance indicators, and the yield platform of the steel frame joints is not evident.

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WOS 号： 000523373300003

第 50 篇

标　　题： Distribution And Generative Mechanisms Of Ground Fissures In China

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期　　刊：JOURNAL OF ASIAN EARTH SCIENCES

摘　　要：In this study, 5002 ground fissures in more than 1500 localities across 22 provinces in China are investigated and mapped to reveal their spatial distribution. The distribution of these ground fissures in China exhibits six regular patterns-assemblages in North China, syngenesis in extensional basins, clustering along fault zones, distributing along geomorphic boundaries, developed on the edge of subsidence areas, and clustering in large and mediumsized cities. Combined with regional GPS, numerical simulations, physical model test and In-SAR monitoring, the generative processes of ground fissures are analyzed and discussed in relationship to four mechanisms: (1) deep dynamic tectonism controls on the location of ground fissures, (2) intracontinental dynamic tectonism resulting in ground fissure assemblages, (3) fault stress inducing formation of ground fissures, and (4) groundwater overmining resulting in the reactivation and expansion of ground fissures. The geological environment is thus responsible for the establishment and appearance of ground fissure. More importantly, ground fissure propagation in China is the result of the synergistic effects of internal geological dynamic (including in deep tectonism, intracontinental tectoniim, and fault movement) coupled with anthropomorphic stress. This genetic model can be summarized as one that is tectonically controlled, stress -driven, and affected by regional hydrodynamic.

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WOS 号：000519655600007

第 51 篇

标　　题：The Effects Of Soil Shrinkage During Centrifuge Tests On Swcc And Soil Microstructure Measurements

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期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：Significant soil shrinkage occurred during SWCC (soil-water characteristic curve) measurement using centrifuge methods and thus affects the soil microstructure. This paper deals with an experimental investigation aimed at correcting for SWCC measurements with soil shrinkage considered and at studying the evolution of the microstructure induced by soil consolidation along drying path. Microstructure evolution of samples subjected to different pressure heads is determined using mercury intrusion porosimetry (MIP) and scanning electron microscopy (SEM) techniques. The relationship between the soil microstructural features and the soil mechanical and hydraulic properties is explained from the microstructure point of view. The results show that after the centrifugation ended, the height shrinkages of the soil samples were 10.36, 8.86, 6.39, 4.16, and 2.37 mm, while the corresponding initial bulk densities were 1.30, 1.36, 1.46, 1.55, and 1.68 g/cm(3). The corrected volumetric water contents

were higher than the uncorrected values at a specific pressure head. The soil shrinkage, void ratio, and degree of saturation changed at a decreasing rate as the pressure head gradually increased. These changes occurred because of the greater compressibility of the macropores, which allowed for consolidation, and because the water in the macropores was removed at a relatively low pressure head. The drastic decrease in the pore volume and the dominant diameter of such macropores inhibited further and obvious soil consolidation at a higher pressure head and inhibited the flow of water out of the soil matrix.

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WOS 号： 000528113600001

第 52 篇

标　　题： Improved Kalman Filter Method Considering Multiple Factors And Its Application In Landslide Prediction

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通讯作者： Qu, W (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian 710064, Peoples R China.

期　　刊： FRONTIERS OF EARTH SCIENCE

摘　　要： Landslides, seriously threatening human lives and environmental safety, have become some of the most catastrophic natural disasters in hilly and mountainous areas worldwide. Hence, it is necessary to forecast landslide deformation for landslide risk reduction. This paper presents a method of predicting landslide displacement, i.e., the improved multi-factor Kalman filter (KF) algorithm. The developed model has two advantages over the traditional KF approach. First, it considers multiple external environmental factors (e.g., rainfall), which are the main triggering factors that may induce slope failure. Second, the model includes random disturbances of triggers. The proposed model was constructed using a time series which consists of over 16-month of data on landslide movement and precipitation collected from the Miaodian loess landslide monitoring system and nearby meteorological stations in Shaanxi province, China. Model validation was performed by predicting movements for periods of up to 7 months in the future. The performance of the developed model was compared with that of the improved single-factor KF, multi-factor KF, multi-factor radial basis function, and multi-factor support vector regression approaches. The results show that the improved multi-factor KF method outperforms the other models and that the predictive capability can be improved by considering random disturbances of triggers.

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第 53 篇

标　　题： Traveltime Computation And Obn Seismic Record Simulation For Rugged Seafloor In Vti Medium

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期　　刊：EXPLORATION GEOPHYSICS

摘　　要：To improve the computational accuracy of seismic traveltime for complex structures in inhomogeneous media, a mesh generation method that is adaptive to a rugged seafloor or interface is presented. A hybrid mesh discrete velocity model consisting of conventional rectangular mesh and irregular quadrilateral mesh is also proposed. The local traveltime equations for the hybrid mesh are derived from the linear traveltime interpolation (LTI) method and are shown to be stable. The relationship between the group velocity and group angle is converted into that between group velocity and interpolated point coordinates, extending the LTI ray tracing algorithm to multiwave simulation in vertical transversely isotropic (VTI) medium by multi-stage partitioning. Computations of the first arrival, reflection, multiple reflection, multiple transmission conversion, and multiple reflection conversion seismic waves in the VTI medium with rugged seafloor and complex structural interfaces are realised. The results show that the proposed method can adapt to the rugged seafloor and velocity interfaces of complex structures, resulting in higher computational accuracy of the traveltime and ray paths for ocean bottom node (OBN) seismic wave simulation. The accuracy of the proposed method is verified by comparison with the finite-difference method. This method will be useful for modelling of seismic waves, wavefield identification, and study of seismic wave propagation in OBN seismic observations.

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WOS 号：000533279200001

第 54 篇

标　　题：Microanisotropy And Preferred Orientation Of Grains And Aggregates (Poga) Of The Malan Loess In Yan'An, China: A Profile Study

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期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：It is well known that the microfabric formed by the shape, size, and preferred orientation of grains and aggregates (POGA) is the primary cause of the macroscopic anisotropy of soil. Therefore, this study investigated the vertical and horizontal anisotropic characteristics of the POGA at different burial depths in the Malan loess of Yan'an. Quantitative information of particle aggregates from scanning electron microscopy (SEM) photographs of vertical and horizontal solidified slice specimens

was derived via the ArcGIS vectorization tool. The variation in the roundness (R), anisotropy index (Ia), and probability entropy (Hm) of clay grain aggregates was analyzed, and the results show that the azimuthal of the POGA in the horizontal direction is between 130 degrees and 150 degrees (N40 degrees W-N60 degrees W), while the POGA in the vertical direction is parallel to the ground plane. Moreover, the deeper the burial depth is, the more significant the preferred orientation (PO). Both vertical and horizontal grain aggregates are based on rounded grains, and the Ia of soil increases with the burial depth. The Hm shows little change in the horizontal direction with the burial depth but decreases in the vertical direction, and the POGA of the vertical direction is better than that of the horizontal direction. Finally, the Ia and Hm of undisturbed loess are compared with that of remolded clay in the published literature, and the relationship between microanisotropy and POGA is discussed.

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WOS 号： 000526386800017

第 55 篇

标　　题： The Dynamic Response Of Sites With Earth Fissures As Revealed By Microtremor Analysis-A Case Study In The Linfen Basin, China

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期　　刊： SOIL DYNAMICS AND EARTHQUAKE ENGINEERING

摘　　要： Earth fissures are a major cause for concern worldwide, and an ever-increasing number of geohazards are being caused by fissures. However, the dynamic response of sites with earth fissures is still unclear. With the aim of providing previously lacking advice regarding earthquake fortification in proximity to fissures, this study employed microtremors to estimate the effect of fissures on the dynamic response of a site, taking fissures in the Linfen Basin as its example. Survey lines were laid across four earth fissures in three different regions: the Linfen depression, the Houma depression, and the piedmont of Lvliang Mountain. The time-history acceleration of microtremors was transformed into the Fourier amplitude spectrum, response acceleration, Arias intensity, and H/V spectral ratio. The results show that the frequency contents, including the spectral pattern, bandwidth, and spectral area, are consistent with the conditions in each region. The Fourier amplitude, peak acceleration, Arias intensity and H/V ratio amplitude are significantly elevated near the fissure, falling to the background value by 20 m away from it, whereas the predominant frequencies are independent of distance from the fissure. This change in the amplification factors confirms that earth fissures amplify the dynamic response of the site. A larger range of influence and greater amplification were detected on the hanging side of the fissure. Results from different regions show that the amplification and range of influence vary between regions. On the basis of the results, it is suggested that a higher seismic fortification intensity and a greater setback distance should be adopted at sites with earth fissures.

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WOS 号： 000527316400022

第 56 篇
标　　题： Characteristics And Dynamics Of The Ganqiuchi Rock Avalanche Triggered By A Paleo-Earthquake In The Northern Qinling Mountains
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通讯作者： Lyu, Y (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian 710054, Peoples R China.
期　　刊： JOURNAL OF MOUNTAIN SCIENCE
摘　　要： Analyzing large prehistoric rock avalanches provides significant data for evaluating the disaster posed by these relatively infrequent but destructive geological events. This paper attempts to study the characteristics and dynamics of the Ganqiuchi granitic rock avalanche, in the middle of the northern margin of Qinling Mountains, 30 km to the south of Xi'an, Shaanxi Province, China. In plane view, this rock avalanche is characterized by source area, accumulation area and dammed lake area. Based on previous studies, historical records and regional geological data, the major trigger of the Ganqiuchi rock avalanche is considered to be a strong paleo-earthquake with tremendous energy. The in situ deposit block size distributions of the intact rock mass and the debris deposits are presented and analyzed by using a simple model for estimating the number of fragmentation cycles that the blocks underwent. The results show that the primary controlling factor of the fragmentation process is the pre-existing fractures, and there is a relationship between the potential energy and the fragmentation energy: the latter is approximately 20% of the former. Based on the dynamic discrete element technique, the study proposes a four-stage model for the dynamic course of the Ganqiuchi rock avalanche: (1) failing; (2) highspeed sliding; (3) collision with obstacles; (4) decelerated sliding, which has implication for hazard assessment of the potential rock avalanches in China and other countries with similar geological setting.
DOI： 10.1007/s11629-019-5599-0
WOS 号： 000534803600010

第 57 篇
标　　题： Deep Learning-Based Human Activity Real-Time Recognition For Pedestrian Navigation
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通讯作者： Li, X (corresponding author), Changan Univ, Coll Geol Engn & Geomant, Xian 710054, Peoples R China.
期　　刊： SENSORS
摘　　要： Several pedestrian navigation solutions have been proposed to date, and most of them are based on smartphones. Real-time recognition of pedestrian mode and smartphone

posture is a key issue in navigation. Traditional ML (Machine Learning) classification methods have drawbacks, such as insufficient recognition accuracy and poor timing. This paper presents a real-time recognition scheme for comprehensive human activities, and this scheme combines deep learning algorithms and MEMS (Micro-Electro-Mechanical System) sensors' measurements. In this study, we performed four main experiments, namely pedestrian motion mode recognition, smartphone posture recognition, real-time comprehensive pedestrian activity recognition, and pedestrian navigation. In the procedure of recognition, we designed and trained deep learning models using LSTM (Long Short-Term Memory) and CNN (Convolutional Neural Network) networks based on Tensorflow framework. The accuracy of traditional ML classification methods was also used for comparison. Test results show that the accuracy of motion mode recognition was improved from <mml:semantics>89.9%</mml:semantics>, which was the highest accuracy and obtained by SVM (Support Vector Machine), to <mml:semantics>90.74%</mml:semantics> (LSTM) and <mml:semantics>91.92%</mml:semantics> (CNN); the accuracy of smartphone posture recognition was improved from <mml:semantics>81.60%</mml:semantics>, which is the highest accuracy and obtained by NN (Neural Network), to <mml:semantics>93.69%</mml:semantics> (LSTM) and <mml:semantics>95.55%</mml:semantics> (CNN). We give a model transformation procedure based on the trained CNN network model, and then obtain the converted <mml:semantics>.tflite</mml:semantics> model, which can be run in Android devices for real-time recognition. Real-time recognition experiments were performed in multiple scenes, a recognition model trained by the CNN network was deployed in a Huawei Mate20 smartphone, and the five most used pedestrian activities were designed and verified. The overall accuracy was up to <mml:semantics>89.39%</mml:semantics>. Overall, the improvement of recognition capability based on deep learning algorithms was significant. Therefore, the solution was helpful to recognize comprehensive pedestrian activities during navigation. On the basis of the trained model, a navigation test was performed; mean bias was reduced by more than 1.1 m. Accordingly, the positioning accuracy was improved obviously, which is meaningful to apply DL in the area of pedestrian navigation to make improvements.

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WOS 号： 000537106200138

第 58 篇

标　　题： Consistency Analysis Of Remote Sensing Land Cover Products In The Tropical Rainforest Climate Region: A Case Study Of Indonesia

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期　　刊： REMOTE SENSING

摘　　要： Land cover changes in tropical rainforest climate zones play an important role in global climate change and the functioning of the Earth's natural system. Existing research on the consistency of different land cover products has mainly focused on administrative divisions (continental or national scales). However, the ongoing production of large regional or global land cover products with higher resolutions requires us to have a better grasp of confusing land types and their geographical locations for different zoning (e.g., geographical zoning) in order to guide the optimization of strategies such as zoning and sample selection in automated land cover classification. Therefore, we selected the GlobeLand30-2010, GLC_FCS30-2015, and FROM_GLC2015 global land cover products with a 30-m resolution covering Indonesia, which has a tropical rainforest climate, as a case study, and then analyzed these products in terms of areal consistency, spatial consistency, and accuracy evaluation. The results revealed that (a) all three land cover products revealed that forest is the main land cover type in Indonesia. The area correlation coefficient of any two products is better than 0.89; (b) the areas that are completely consistent among the three products account for 58% of the total area of Indonesia, mainly distributed in the central and northern parts of Kalimantan and Papua, which are dominated by forest land types. The spatial consistency of the three products is low, however, due to the complex surface types and staggered distributions of grassland, shrub, cultivated land, artificial surface, and other land cover types in Java, eastern Sumatra, and the eastern, southern, and northwestern sections of Kalimantan, where the elevation is less than 200 m. Given these results, land cover producers should take heed of the classification accuracy of these areas; (c) the absolute accuracy evaluation demonstrated that the GLC_FCS30-2015 product has the highest overall accuracy (65.59%), followed by the overall accuracy of the GlobeLand30-2010 product (61.65%), while the FROM_GLC2015 exhibits the lowest overall accuracy (57.71%). The mapping accuracy of the three products is higher for forests and artificial surfaces. The cropland mapping accuracy of the GLC_FCS30-2015 product is higher than those of the other two products. The mapping accuracy of all products is low for grassland, shrubland, bareland, and wetland. The classification accuracy of these land cover types requires further improvement and cannot be used directly by land cover users when conducting relevant research in tropical rainforest climate zones, since the utilization of these products could lead to serious errors.

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第 59 篇

标　　题：Two-Pathway Anti-Interference Neural Network Based On The Retinal Perception Mechanism For Classification Of Remote Sensing Images From Unmanned Aerial Vehicles

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期　　刊：JOURNAL OF APPLIED REMOTE SENSING

摘　　要：The ultrahigh resolution of unmanned aerial vehicle (UAV) remote sensing images and tilting photography with multiple perspectives provide complete and detailed ground observation data for various engineering applications. However, noise and interference information make learning the typical features of ground objects difficult for current deep learning semantic segmentation networks. The hierarchical cognitive structure of human vision and the information transmission modes of retinal cone and rod cells were used to design a two-pathway anti-interference network for retinal perception mechanism simulation (RPMS). In the first pathway, the hierarchical cognition of cone cells was simulated by a one-to-one connected multiscale dilated convolution structure. In the second pathway, the hierarchical cognition of rod cells was simulated by a multiscale pyramid structure with many-to-one connections. With the one-to-one connection, the ability of RPMS to recognize detailed edges was strengthened. Furthermore, the many-to-one connection helped RPMS resist the disturbance from noise and interference. By combining the feature maps of the two paths, RPMS exhibited stronger noise resistance, better texture recognition, and better detail recognition compared with other semantic segmentation networks in the classification experiments. Thus this technique is suitable for UAV remote sensing image classification and has a broad application potential. (C) 2020 Society of Photo-Optical Instrumentation Engineers (SPIE)

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第 60 篇

标　　题：Experimental Study Of Land Subsidence In Response To Groundwater Withdrawal And Recharge In Changping District Of Beijing

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期　　刊：PLOS ONE

摘　　要：Over exploitation of groundwater in Changping District of Beijing city has caused

serious land subsidence in the past decades. In recent years, the operation of the South-to-North Water Transfer Project has reduced the land subsidence rate. In this paper, Experimental tests are performed using the GDS Consolidation Testing System to characterize the compression and rebound of soils at depths of less than 100 m caused by groundwater withdrawal and recharge in Changping District. The results indicate that the compressible layers are the main contributors to land subsidence. The first compressible layer experiences greater deformation and more considerable hysteresis than the other compressible layers with the same decrease in the pore water pressure. Therefore, the exploitation of the adjacent aquifer should be controlled in the future. The deformation in the second and third compressible layers is a gradual and long-term process with little rebound; therefore, the subsidence should be seriously addressed when the groundwater in the two compressible layers is exploited on a large scale. In the same compressible layer, silty clay is more compressible and hysteretic than silt. For the same soil sample, the deformation rate decreases gradually as the pore water pressure decreases, whereas the creep deformation shows an overall increasing trend. A parameter named the subsidence index C-w is proposed in this paper to describe the soil compressibility during groundwater withdrawal. All the soil samples are characterized by elastic-plastic deformation, and the shallow soil samples with less pore water pressure decrease are more likely to rebound.

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WOS 号： 000532467400001

第 61 篇

标　　题： A Study Of The Symbiotic Relationship Between Tectonic Fissures And Faults In The Fenwei Graben System, China

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： The Fenwei Graben System is an important extensional fault-depression zone, which is the tectonic boundary between the Ordos Block and the South China Block and the North China Block. The graben system presents an S shape, with a total length of 1200 km and a width of 30-60 km and an overall strike of NNE. Due to complex tectonic background and active faults, nearly 612 ground fissures develop in these basins, and more than 90% of these ground fissures are tectonic fissures, which are closely

associated with fault activities. To reveal the plane symbiotic phenomena, profile symbiotic modes and symbiotic mechanism between tectonic fissures and faults in the Fenwei Graben System, the developmental characteristics were investigated in detail by surveying, mapping, trenching and drilling in the study area. The main conclusions are as follows. (1) The tectonic fissures of the Fenwei Graben System are mainly distributed along the margin faults of basins, the boundary faults between blocks and the hidden faults within blocks, causing serious damages to farmlands, houses and roads. The symbiosis between these fissures and faults is obvious on the surface. (2) The profile symbiotic morphology includes vertical extension type, syncline and anticline y type, and stepped type. (3) The symbiotic mechanisms include vertical growth, lateral rupture and clustery derivation. (4) The activities of underlying faults give impetus to the formation and expansion of tectonic fissures. The exposure of the fissures makes underlying faults continue to develop in the form of surface fractures.

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第 62 篇

标　　题： Numerical Modelling Analysis Of Multi-Source Semi-Airborne Tem Systems Using A Tfem

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期　　刊： JOURNAL OF GEOPHYSICS AND ENGINEERING

摘　　要： Traditional transient electromagnetic methods use single sources for excitation and extract the characteristics of underground media by improving interpretation technology. This study focused the improvements of transient electromagnetic interpretation using complex source technology. A time-domain vector finite element method (TFEM) was applied on three-dimensional forward modelling of semi-airborne transient electromagnetic (TEM) with multiple electrical sources, and it analysed the characteristics of fields with multiple sources. The study used a model of an isolated anomalous body in a homogeneous medium as an example. The effects of different combinations of excitation sources on the distributions of the magnetic field characteristics were analysed. Numerical results showed that the magnetic field components in a specific area could be strengthened by changing the layout of the sources, which was significant for future field data collections. By comparing the transient electromagnetic fields of the vertical array dipole sources with that of the loop source, the anomaly transient electromagnetic field of multi-source was more obvious than the field with a single source. Taking a complex orebody model as an example, a cross-electric source was used to calculate the magnetic field components of the semi-airborne TEM method. The resistivity distribution characteristics of the underground medium were obtained using an apparent resistivity interpretation method of the vertical magnetic field, which fully demonstrated that a multi-source transient electromagnetic system had the ability to determine abundant resistivity information of

a complex medium.

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第 63 篇

标　　题： Interannual Glacier And Lake Mass Changes Over Scandinavia From Grace

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期　　刊： GEOPHYSICAL JOURNAL INTERNATIONAL

摘　　要： The Gravity Recovery and Climate Experiment (GRACE) satellite gravimetry observations have been widely used in the study of glaciers. However, there is still no detailed GRACE-based study of the glaciers over the Scandinavian Mountains (SCAMs), where the glaciers are debris-covered and the effects of glacial isostatic adjustment (GIA) are significant. In this paper, GRACE observations are combined with climate data to analyse interannual mass changes in glacier and lake areas over Scandinavia during the period from 2003 to 2016. An inversion algorithm, the constrained forward modelling method, is used to recover the signals of glaciers and lakes from GRACE observations. Our results show that the total glacier mass loss rate over Scandinavia is -1.0 +/- 1.1 Gt yr -I during our study period. We find that the glacier accumulation regime in different subregions of the SCAMs may be different. The glacier mass change in the central SCAMs tends to be mainly driven by precipitation.lWo rapid transitions from dry/wet years to wct/dry years in the lake area in south Scandinavia arc identified by multiple data. The transitions are likely caused by changes in atmospheric circulation, that is surface wind. The mass changes of Scandinavia can be primarily explained by the influence of winds. We find that the glacier area is controlled by both the northerly and southerly winds, while the lake area is mainly driven by the southerly winds. This discrepancy leads to the different mechanisms of mass change in glacier and lake areas. We also discuss the influence of GIA, and suggest that the GRACE-derived long-term hydrology trends over Scandinavia may be unreliable and need to be verified. Our study indicates that GRACE data have potential in detecting small-scale glacier changes.

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第 64 篇

标　　题： Three-Dimensional Adaptive Finite-Element Method For Time-Domain Airborne Em Over An Anisotropic Earth

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期　　刊：CHINESE JOURNAL OF GEOPHYSICS-CHINESE EDITION

摘　　要：How to generate a reasonable mesh for the anisotropic medium model with complex electrical structure is the key to obtaining high-precision modeling results. In this paper, we study the adaptive finite-element (FE) method for 3D time-domain airborne EM modeling over an anisotropic earth. By combining the time-domain unstructured FE algorithm and the adaptive mesh refinement technology, we successfully realize the 3D time-domain airborne EM adaptive forward modeling for anisotropic media. To deal with the big difference of EM responses at different time channels, we bring in a temporal weighting to achieve a synchronous refinement of shallow and deep meshes. The reliability of our algorithm is verified by comparing our results with 1D semi-analytic solution. The numerical experiments show that the anisotropic conductivity has a big influence on the mesh refinement. The value of the maximum principal-axis conductivity and its distribution directly determines the mesh refinement. In addition, anisotropic conductivity can also seriously affect the distribution pattern and anomalous amplitude of the three-component EM responses. By using the polarity maps for full-domain apparent resistivity, the direction of the anisotropic principal axis can be well identified.

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第 65 篇

标　　题：Sequential Estimation Of Dynamic Deformation Parameters For Sbas-Insar

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期　　刊：IEEE GEOSCIENCE AND REMOTE SENSING LETTERS

摘　　要：The synthetic aperture radar (SAR) interferometry (InSAR) has been developed for more than 20 years for historical surface deformation reconstruction. In particular, the onboard Sentinel-1/A/B satellite, newly planned NASA-ISRO SAR (NISAR), and Germany Tandem-L will continue to provide unprecedented SAR data with an increased number of acquisitions. However, processing of real-time SAR data has been

experiencing challenges regarding the InSAR deformation parameter estimation over a long time with the small baseline subsets (SBAS) InSAR technology. We use sequential adjustment for the estimation of the deformation parameters, which uses Bayesian estimation theory under the least square criteria to inverse long time-series deformation dynamically. Finally, both simulated and real Sentinel-1A SAR data verify the performance of the sequential estimation. It can be regarded as an effective data processing tool in the coming era of SAR big data.

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第 66 篇

标　　题： Gps/Bds-2/Galileo Precise Point Positioning Ambiguity Resolution Based On The Uncombined Model

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期　　刊： REMOTE SENSING

摘　　要： In this study, an uncombined precise point positioning (PPP) model was established and was used for estimating fractional cycle bias (FCB) products and for achieving ambiguity resolution (AR), using GPS, BDS-2, and Galileo raw observations. The uncombined PPP model is flexible and efficient for positioning services and generating FCB. The FCBs for GPS, BDS-2, and Galileo were estimated using the uncombined PPP model with observations from the Multi-GNSS Experiment (MGEX) stations. The root mean squares (RMSs) of the float ambiguity a posteriori residuals associated with all of the three GNSS constellations, i.e., GPS, BDS-2, and Galileo, are less than 0.1 cycles for both narrow-lane (NL) and wide-lane (WL) combinations. The standard deviation (STD) of the WL combination FCB series is 0.015, 0.013, and 0.006 cycles for GPS, BDS-2, and Galileo, respectively, and the counterpart for the NL combination FCB series is 0.030 and 0.0184 cycles for GPS and Galileo, respectively. For the BDS-2 NL combination FCB series, the STD of the inclined geosynchronous orbit (IGSO) satellites is 0.0156 cycles, while the value for the medium Earth orbit (MEO) satellites is 0.073 cycles. The AR solutions produced by the uncombined multi-GNSS PPP model were evaluated from the positioning biases and the success fixing rate of ambiguity. The experimental results demonstrate that the growth of the amount of available satellites significantly improves the PPP performance. The three-dimensional (3D) positioning accuracies associated with the PPP ambiguity-fixed solutions for the respective only-GPS, GPS/BDS-2, GPS/Galileo, and GPS/BDS-2/Galileo models are 1.34, 1.19, 1.21, and 1.14 cm, respectively, and more than a 30% improvement is achieved when compared to the results related to the ambiguity-float solutions. Additionally, the convergence time based on the GPS/BDS-2/Galileo observations is only 7.5 min for the ambiguity-fixed solutions, and the results exhibit a 53% improvement in comparison to

the ambiguity-float solutions. The values of convergence time based on the only-GPS observations are estimated as 22 and 10.5 min for the ambiguity-float and ambiguity-fixed solutions, respectively. Lastly, the success fixing rate of ambiguity is also dramatically raised for the multi-GNSS PPP AR. For example, the percentage is approximately 99% for the GPS/BDS-2/Galileo solution over a 10 min processing period. In addition, the inter-system bias (ISB) between GPS, BDS-2, and Galileo, which is carefully considered in the uncombined multi-GNSS PPP method, is modeled as a white noise process. The differences of the ISB series between BDS-2 and Galileo indicate that the clock datum bias of the satellite clock offset estimation accounts for the variation of the ISB series.

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第 67 篇

标　　题： A Qualitative Study Of The Critical Conditions For The Initiation Of Mine Waste Debris Flows

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期　　刊： WATER

摘　　要： Mine waste debris flows are a type of man-made debris flow that commonly lead to major disasters. In this study, the Xiaotong Gully, which is located in the Xiaoqinling gold mining area in China and contains a typical mine waste debris flow gully, was selected as the study area. Since a debris flow can be classified as either a geotechnical debris flow or hydraulic debris flow based on its initiation mode, we conducted 46 experimental model tests to explore the initiation conditions of these two different types of debris flows. According to our tests, the initiation conditions of hydraulic debris flows were mainly affected by the flume gradient, the water content of the mine waste, the inflow discharge, the water supply modes, and the clay particle content. A larger flume gradient and higher mine waste water content were more conducive to initiating a hydraulic debris flow. However, the influence of the water supply mode on the initiation of a hydraulic debris flow was complex (influenced by factors such as water content of mine waste, runoff discharge rate and rainfall intensity). The critical runoff of a hydraulic debris flow, which starts with a parabolic relationship to the clay particle content of the mine waste, decreased with increasing clay particle content and then increased. There was a minimum critical runoff when the clay content of the mine waste was 30%. The initiation conditions of a geotechnical debris flow were mainly affected by the flume gradient, the water content, and the clay particle content. The critical gradient of a geotechnical debris flow decreased with increasing water content and had

a parabolic relationship to the clay particle content. In tests 31-46 of this study, the second and third critical slopes both decreased and then increased with increasing clay particle content. These preliminary research results provide a scientific reference for subsequent research on the prevention and mitigation of mine waste debris flows.

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第 68 篇

标　　题： Characteristics And Numerical Runout Modeling Analysis Of The Xinmo Landslide In Sichuan, China

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期　　刊： EARTH SCIENCES RESEARCH JOURNAL

摘　　要： A catastrophic landslide hit Mount Fugui, Diexi Township, Mao County, Sichuan Province, at 05:38:58 on June 24, 2017. This landslide buried Xinmo Village, caused 83 deaths, and resulted in enormous losses of life and property. The landslide mass cut out and slid from a high position, loaded continuously, and accumulated at the top of the slope body. Subsequently, the landslide mass was transformed into avalanche debris. This process was a typical chain disaster of avalanche debris triggered by a ridge-top landslide. The total volume, elevation difference, and horizontal distance of the landslide were 1637.6 x 104 m(3), 1200 m, and 2800 m. In this research, the disaster-formation mechanism of the Xinmo Landslide was identified based on a geological field survey and remote sensing satellites. The disaster characteristics of the landslide source zone, debris avalanche zone, and accumulation zone were then numerically simulated. The entire process of the Xinmo Landslide movement was comparatively studied using DAN-W, a dynamic landslide software program, and multiple rheological models. The research findings indicated that the frictional model favorably simulated the movement characteristics of various phases of the Xinmo Landslide. This landslide lasted approximately 120 s, and it had a maximum velocity of movement of 74 m/s. Therefore, the frictional model and its parameters can be used in similar studies to investigate the dynamic disaster effects of ridge-top rock landslides.

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第 69 篇

标　　题： Mining Subsidence Prediction By Combining Support Vector Machine Regression And Interferometric Synthetic Aperture Radar Data

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期　　刊： ISPRS INTERNATIONAL JOURNAL OF GEO-INFORMATION

摘　　要： Mining subsidence is time-dependent and highly nonlinear, especially in the Loess Plateau region in Northwestern China. As a consequence, and mainly in building agglomerations, the structures can be damaged severely during or after underground extraction, with risks to human life. In this paper, we propose an approach based on a combination of a differential interferometric synthetic aperture radar (DInSAR) technique and a support vector machine (SVM) regression algorithm optimized by grid search (GS-SVR) to predict mining subsidence in a timely and cost-efficient manner. We consider five Advanced Land Observing Satellite (ALOS)/Phased Array type L-band Synthetic Aperture Radar (PALSAR) images encompassing the Dafosi coal mine area in Binxian and Changwu counties, Shaanxi Province. The results show that the subsidence predicted by the proposed InSAR and GS-SVR approach is consistent with the Global Positioning System (GPS) measurements. The maximum absolute errors are less than 3.1 cm and the maximum relative errors are less than 14%. The proposed approach combining DInSAR with GS-SVR technology can predict mining subsidence on the Loess Plateau of China with a high level of accuracy. This research may also help to provide disaster warnings.

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WOS 号： 000551065200001

第 70 篇

标　　题： Detection Of Shallow Underground Fissures By Time-Frequency Analysis Of Rayleigh Waves Based On Wavelet Transform

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期　　刊： APPLIED GEOPHYSICS

摘　　要： Ground fissure is a geological hazard that poses a great threat to human life and, property and the environment. Therefore, it is necessary to detect shallow underground fissures effectively. In this paper, a time-frequency analysis of Rayleigh waves based on the wavelet transform is proposed to detect shallow underground fissures. The arrival time of the directed Rayleigh waves and the diffracted Rayleigh waves from the underground fissure is extracted from the time-frequency spectrum of any two traces. Furthermore, the locations of the underground fissures are calculated according to the time difference relation. Four sets of fracture models and one set of field data were used to test the effectiveness of the wavelet transform of Rayleigh waves. Moreover, the detection results of the actual data are compared with that of the high-density electrical method to further prove its detection effect. The field investigation shows that using the wavelet transform of Rayleigh waves to detect shallow underground fissures is feasible and effective.

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第 71 篇

标　　题： Field And Numerical Investigations On Triggering Mechanism In Typical Rainfall-Induced Shallow Landslides: A Case Study In The Ren River Catchment, China

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期　　刊： NATURAL HAZARDS

摘　　要： A combined field hydrological monitoring and hydro-mechanical numerical investigation into the triggering mechanism in rainfall-induced shallow landslides was proposed and carried out in the Ren River catchment of central China, considering the effect of predisposing geological conditions. Based on the seasonal monitored data of shallow soils, hydrological behaviors of the slope were obtained and it facilitates the development of conceptual hydrological models. A calibrated hydrological model was then obtained by comparing the event-based results of both the monitored and simulated variation in soil water content/pore pressure. Then, this calibrated hydrological model was extended to reconstruct a seasonal hydrological regime and the corresponding triggering condition of a shallow landslide on the monitored slope in 2010. Local geomorphological and stratigraphic features of the slopes affected by shallow landslides in the Ren River catchment were considered as prediposing factors to impact hydrological behaviors and the corresponding triggering mechanism of a shallow landslide. Additional slope cases with distinctive slope topography and stratigraphic features were reconstructed to carry out seasonal hydrological response modelling and local slope stability analysis. Results indicate that the decreasing matric suction in response to rainfall infiltration at shallow depth is the main trigger for those landslides on planar and concave slopes with relatively thick soil mantle. A stratigraphic discontinuity that the presence of a steep rock scrap leads to the pinching out of a soil layer on a convex slope, narrows the drainage channel and possibly leads to a significant accumulation of a perched water table. The infinite slope model, considering the evaluated pore pressure at different depths and local geological conditions can be effectively applied to reconstruct the shallow landslide occurrences during the rainstorm event in 2010.

DOI： 10.1007/s11069-020-04075-9

WOS 号： 000537990000002

第 72 篇

标　　题：Quantitative Research And Characterization Of The Loess Microstructure In The Bai Lu Tableland, Shaanxi Province, China

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Loess is a special geotechnical material with strong structural properties, and the microstructural characteristics of loess significantly influence its macroscopic physical features, mechanical properties, and catastrophic behavior. In this paper, serial samples were extracted from the continuous loess and paleosol strata of the Bai Lu tableland; with these samples, the optical microscopy-based serial sectioning method was adopted to study the quantitative characterization and variation in the loess microstructure. Three-dimensional characteristics and quantitative parameters of the particles, pores, and throats of the loess were obtained. The results indicate that the volume, Eq-Radius, and major-minor axis ratio of the loess particles satisfy third-order, third-order, and second-order Gaussian distributions, respectively. The Eq-Radius of the loess pores and throats satisfies a first-order Gaussian distribution, and the throat channel length satisfies a gamma distribution. With increasing stratum depth, the particles become more flattened, the throat radii become larger and the pore channels become slenderer. The variation in fitting parameters and the correlations between the macrophysical and mechanical properties of loess were then explored. The study of the microstructure of loess contributes to a better understanding of the catastrophic behavior of loess and the physical mechanism of geologic hazards in this area.

DOI：10.1155/2020/3681382

WOS 号：000543458700004

第 73 篇

标　　题：Permeability Of Loess From The South Jingyang Plateau Under Different Consolidation Pressures In Terms Of The Three-Dimensional Microstructure

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期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：Multiple consolidation-permeability tests were performed on loess samples from the South Jingyang Plateau in northwest China to analyze permeability under actual stresses. Three-dimensional microstructures for loess samples under each consolidation stress were established based on high-resolution computed tomography images to thoroughly interpret the permeability variation in terms of the loess microstructures including the pores and throats. With increasing consolidation pressure, the permeability decreased greatly at the beginning and tended to become stable. In the stage of dramatic decrease in permeability, pore coordination number decreased slightly under pressure, indicating little influence of connectivity among pores on permeability. The pores in the range of 14 to 25 mu m decreased by 10.1% in volume percentage, and the pores larger than 13 mu m decreased by 19.6% in number. Accordingly, throats larger than 6 mu m decreased by 13.1% in area percentage, and throats larger than 2 mu m decreased by 14.9% in number. Throat size distribution played a decisive role in permeability, pore size distribution acted as a bridge to influence permeability, and only the spaced pores and some interaggregate or intergrain pores larger than 13 mu m that allowed free water to pass were related to permeability. The decreases in these relatively large pores and throats caused considerable decreases in permeability. However, the existence of large throats, even large numbers of such throats, does not mean high permeability, which can be verified in the stable stage of permeability. This research provides a better understanding of loess permeability in terms of three-dimensional microstructure and further insights into the stability analysis of loess slopes and the control of other hazards in loess regions.

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WOS 号：000541060600001

第 74 篇

标　　题：Development Characteristics And Mechanisms Of Damage-Causing Urban Ground Fissures In Datong City, China

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期　　刊：ENGINEERING GEOLOGY

摘　　要：A set of widely developed ground fissures within the Datong Basin, northern China, have inflicted serious damage to farm fields, roads, houses, and building foundations in Datong City. Such emergence of large-scale ground fissures is rare in urban areas. The formation mechanisms of these features were therefore investigated in detail through surveying, mapping, trenching, drilling, and geophysical prospecting. The 11 fissures in

Datong City are located on the hanging wall of the Kouquan fault (part of regional horst and graben terrain), and run approximately parallel, with a dominant strike of NE34 degrees-70 degrees and a maximum length of 5.5 km. These structures occur in clear zones with similar directions and lateral distributions on the surface. They possess evident syn-sedimentary fault characteristics, including y-shaped, trapezoidal, and traction structures in their profiles. The synergistic action of different tectonic factors and groundwater exploitation is responsible for fissure formation. Under the influences of regional tensile stress, upper mantle uplift, and fault block movement, activity along local faults created hidden fracture systems within the hanging wall. The over-exploitation of groundwater in the region subsequently accelerated fracture growth, and varying vertical compressibility of the strata on both sides of the local fault resulted in uneven subsidence on the surface, generating tensile zones and promoting the appearance of fissures at the edges of settlement funnels.

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WOS 号： 000532829600008

第 75 篇

标　　题： Influence Of Textural Properties On The Failure Mode And Process Of Landslide Dams

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通讯作者： Peng, JB (corresponding author), Changan Univ, Coll Geol Engn & Surveying, Key Lab Western China Mineral Resources & Geol En, Xian 710054, Peoples R China.

期　　刊： ENGINEERING GEOLOGY

摘　　要： The failure of a landslide dam is a sudden geo-hazard, which can significantly threatens the lives and property of local residents. In this study, 11 experiments were designed to reproduce the failure process of landslide dams with different grain size distributions and hydrodynamic conditions. In order to fully consider the influence of seepage on the stability of landslide dams with different textural properties, the inflow discharge was small in these tests. By analyzing the experimental data, we found that the textural properties plays a key role in the failure modes and process of landslide dams. The eleven tests produced five different results: the landslide dam in experiment 1 and 8 remained stable; the landslide dam in experiment 2 partially failed; in experiments 3-6, the dams failed due to overtopping and erosion, while in experiment 7, the dam failed due to overtopping and soil collapse; in experiment 9-11, the dams failed due to piping, overtopping and erosion. In addition, the evolution of the outflow discharge and density also varied for the different textural properties of the dam materials. Based on the experimental results, the landslide dam materials were classified as coarse-matrix controlled, medium particle controlled, fine-matrix controlled, and balanced composition. The failure modes and process as well as the evolution characteristics of the outflow discharge and flow density were all summarized, providing a scientific reference for disaster prevention and mitigation research of landslide dams.

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WOS 号： 000532829600013

第 76 篇

标　　题： Mapping Of High-Spatial-Resolution Three-Dimensional Electron Density By Combing Of Full-Polarimetric Sar And Iri Model

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期　　刊： FRONTIERS IN EARTH SCIENCE

摘　　要： Retrieval of ionospheric parameters from spaceborne synthetic aperture radar (SAR) and SAR interferometry observations has been developed in recent years because of its high spatial resolution. However, current studies are centered on the one-dimensional or two-dimensional ionospheric parameters, and there is a lack of retrieving three-dimensional ionospheric electron density. Based on this background, this study proposes an efficient method to map high-spatial-resolution three-dimensional electron density by combing of the full-polarimetric SAR images and International Reference Ionosphere (IRI) model. For a performance test of the proposed method, two L-band Advanced Land Observation Satellite Phase Array L-band SAR full-polarimetric SAR images over Alaska regions are processed. The high-spatial-resolution ionospheric parameters, including vertical total electron content and three-dimensional ionospheric electron density, are reconstructed over the study area. When comparing with the electron density derived from Poker Flat Incoherent Scatter Radar (PFISR) system, it is found that the IRI-derived electron density is obviously improved, where the standard deviations of differences between PFISR and IRI decrease, respectively, by similar to 2 and 1.5 times compared to those before the correction, demonstrating the reliability of the proposed method. This study can help us better understand the characteristics of ionospheric variation in space.

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第 77 篇

标　　题： Q Inversion And Comparison Of Influential Factors Among Three Methods: Cfs, Sr, And Aa

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通讯作者： Wu, YT (corresponding author), Changan Univ, Sch Geol & Surveying & Mapping Engn, Xian 710064, Peoples R China.

期　　刊： COMMUNICATIONS IN COMPUTATIONAL PHYSICS

摘　　要： The goals of this study were to examine factors influencing Q inversion and to provide references for practical application. Three different methods for inverting Q values with VSP data were explored, including centroid frequency shift (CFS), spectral ratio (SR), and amplitude attenuation (AA). Comparison between the CFS and the other two

methods was conducted on frequency band widths and low attenuation, wavefield components, interface interference, and thin layers. Results from several sets of VSP modeling data indicated that the CFS method is more stable and accurate for dealingwith thin and high Q layers. Frequency bandwidth, especially the presence of high frequencies, influences the inversion effect of all three methods. The wider the band, the better the results. Q inversion from downgoing wavefield was very similar to that of the upgoing wavefield. The CFS method had fewer outliers or skip values from the full wavefield than the other two methods. Moreover, the applications to Q inversion for the set of field VSP data demonstrated that the Q curves from the CFS method coincided with the geological interpretations better than the Q curves of the other methods. Meanwhile, inverse Q filtering shifted the frequency component from 25 Hz to 35 Hz. The results demonstrated that the Q curve is more sensitive to geological horizons than velocity.

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WOS 号： 000532318100018

第 78 篇

标　　题： A Modified Multiple Matching Method Based On Equipoise Pseudomulti-Channel Filter And Huber Norm

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通讯作者： Wu, YT (corresponding author), Changan Univ, Sch Geol & Surveying & Mapping Engn, Xian 710064, Peoples R China.

期　　刊： COMMUNICATIONS IN COMPUTATIONAL PHYSICS

摘　　要： This study is aimed at improving multiple adaptive subtraction. We propose a modified pseudomulti-channel matching method based on the Huber norm, to adjust the matching differences on frequency and phase between the predicted multiples and original data. The second-order derivative of the predicted multiples is utilized to replace the derivative of its Hilbert transform. Due to the additional frequency term, this method can enhance the high-frequency component. We introduce 180. phase rotation of the multiple channels, which can decrease phase differences. The Huber norm interpolates between smooth L2 norm treatment of small residuals and robust L1 norm treatment of large residuals. This method can eliminate the restriction of large value conditions from the L2 norm and weaken the condition of orthogonality from the L1 norm. The applications of the Pluto and Delft models shows that compared with pseudomulti-channel matching filter, the main frequency is increased from 36 Hz to 38 Hz, and the primary reflection wave is more concentrated. The practical application of field data verifies the effectiveness of the proposed method.

DOI： 10.4208/cicp.OA-2018-0123

WOS 号： 000532318100025

第 79 篇

标　　题： Immersion Test Of Loess In Ground Fissures In Shuanghuaishu, Shaanxi Province,

China

作　　者：[Lu, Quanzhong; Liu, Yang; Peng, Jianbing; Li, Liang; Fan, Wen; Liu, Nina; Sun, Kai] Changan Univ, Sch Geol Engn & Geomat, Xian 710054, Peoples R China; [Lu, Quanzhong; Peng, Jianbing; Fan, Wen; Liu, Nina; Liu, Rendao] Changan Univ, Minist Educ, Key Lab Western Chinas Mineral Resources & Geol E, Xian 710054, Peoples R China

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期　　刊：BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要：The ground fissure of Shuanghuaishu in Shaanxi Province, China, is a tectonic ground fissure developed in the northern Loess Plateau of the Weihe Basin. Remarkably, it exhibits multiple activities under heavy rainfall conditions. To explore how heavy rainfall infiltration can induce ground fissures to reactivate, we conducted an in situ large-scale water immersion test on the ground fissure zone. Through measurement of soil moisture content and observation of subsidence and deformation of surface and soil layers at different depths before and after water immersion, we determined the variation law of soil moisture content and the humidification deformation of the ground fissure zone after rain infiltration. Results show that ground fissures destroy the structure of soil layers and form a certain width of influence zone, which allows surface water to seep through the fissure zone into the deep soil below the relative aquifuge. After water immersion, the deformation of the soil in the ground fissure zone is obviously larger than that in the non-fracture zone, the influence zone width of hanging wall of the ground fissure is larger than that of the footwall, and the influence range on the upper soil layer is larger than that on the lower soil layer.

DOI：10.1007/s10064-019-01718-5

WOS 号：000540841800008

第 80 篇

标　　题：Destructuration Of Saturated Natural Loess: From Experiments To Constitutive Modeling

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期　　刊：INTERNATIONAL JOURNAL OF DAMAGE MECHANICS

摘　　要：It has been well recognized that unsaturated natural loess shows significant volume contraction upon wetting due to its metastable internal structure. But the structural

effect on stress-strain relationship of saturated natural (undisturbed) loess is much less explored. Few attempts have been made in proposing a constitutive model for saturated natural loess. This study presents both laboratory tests and constitutive modeling of a saturated natural loess, with special focus on the structural effect and evolution of structure damage during loading. Oedometer and drained triaxial compression tests have been carried out on undisturbed and remolded saturated loess samples. It is found that the natural soil structure has dramatic influence on mechanical behavior of loess, including the compressibility, dilatancy, and shear strength. Destructuration, which is the damage of soil structure with deformation, is observed in both oedometer and triaxial tests. A constitutive model is proposed for saturated loess based on the experimental observations. The model is established within the theoretical framework of subloading and superloading surface concepts. Destructuration of loess is assumed to be affected by both plastic volumetric and shear strain. A new method for determining the initial degree of structure is proposed. The model can reasonably predict the compression and shear behavior of both undisturbed and remolded saturated loess.

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WOS 号： 000548561000001

第 81 篇

标　　题： The Study Of Road Deformation Induced By Ground Fissure In Xi'An, Central China

作　　者： [Fan, Wen; Peng, Xianglin; Deng, Longsheng; Jiang, Chengcheng] Changan Univ, Sch Geol Engn & Geomat, Xian 710054, Peoples R China; [Peng, Xianglin] China Nonferrous Met Ind Co Ltd, Xian Engn Invest & Design Res Inst, Xian 710054, Peoples R China; [Deng, Longsheng] Changan Univ, Key Lab Western Chinas Mineral Resources & Geol E, Minist Educ, Xian 710054, Peoples R China; [Deng, Longsheng] Changan Univ, Open Res Lab Geo Tech Engn, Minist Land & Resources, Xian 710064, Peoples R China

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期　　刊： ARABIAN JOURNAL OF GEOSCIENCES

摘　　要： Tremendous losses and threaten traffic safety were caused by ground fissures as it covers over half of the area of Xi'an, in China. This study summarizes the formation of ground fissures and found that variations in the dip angles and cross angles influence road deformation and cracking. Based on survey data, numerical simulation using MSC.MARC finite element software was conducted to analyze the impact of ground fissures on roads. The results show that the cross angle has a negative correlation with the deformation range and a positive correlation with the tensile and compressive stresses, plastic strain and shear stress. The dip angle has a negative correlation with the maximum tensile stress and plastic strain and a positive correlation with the vertical displacement of pavement, but it has little effect on the maximum compressive stress. It is recommended to take some engineering measures for prevention and treatment when road projects cross a ground fissure, such as avoiding ground fissures, changing the road structure, and establishing a monitoring system. These conclusions can serve as a

reference for structural design and preventative measures for roads passing through active ground fissure zones.

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WOS 号： 000555863200002

第 82 篇

标　　题： Prediction Of Loess Soil-Water Characteristic Curve By Mercury Intrusion Porosimetry

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通讯作者： Li, TL (corresponding author), Changan Univ, Dept Geol Engn, Xian 710054, Peoples R China.; Li, TL (corresponding author), Minist Educ, Observat & Res Stn Chinese Loess Plateau, Zhengning 745399, Peoples R China.

期　　刊： JOURNAL OF MOUNTAIN SCIENCE

摘　　要： Mercury intrusion porosimetry (MIP) is a simple and fast way to obtain the pore distribution of soil and can be used to estimate the soil-water characteristic curve (SWCC). In previous studies, soil was assumed to be a perfect wettability material, and the contact angle (CA) of the soil-water interface was taken as zero in the SWCC prediction method. However, the CA has proved to be much greater than zero even for hydrophilic soils according to some soil wettability experiments, and it has a significant effect on predicting the SWCC. In this research, a method for predicting the SWCC by MIP, which takes the CA as a fitting coefficient, is proposed. The pore size distribution curves are measured by MIP, and the SWCCs of two loess soils are measured by pressure plate and filter paper tests. When the CA is taken as 70 degrees and 50 degrees for the wetting and drying process, respectively, the SWCCs predicted by the pore size distribution curves agree well with the measured SWCCs. The predicted suction range of the proposed method is 0-10(5)kPa. The consistency of the results suggests that utilizing the MIP test to predict the SWCC with a proper CA is effective for loess.

DOI： 10.1007/s11629-019-5929-2

WOS 号： 000558778200001

第 83 篇

标　　题： Ground Deformation And Fissure Activity Of The Yuncheng Basin (China) Revealed By Multiband Time Series Insar

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期　　刊： ADVANCES IN SPACE RESEARCH

摘　　要： The Yuncheng Basin (China) is affected by severe land subsidence and ground fissure

hazards, which have caused serious land damage and economic losses to the local inhabitants. Due to the lack of long-term continuous monitoring in the region, the trend of land sub- sidence and fissure activities is unknown, which cannot meet requirements for disaster reduction and disaster prevention. In this study, Envisat ASAR, ALOS PALSAR, and TerraSAR-X are employed to monitor these hazards using time series InSAR methodology. The results showed that there were two obvious subsidence centers occurred in Yuncheng. Compared to the period from 2007 to 2011, the land subsidence rate in the Yuncheng Basin from 2012 to 2015 decreased significantly. Analysis of the differential deformation rate observed by InSAR between the two sides of the ground fissure indicates that fissure activity has weakened in recent years at the cross-section. To explain the phenomena observed by InSAR, FLAC3D was used to study the effect of pumping on ground fissure activ- ity under the condition of pre-existing faults, and the results show that pumping promotes differential activities between two sides of the fault and has a positive impact on the occurrence and the activity of ground fissures. Horizontal rectangular sill with uniform opening model is used to simulate the land subsidence and invert the pumping depth. The results are basically consistent with the local situation. (c) 2020 COSPAR. Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

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WOS 号： 000544178600002

第 84 篇

标　　题： The Impact Of Grain Characteristics On Acoustic Logging In Unconsolidated Sands

作　　者： [Yue, Chongwang; Yang, Zhi; Li, Yu] Changan Univ, Coll Geol Engn & Surveying, Xian 710054, Peoples R China; [Wang, Zhuwen] Jilin Univ, Coll Geoexplorat Sci & Technol, Changchun 130000, Peoples R China

通讯作者： Yue, CW (corresponding author), Changan Univ, Coll Geol Engn & Surveying, Xian 710054, Peoples R China.

期　　刊： INTERPRETATION-A JOURNAL OF SUBSURFACE CHARACTERIZATION

摘　　要： Characterizing acoustic propagation in unconsolidated sand reservoirs is critical in offshore oil and gas exploration. We have simulated the acoustic field in a borehole surrounded by granular media based on non-uniform contact, using a 2nd-order in time and 10th-order in space finite-difference technique. We focus on the impact of the porosity and coordination number, grain size, and grain scale distribution on acoustic logging. Numerical simulation results show that P- and S-wave velocities decrease with increasing the porosity or decreasing the coordination number and increase with increasing the grain size. For different grain size distributed in the vertical and radial directions, the velocity and amplitude of the P-wave and S-wave are different As reflected waves in a borehole, the arrival wave's velocity is higher and the amplitude is stronger, whereas grains near the source or borehole axis are larger. The results of this paper provide a reference for analyzing and predicting different graded bedding formations for acoustic logging.

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WOS 号： 000566709400034

第 85 篇

标　　题： Pavement Crack Detection From Mobile Laser Scanning Point Clouds Using A Time Grid

作　　者： [Zhong, Mianqing; Sui, Lichun; Hu, Dongming] Changan Univ, Coll Geol Engn & Geomat, Xian 710054, Peoples R China; [Wang, Zhihua] Chinese Acad Sci, State Key Lab Resources & Environm Informat Syst, Inst Geog Sci & Nat Resources Res, Beijing 100101, Peoples R China

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期　　刊： SENSORS

摘　　要： This paper presents a novel algorithm for detecting pavement cracks from mobile laser scanning (MLS) data. The algorithm losslessly transforms MLS data into a regular grid structure to adopt the proven image-based methods of crack extraction. To address the problem of lacking topology, this study assigns a two-dimensional index for each laser point depending on its scanning angle or acquisition time. Next, crack candidates are identified by integrating the differential intensity and height changes from their neighbors. Then, morphology filtering, a thinning algorithm, and the Freeman codes serve for the extraction of the edge and skeleton of the crack curves. Further than the other studies, this work quantitatively evaluates crack shape parameters: crack direction, width, length, and area, from the extracted crack points. TheF1 scores of the quantity of the transverse, longitudinal, and oblique cracks correctly extracted from the test data reached 96.55%, 87.09%, and 81.48%, respectively. In addition, the average accuracy of the crack width and length exceeded 0.812 and 0.897. Experimental results demonstrate that the proposed approach is robust for detecting pavement cracks in a complex road surface status. The proposed method is also promising in serving the extraction of other on-road objects.

DOI： 10.3390/s20154198

WOS 号： 000567245600001

第 86 篇

标　　题： Global Apparent Resistivity Definition For A High-Performance Tem Excitation Source

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期　　刊： JOURNAL OF GEOPHYSICS AND ENGINEERING

摘　　要： The high-performance transient electromagnetic method (TEM) excitation source is a new type of source that has been proposed for urban underground space exploration. This source is composed of two trapezoid plates. To ensure that the radiation field was focused in a certain direction, the two trapezoid plate-shaped antennas were arranged

into a horn shape. This new source is characterised by high power, directional excitation and high resolution. The corresponding multi-component global apparent resistivity definition method is established for a high-performance transient electromagnetic excitation source. This method is studied using the inverse function theorem. Then, the monotonic relationship between components of the electromagnetic field and resistivity is analysed. For the fields that satisfy the monotonic relationship with half-space resistivity, the apparent resistivity can be calculated correctly to ignore the time period and location in the space. This means that this definition method can eliminate the limitation of early and late times, and the near and far zones. The apparent resistivity calculation results of the theoretical layered model reveal that global apparent resistivity curves show a regular change, which smoothly and comprehensively reflects the change of electrical information in the model. The experimental results of the 3D model show that the five-layer low-resistivity anomaly contained in the urban underground space designed in this paper exhibits an obvious response in the global apparent resistivity profile. It is concluded that a high-performance TEM excitation source possesses a high resolution, clearly reflecting all of the anomalies of a complex urban underground space model.

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第 87 篇

标　　题： Prediction Model Of Thermal Thawing Sensibility And Thaw Depth For Permafrost Embankment Along The Qinghai-Tibet Engineering Corridor Using Modis Data

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期　　刊： JOURNAL OF SENSORS

摘　　要： The aim of this paper was to reveal the distribution law of permafrost thermal thawing sensibility and thaw depth caused by road construction in Qinghai-Tibet engineering corridor (QTEC). The prediction models of permafrost thermal thawing sensibility and thaw depth have been developed by incorporating the MODIS and in situ soil temperature observation data. The comprehensive earth-atmosphere-coupled numerical models of different embankment structures have been utilized to calculate the thaw depth of the underlying permafrost foundation. Finally, using the given data and above developed prediction models, the distribution maps of permafrost thermal thawing sensibility and thaw depth in QTEC are obtained by grid calculation. The results show the following: (1) Insensitive permafrost of QTEC mainly distributes in the large-scale mountain and high latitude area, and highly sensitive permafrost is located in the perennial river bed, flood plain, and terrace regions. (2) Road construction has a strong thermal disturbance to underlying permafrost, and the proportion of large thaw depth area of separate embankment is obviously smaller than that of 26 m full-width

embankment. (3) Increase of subgrade interval reduces the proportion of large thaw depth areas, and the application of separate embankment structure is an effective engineering means for the Qinghai-Tibet expressway.

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第 88 篇

标　　题： The Internal Erosion Process And Effects Of Undisturbed Loess Due To Water Infiltration

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期　　刊： LANDSLIDES

摘　　要： Internal erosion is a complex phenomenon that is one of the main risk factors to soil destruction. Its occurrence is mainly due to water infiltration and can cause slope instability. Karst soil is a type of loess with special soil and water sensitivity that makes it prone to landsliding. The processes of internal erosion include transport erosion and chemical dissolution, which strongly effect loess structure and strength. To reveal the internal processes and effects of the loess due to water infiltration, field investigations and indoor tests, including infiltration tests, undrained triaxial tests, particle analysis, chemical analysis, and scanning electron microscopy (SEM), were conducted. The results show that (1) the fine particles (clay and silt) and chemicals can move within the matrix of the macro-pores under seepage flow. The physical internal erosion is mainly due to fine particle migration out of the water and clay and silt particles, and the sample column settlement was 3.3 cm with a settlement ratio of 16.5%, which results in changes to the soil skeleton, increasing the porosity and infiltration rate of loess. (2) Chemical dissolution is also an important internal erosion process in loess, especially cations of Na, Mg, Ca, and K and anions of Cl, SO4, and CO3, which are mainly lost due to dissolution and flow out of with water and clay particles, resulting in altered physical characteristics of the soil. (3) Soil particles' mitigation and chemical dissolution change the loess structure, leading to skeletal destruction and decreased peak strength and residual strength of the infiltrated sample to 7.75% and 8.13%, respectively. During internal erosion, physical fine particle migration and chemical dissolution are important for loess stability and loess slope susceptible to failure during water infiltration.

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第 89 篇

标　　题： Assessment For Thermal Conductivity Of Frozen Soil Based On Nonlinear Regression And Support Vector Regression Methods

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：The comprehensive understanding of the variation law of soil thermal conductivity is the prerequisite of design and construction of engineering applications in permafrost regions. Compared with the unfrozen soil, the specimen preparation and experimental procedures of frozen soil thermal conductivity testing are more complex and challengeable. In this work, considering for essentially multiphase and porous structural characteristic information reflection of unfrozen soil thermal conductivity, prediction models of frozen soil thermal conductivity using nonlinear regression and Support Vector Regression (SVR) methods have been developed. Thermal conductivity of multiple types of soil samples which are sampled from the Qinghai-Tibet Engineering Corridor (QTEC) are tested by the transient plane source (TPS) method. Correlations of thermal conductivity between unfrozen and frozen soil has been analyzed and recognized. Based on the measurement data of unfrozen soil thermal conductivity, the prediction models of frozen soil thermal conductivity for 7 typical soils in the QTEC are proposed. To further facilitate engineering applications, the prediction models of two soil categories (coarse and fine-grained soil) have also been proposed. The results demonstrate that, compared with nonideal prediction accuracy of using water content and dry density as the fitting parameter, the ternary fitting model has a higher thermal conductivity prediction accuracy for 7 types of frozen soils (more than 98% of the soil specimens' relative error are within 20%). The SVR model can further improve the frozen soil thermal conductivity prediction accuracy and more than 98% of the soil specimens' relative error are within 15%. For coarse and fine-grained soil categories, the above two models still have reliable prediction accuracy and determine coefficient (R-2) ranges from 0.8 to 0.91, which validates the applicability for small sample soils. This study provides feasible prediction models for frozen soil thermal conductivity and guidelines of the thermal design and freeze-thaw damage prevention for engineering structures in cold regions.

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第 90 篇

标　　题：An Extension Of Taylor'S Phi-Circle Method And Some Stability Charts For Submerged Slopes

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Taylor's phi-circle method is a classical method for slope stability calculation, which has analytical solutions. Taylor derived equations in two cases separately, namely, (i) the outlet of the critical failure surface is at the slope toe and (ii) the outlet of the failure surfaces is not at the slope toe. The method is only appropriate for two conditions (without underground water table in slopes or totally submerged slopes). In this study, a general equation that unifies the equations of the two cases is proposed and partially submerged condition is introduced. The critical failure surfaces corresponding to the minimum factor of safety are determined using the computer program proposed by the authors. The general expression of the safety factor of slopes under the following four conditions is derived, namely, (i) partly submerged, (ii) completely submerged, (iii) water sudden drawdown, and (iv) water slow drawdown. The corresponding charts for practical use are available.

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第 91 篇

标　　题： Characterization And Evolution Of Three-Dimensional Microstructure Of Malan Loess

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期　　刊： CATENA

摘　　要： Loess is an aeolian, nonstratified deposit. Loess collapsibility is considered to be closely related to its microstructure. The three-dimensional (3D) microstructure of loess specimens was established based on serial X-ray computed tomography (CT) images with a voxel size of 1 mu m(3). The loess microstructure and parameters, including the particle size, sphericity, and orientation and pore size distribution were characterized qualitatively and quantitatively in 3D space. In addition, the microstructural evolution during collapse based on the 3D microstructure was also analyzed to interpret the mechanism of loess collapse combined with X-ray diffraction and scanning electron microscopy results. The results highlight that loess collapsibility originates from both microstructural and compositional characteristics. The studied loess has an open structure with widely distributed spaced pores and inter-particle or inter-aggregate pores. Brick-shaped and subangular particles with tilted orientations and point-to-point contacts maintain a vulnerable, metastable structure. Carbonate and clay aggregations between particles endow the loess with a high strength in the natural state. Under loading and wetting, the swelling and dispersion of clay aggregation, particularly the

degraded illite and interstratified illite - montmorillonite, and the loss of high suction initiate structural failure. During collapse, particles primarily move down in a vertical or tilted direction with little rotation. Pores are most sensitive to loading and wetting; during collapse, the distributions of the pore number and volume percentage become more unimodal. The pore connectivity becomes weaker. Pores larger than 23 mu m decrease in pore number under wetting, and pores larger than 26 mu m decrease in volume percentage.

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第 92 篇

标　　题： Standardized Object-Based Dual Cnns For Very High-Resolution Remote Sensing Image Classification And Standardization Combination Effect Analysis

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期　　刊： INTERNATIONAL JOURNAL OF REMOTE SENSING

摘　　要： Advances in the object-based convolutional neural network (CNN) have demonstrated the superiority of CNNs for image classification. However, any object-based CNN, regardless of its model structure, only stacks the square images with different scales when extracting features. The impact of background information around the segmented object (the number of pixels around the segmented object) for the classification accuracy is neglected. In addition, blurred object boundaries and feature representation, as well as huge computational redundancy, restrict the application for very high-resolution remote sensing image (VHRI) classification. To solve these problems, a novel standardized object-based dual CNN (SOD-CNN) is proposed for VHRI classification. First, based on geographic object-based image analysis, the image is segmented into homogeneous regions. Second, these less-segmented objects are over-segmented into superpixels with high compactness to provide crisp and accurate boundary delineation at the pixel level. Third, four standardization methods are developed to limit the number of pixels around the segmented object. The standardized less-segmented object and over-segmented object are fed into two different CNNs to capture different perspectives of features at local and global scales. Finally, feature fusion based on the full connection is performed to integrate the class-specific classification results. The effectiveness of the proposed method was verified by using two VHRI, which achieved excellent classification accuracy, consistently outperforming the benchmark comparisons. The overall and per-class classification accuracy was investigated under different standardization combinations. We found that (1) the proposed standardization method not only reduced redundancy of information in the object-based CNN but also highlighted the features of segmented objects; (2) different segmented objects had different optimal standardization combinations; and (3) the classification accuracy was reasonably controlled by the foundation number of

training samples.

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第 93 篇

标　　题： On The Relationship Between Soil Strength And Wave Velocities Of Sandy Loess Subjected To Freeze-Thaw Cycling

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期　　刊： SOIL DYNAMICS AND EARTHQUAKE ENGINEERING

摘　　要： The impact of freeze-thaw cycling on freshly exposed loess is a major concern in design and construction of embankments or earth dams in the Loess Plateau in China. Due to complex nature of loess as compared with the conventional soils such as sand or clay, characterizing the strength of loess to account for this impact is challenging, in particular in the field conditions. In previous research a systematic approach in this regard is still lacking. This paper presents an investigation into the problem through well-controlled experiments using a pair of bender/extender elements. The shear wave (S-wave) velocities and the compression wave (P-wave) velocities were both measured on loess specimens subjected to freeze-thaw cycling. Under otherwise similar conditions, the unconfined compression tests were carried out to evaluate the soil strength of original loess and those with different fractions of add-in quartz sands. Several influence factors including the numbers of freeze and thaw cycles, the sand content and the water content were analyzed in a collective manner to characterize the changes of the unconfined compressive strength (UCS) of loess and the associated wave velocities. It was found that as the number of freeze-thaw cycles increases, the wave velocities of loess decrease. A clear difference in the magnitude of wave velocity was observed in the original loess samples due to the freeze-thaw cycling, whereas the discrepancies were less evident for the loess with higher sand contents. Based on the test results, exponential relationships were established respectively for the S wave and P wave velocities against the UCS values of the tested materials. Discussions were highlighted on whether the wave velocity can be used as an indicator to evaluate the UCS value of loess.

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第 94 篇

标　　题： Fast Forward Modeling Of The 3D Land Controlled-Source Electromagnetic Method Based On Model Reduction

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期　　刊：CHINESE JOURNAL OF GEOPHYSICS-CHINESE EDITION

摘　　要：The main bottleneck of fast forward modeling of 3-D land controlled-source electromagnetics based on the finite element method lies in solving multi-frequency large-scale sparse equations. In this paper, a Krylov subspace projection algorithm based on model reduction is introduced, a model reduction form of the finite element stiffness matrix is derived, and a frequency domain transfer function is constructed. A standard orthogonal vector sequence is used to construct a matrix that is much smaller than the finite element stiffness matrix, which is unrelated to frequency. Through model reduction, it is possible to quickly solve these multiple frequency finite element equations. The variational equation based on the electric field is used, and divergence correction conditions are added to eliminate spurious solutions. The pseudo-delta function is introduced to eliminate the singularity of the source point, which can be applied to 3D finite element numerical simulation of complex models. Such an algorithm may be regarded as the basic principle for a solution to the problem of multiple sources. Using the analytical solution of the layered medium model as the standard, comparison shows that the averaged percentage computing error of the proposed method is 1. 72%. Compared with the 3DFEM algorithm using the Pardiso direct solver, the CPU time consumption of the proposed method is reduced by 1/10 of the original one. Therefore, with a required accuracy, it is possible to achieve highly efficient 3-D finite element numerical solutions. In the numerical simulation, with the horizontal and vertical high-low resistance models, we analyze the changes of the electric field and the Cagniard apparent resistivity from the near to the far region, the performance characteristics of false extremes, and the effects of shadow effects, which verify the correctness of the proposed algorithm. Finally, we apply the proposed algorithm to simulation of a stratum collapse column model. The results show that the apparent resistivity cross section looks like a sag above the collapse column, which is consistent with the model design, and further indicates that the proposed algorithm can be applied to real complex geoelectric structure.

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第 95 篇

标　　题：Co-Seismic And Post-Seismic Temporal And Spatial Gravity Changes Of The 2010 Mw 8.8 Maule Chile Earthquake Observed By Grace And Grace Follow-On

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期　　刊：REMOTE SENSING

摘　　要：The Gravity Recovery and Climate Experiment (GRACE) and GRACE Follow-on (GRACE-FO) satellites are important for studying regional gravitational field changes caused by strong earthquakes. In this study, we chose Chile, one of Earth's most active

seismic zones to explore the co-seismic and post-seismic gravitational field changes of the 2010 Mw 8.8 Maule earthquake based on longer-term GRACE and the newest GRACE-FO data. We calculated the first-order co-seismic gravity gradient changes (GGCs) and probed the geodynamic characteristics of the earthquake. The earthquake caused significant positive gravity change on the footwall and negative gravity changes on the hanging wall of the seismogenic fault. The time series of gravity changes at typical points all clearly revealed an abrupt change caused by the earthquake. The first-order northern co-seismic GGCs had a strong suppressive effect on the north-south strip error. GRACE-FO results showed that the latest post-seismic gravity changes had obvious inherited development characteristics, and that the west coast of Chile maybe still affected by the post-seismic effect. The cumulative gravity changes simulated based on viscoelastic dislocation model is approximately consistent with the longer-term GRACE and the newest GRACE-FO observations. Our results provide important reference for understanding temporal and spatial gravity variations associated with the co-seismic and post-seismic processes of the 2010 Maule earthquake.

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第 96 篇

标　　题： Resistivity-Depth Imaging With The Airborne Transient Electromagnetic Method Based On An Artificial Neural Network

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期　　刊： JOURNAL OF ENVIRONMENTAL AND ENGINEERING GEOPHYSICS

摘　　要： We developed an artificial neural network to map the distribution of geologic conductivity in the earth subsurface using the airborne transient electromagnetic method. The artificial neural network avoids the need for complex derivations of electromagnetic field formulas and requires only input and transfer functions to obtain a quasi-resistivity image. First, training sample set from the airborne transient electromagnetic response of homogeneous half-space models with different resistivities was formed, and net work model parameters, including the flight altitude, time constant, and response amplitude, were determined. Then, a double-hidden-layer back-propagation (BP) neural network was established based on the mapping relationship between quasi-resistivity and airborne transient electromagnetic response. By analyzing the mean square error curve, the training termination criterion of the BP neural network was determined. Next, the trained BP neural network was used to interpret the airborne transient electromagnetic responses of various typical layered geo-electric models, and the results were compared with that from the all-time apparent resistivity algorithm. The comparison indicated that the resistivity imaging from the BP neural network approach was much closer to the true resistivity of the model, and the response to anomalous bodies was better than that from an all-time apparent resistivity. Finally, this imaging technique was used to process field data acquired by employing

the airborne transient method from the HuaYin survey area. Quasi-resistivity depth sections calculated with the BP neural network and the actual geological situation were in good.

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第 97 篇

标　　题： Laboratory Investigation Of The Mechanical Properties Of A Rubber-Calcareous Sand Mixture: The Effect Of Rubber Content

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： This paper introduces a rubber-calcareous sand mixture as a lightweight building material in offshore engineering. The mechanical properties of mixtures of varying rubber contents were investigated by performing a one-dimensional (1-D) compression test in a modified oedometer cell, as well as a resonant column test. A discussion on the test results, along with detailed interpretations regarding the role of rubber chips in the mixtures, are provided. It was found that the virgin compression curves of the rubber-calcareous sand mixtures tended to converge at a certain stress level, whilst the stress level depended on the rubber content. Moreover, the relative breakage was examined by comparing the particle size distribution curves of the calcareous sand before and after the compression test. It was shown that the grain crushing of calcareous sand was less remarkable with the inclusion of rubber chips. Furthermore, the small strain shear modulus (G(0)) of the mixtures decreased with the rubber content, yet the modulus reduction and damping curves exhibited little difference for the specimens of varying rubber contents.

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第 98 篇

标　　题： Dynamic Mechanical Properties And Visco-Elastic Damage Constitutive Model Of Freeze-Thawed Concrete

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期　　刊： MATERIALS

摘　　要：To study the dynamic mechanical characteristics and constitutive relation of concrete materials under freeze-thaw (FT) cycle conditions, C35 concrete was taken as the research object in this paper, and FT tests were carried out with a freeze-thaw range of -20-20 degrees C and a freeze-thaw frequency up to 50 times. By using the separated Hopkinson pressure bar (SHPB) system, impact compression tests of concrete specimens under different FT cycle actions were developed, then the dynamic fracture morphology, fracture block distribution, stress-strain curve, peak stress and other dynamic mechanical properties of concrete were analyzed, and the influence law of FT action and strain rate was obtained. Through introducing the freeze-thaw deterioration damage factor and the stress damage variable, the dynamic visco-elastic damage constitutive equation of freeze-thawed concrete was constructed based on component combination theory. Furthermore, the damage evolution process and mechanism of freeze-thawed concrete materials were revealed. The research results show that the dynamic mechanical properties of concrete under a freeze-thaw environment are the combined results of the freeze-thaw deterioration effect and the strain rate strengthening effect. The dynamic visco-elastic damage constitutive model established in this paper can effectively describe the dynamic mechanical properties of freeze-thawed concrete, and has the characteristics of few parameters and good effect. The stress damage evolution path of concrete goes backward with the increase of FT cycles and the development speed gradually slows down. The greater the difference in FT cycles, the greater the difference in stress damage path.

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第 99 篇

标　　题：The Impacts Of The Covid-19 Lockdown On Air Quality In The Guanzhong Basin, China

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期　　刊：REMOTE SENSING

摘　　要：The Corona Virus Disease 2019 (COVID-19) appeared in Wuhan, China, at the end of 2019, spreading from there across China and within weeks across the whole world. In order to control the rapid spread of the virus, the Chinese government implemented a national lockdown policy. It restricted human mobility and non-essential economic activities, which, as a side effect, resulted in the reduction of the emission of pollutants and thus the improvement of the air quality in many cities in China. In this paper, we report on a study on the changes in air quality in the Guanzhong Basin during the COVID-19 lockdown period. We compared the concentrations of PM2.5, PM10, SO2, NO2, CO and O(3)obtained from ground-based monitoring stations before and after the

COVID-19 outbreak. The analysis confirmed that the air quality in the Guanzhong Basin was significantly improved after the COVID-19 outbreak. During the emergency response period with the strictest restrictions (Level-1), the concentrations of PM2.5, PM10, SO2, NO(2)and CO were lower by 37%, 30%, 29%, 52% and 33%, respectively, compared with those before the COVID-19 outbreak. In contrast, O(3)concentrations increased substantially. The changes in the pollutant concentrations varied between cities during the period of the COVID-19 pandemic. The highest O(3)concentration changes were observed in Xi'an, Weinan and Xianyang city; the SO(2)concentration decreased substantially in Tongchuan city; the air quality had improved the most in Baoji City. Next, to complement the sparsely distributed air quality ground-based monitoring stations, the geographic and temporally weighted regression (GTWR) model, combined with satellite observations of the aerosol optical depth (AOD) and meteorological factors was used to estimate the spatial and temporal distributions of PM(2.5)and PM(10)concentrations with a resolution of 6 km x 6 km before and after the COVID-19 outbreak. The model was validated by a comparison with ground-based observations from the air quality monitoring network in five cities in the Guanzhong Basin with excellent statistical metrics. For PM(2.5)and PM(10)the correlation coefficients R(2)were 0.86 and 0.80, the root mean squared errors (RMSE) were 11.03 mu g/m(3)and 14.87 mu g/m(3)and the biases were 0.19 mu g/m(3)and -0.27 mu g/m(3), which led to the conclusion that the GTWR model could be used to estimate the PM concentrations in locations where monitoring data were not available. Overall, the PM concentrations in the Guanzhong Basin decreased substantially during the lockdown period, with a strong initial decrease and a slower one thereafter, although the spatial distributions remained similar.

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第 100 篇

标　　题： New Method For Estimating Roughness Coefficient For Debris Flows

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期　　刊： WATER

摘　　要： Flow resistance is a fundamental control of flow hydraulics in streams and rivers. In this paper, five dimensionless factors affecting the Manning roughness coefficient n and attributed to the external roughness coefficient n(1) and the internal roughness coefficient n(2) were analyzed comprehensively. And then, dimensionless factors affecting n(1) and n(2) with precise physical meanings were proposed. With a calculation method for roughness coefficient fitted and analyzed based on observation data from published research papers, the analysis results showed that the external resistance coefficient is closely related to the dimensionless factor D-84/R. The correlation between the dimensionless factor (D-16/D-50) and the internal roughness

coefficient n(2) was not significant. While the factors H/D-50, J, and S-v showed significant correlation. In addition, the expression of external roughness n(1) is calibrated based on the observation data of 102 cross-sections listed in previous works, while the internal roughness n(2) is calibrated by 20 experimental model tests. Finally, an equation describing the Manning's roughness coefficient is presented and verified based on 24 groups of observation data from Dongchuan Debris Flow Observation Station (DDFORS) in China. This study is contributing toward a comprehensive model for the Manning coefficient, which provide a scientific reference for the research on disaster prevention and mitigation of debris flow.

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WOS 号： 000582462100001

第 101 篇

标　　题： Investigation On Mining Subsidence Based On Sentinel-1A Data By Sbas-Insar Technology-Case Study Of Ningdong Coalfield, China

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期　　刊： EARTH SCIENCES RESEARCH JOURNAL

摘　　要： Ground deformation characterization was difficult to obtain over large spatial areas before the invention of the Satellite radar interferometry (InSAR) technique. Especially underground mining in the Loess Plateau of China, it causes large-scale ground damage within a short period of time. A small baseline subset (SBAS) algorithm can overcome some limitations of InSAR technology, such as temporal decorrelation, spatial decorrelation, and atmospheric delay. In this study, SBAS-InSAR technology was applied to process 19 scenes of Sentinel-1A data in Ningdong Coalfield, China. We investigated and analyzed the mining subsidence status from March 2015 to June 2016. 'There are 6 ground deformation areas in the cumulative subsidence maps, and the maximum cumulative subsidence value is -178cm distributed in the Renjiazhuang mining area during this period. The deformation rate map shows that the maximum deformation rate was -117cm/year. GPS data above the working tunnel was collected in six mining areas in Shigouyi. The subsidence value of SBAS data is consistent with GPS observation station data. The results reveal the evolution process of subsidence in mining subsidence and are helpful to the early warning of the mine disaster.

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WOS 号： 000600896900014

第 102 篇

标　　题： Pre- And Postcollapse Ground Deformation Revealed By Sar Interferometry: A Case Study Of Foshan (China) Ground Collapse

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期　　刊：JOURNAL OF SENSORS

摘　　要：On the evening of 7 February 2018, a deadly collapse of a metro tunnel under construction in the Southern China city of Foshan caused 11 deaths, 8 injuries, and 1 missing person. For disaster prevention and mitigation, the spatiotemporal ground deformations before and after the collapse event were derived from 55 Sentinel-1A synthetic aperture radar (SAR) images spanning from March 2017 to January 2019. The results showed that prominent ground subsidence in the shape of a funnel with a maximum rate of 42 mm/year was observed in the vicinity of the collapse area before the accident. After the accident, the area and magnitude of subsidence decreased compared with precollapse subsidence. This decrease is related to the progress of tunnel excavation and groundwater changes. In the temporal domain, continuous subsidence was observed over a year before and after the accident, and accelerated subsidence appeared one month before the collapse accident. Soft soil consolidation and tunnel-induced soil losses were the main reasons for the subsidence over the study area. The leakage of groundwater accounted for the collapse event. The leaked groundwater eroded the soil, resulting in the formation of an arched hole. The connection between the arched hole and the tunnel reduced the bearing capacity of the soil layer above the arched hole, triggering the collapse event. The findings provide scientific evidence for future collapse monitoring and early warning due to tunnel excavation.

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第 103 篇

标　　题：Characteristics And Genesis Mechanism Of Ground Fissures In Taiyuan Basin, Northern China

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期　　刊：ENGINEERING GEOLOGY

摘　　要：Since the 1980s, ground fissures in the Taiyuan Basin have experienced blowouts, resulting in a significant but hidden danger to cities in the Basin. This paper describes

the plane and damage characteristics of the ground fissures based on the findings of field investigations and mapping. Most ground fissures in the Basin were determined as linear with pinch-out reappearances on the surface. They were characterized by both horizontal tension with maximum widths and vertical offsets of up to 40 and 15 cm, respectively. The ground fissure strikes in the Basin were observed to be consistent with those of nearby active faults and the long-axis direction of the groundwater depression funnel. The roads and houses that lie across the fissures were determined to be the most affected by ground-fissure disasters in the Basin. The primary damage modes for the roads were vertical offset and surface collapse, whereas buildings experienced foundation failure and tensile damage. Profiles obtained through geological drilling and trench exploration further revealed obvious tension and synsedimentary characteristics of the ground fissures correlated with existing faults. Correlation analysis shows that the formation of ground fissures in Taiyuan Basin is mainly related to faults and excessive groundwater extraction. Theoretical analysis revealed that the size and activity of ground fissures in the Basin were positively correlated with four factors-the dip of faults in an area, regional tensile stress, difference between the thicknesses of aquifers on either side of a fault, and groundwater exploitation. The significant increase in ground fissure activity since the 1980s mainly reflects uncontrolled groundwater discharge. Hence, prevention of excessive groundwater exploitation in the Basin would mitigate the destructive effects of the ground fissures.

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WOS 号： 000560722900009

第 104 篇

标　　题： Determination And Influence Of The Unified Strength Theory Parameter For Loess

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期　　刊： ENVIRONMENTAL EARTH SCIENCES

摘　　要： The parameter b of the unified strength theory was set to depict the contribution of the intermediate principal stress on the failure of materials. A large number of true triaxial tests were carried out to determine the values and variation in the parameter b for loess, with which the effect of b on the estimation of the stability for a typical loess slope was then studied. The unified strength theory could be applied to fit the experimental failure loci of loess better than the traditional strength theories. The value of the parameter b greatly depends on the stratum age, remolding state, dry unit mass (dr) and water content (w) of the loess, and the appropriate value decreases with increasing dr and w. The value of b for the undisturbed Malan loess (L1) is much greater than that for the Lishi loess (L2). Comprehensively, the range of b=0.2-0.5 is recommended to obtain the empirical value of the loess, with which the factor of stability (FOS) for the loess

slope can be estimated with a 5-15% increase compared to that when applying the Mohr-Coulomb failure law.

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WOS 号： 000574654300008

第 105 篇

标　　题： A Tale Of Two Cities: Different Urban Heat Mitigation Efficacy With The Same Strategies

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期　　刊： THEORETICAL AND APPLIED CLIMATOLOGY

摘　　要： Recent intensification of urban heat islands (UHIs) poses a great threat to public health, promoting studies on UHI mitigation strategies. However, the question about the transferability of a mitigation method from a specific city to another remains largely unanswered. This study compares common UHI mitigation strategies (including green roofs, cool roofs, and changing urban building structure) for two Chinese megacities suffered from summer heat stress: Xi'an with a semi-humid climate and Wuhan with a humid climate, through the use of the urbanized-high-resolution land data assimilation system (u-HRLDAS) modeling tool and remote-sensing data. The results reveal that (1) all UHI mitigation strategies work more efficiently for Xi'an than that for Wuhan, particularly for the strategy of modifying urban fraction and associated green roof fraction; (2) the difference in cooling efficacy between the two cities is insignificant during relatively cool periods. Under hot weather conditions, the best choice of UHI mitigation strategy depends on urban land use categories in Xi'an; and (3) the differences in UHI mitigation efficacy are likely caused by the differing regional climate. This study highlights the need to better understand the transferability of UHI mitigation strategies in different climate zones.

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WOS 号： 000574104800001

第 106 篇

标　　题： 3-D Full-Time Tem Modeling Using Shift-And-Invert Krylov Subspace Method

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期　　刊： IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING

摘　　要： The 3-D time-domain electromagnetic (TEM) modeling is computationally expensive. Shift-and-invert (SAI) Krylov subspace technique has proved efficient for the modeling of OFF-time TEM data. However, the ON-time data, which also involves useful Earth

conductivity information, have not been well treated. In this article, we extend the SAI Krylov subspace method to deal with the ON-time data and obtain a complete algorithm for modeling of the full-time data. To deal with the ON-time problem, while retaining the whole framework of an SAI-style method, we have developed a new time integration method, based on the exponential trapezoidal rule, to help discrete the integral terms into matrix exponential function. Next, the solution of this matrix exponential function is obtained by constructing a new type of SAI Krylov subspaces. Numerical results for typical transmitting waveforms, such as half-sine, versatile-time-domain-electromagnetic (VTEM), and MULTIPULSE, demonstrate that the novel algorithm is accuracy for full-time TEM modeling.

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WOS 号： 000573923100025

第 107 篇

标　　题： Three-Dimensional Time Series Movement Of The Cuolangma Glaciers, Southern Tibet With Sentinel-1 Imagery

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期　　刊： REMOTE SENSING

摘　　要： Many debris-covered glaciers are broadly distributed across High Mountain Asia and have made a number of contributions to water circulation for Qinghai-Tibet Plateau (QTP). The formation of large supraglacial lakes poses risks for glacier lake outburst floods (GLOFs). Therefore, it is important to monitor the movement of glaciers and to analyze their spatiotemporal characteristics. In this study we take Cuolangma glaciers in the central Himalayas as study targets, where glacier No.1 is a lake-terminating debris-covered glacier and glacier No.2 is a land-terminating debris-covered glacier. The 3D deformation time series is firstly estimated by using the Pixel Offset-Small Baseline Subsets (PO-SBAS) based on the ascending and descending Sentinel-1 datasets spanning from January to December 2018. Then the horizontal and vertical time series displacements are obtained to show their spatiotemporal features. The velocities of glacier No.1 in horizontal and vertical direction were up to 16.0 +/- 0.04 m/year and 3.4 +/- 0.42 m/year, respectively, and the ones of the glacier No.2 were 12.0 +/- 0.07 m/year and 2.0 +/- 0.27 m/year, respectively. Next, the correlation between the precipitation and the surface velocity suggests that the glacier velocity does not show a clear association with daily precipitation alone. Finally, the debris-covered glaciers

evolution is evaluated which shows that the tongue of the glacier No.1 is wasting away and the transition of glacier No.2 from land-terminating to lake-terminating is a probable scenario in the later period of glacier wastage. This research can significantly serve for glacier multidimensional monitoring and the mitigation of hazardous disaster caused by debris-covered glaciers in the central Himalayas.

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WOS 号： 000585555400001

第 108 篇

标　　题： Inversion And Distribution Of Total Suspended Matter In Water Based On Remote Sensing Images-A Case Study On Yuqiao Reservoir, China

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期　　刊： WATER ENVIRONMENT RESEARCH

摘　　要： In this paper, Yuqiao Reservoir is taken as the research object. The total suspended matter (TSM) produced by the economic development in the upper reaches of the reservoir and its surrounding areas has brought great ecological harm to the safe operation of the reservoir. Satellite remote sensing technology provides a good way to obtain the temporal and spatial variation of TSM in the study area. Two field surveys were carried out in the Yuqiao Reservoir, a total of 44 sampling points collected in the two tests. The spectral data and concentration of TSM were obtained. We developed and validated a robust empirical model to estimate the concentration of TSM in the water of the Yuqiao Reservoir for the first time. The TSM distribution map of the Yuqiao Reservoir in 2013-2018 is retrieved based on Landsat 8 OLI images. This paper analyzes the spatial distribution characteristics of TSM concentration in the Yuqiao Reservoir for several years, as well as the interannual, seasonal, and monthly variation laws and development trends. The results show that the spatial distribution of TSM in Yuqiao Reservoir shows a decreasing trend from the periphery to the center; the interannual changes are mainly as follows: The annual change trend of TSM in Yuqiao Reservoir is not obvious; the seasonal changes are significant: the highest in summer (higher than 40 mg/L), the second in autumn, and the lowest in spring and winter (lower than 15 mg/L); and the monthly changes show regular fluctuations: In a year cycle, the concentration of TSM generally shows an inverted V-shaped trend; that is, TSM increases gradually from January to August and decreases gradually from August to December. The research results of this paper can be applied to other similar types of land water bodies, which will promote the wide application of Landsat 8 OLI images in the monitoring of TSM in lakes, rivers, and reservoirs in different regions across China, and provide data support for the scientific management of the safe operation of research areas. Practitioner points The monitoring model of TSM in Yuqiao Reservoir was built for the first time. Temporal and spatial analysis of TSM concentration in Yuqiao Reservoir for the first time. The concentration of TSM is in Yuqiao Reservoir greatly

affected by wind speed and precipitation.

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第 109 篇

标　　题： Study On A New Rock Fracability Evaluation Model Of Shale Gas Reservoir

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期　　刊： GEOFLUIDS

摘　　要： Shale gas is an important unconventional energy resource that needs large-scale fracturing to form industrial deliverability. The evaluation of reservoir fracability plays a key role in the optimization of the sweet spot, the design of multistage fracturing, and the prediction of economic benefit. Based on volumetric fracturing, the study proceeded from the fracture complexity of the fractured core, and the bursting pressure experiment technology using the constant strain rate method was established. After the core has fractured, the fracture morphology was extracted and the fracture parameters including fracture area ratio and fracture declination dispersion were calculated to construct the fracture complexity of the pressed core. Combined with the core strength, the fracability index of the core was determined to evaluate the reservoir fracability. This method can represent not only the fracturing effect but also the fracturing difficulty. Compared with the monitoring data of hydrofracture-induced microseism of the sample well, the core fracturing index was found to be in good agreement with the actual fracturing effect. This method is more reasonable than the traditional brittleness index method and rock mechanics parameter method.

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WOS 号： 000591545100001

第 110 篇

标　　题： Spatiotemporal Characterization Of Land Subsidence In Guandu (China) Revealed By Multisensor Insar Observations

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期　　刊： JOURNAL OF SENSORS

摘　　要： Excessive groundwater exploitation has brought about severe ground subsidence in Guandu (China), threatening the stability of urban infrastructure. Mapping of the spatiotemporal variations of ground deformation is urgently needed for disaster prevention and mitigation. In this study, multisensor interferometric synthetic aperture radar (InSAR) observations were applied to Guandu to derive the time series

deformation from 2007 to 2019. The annual deformation velocity revealed three severe subsiding regions in Guandu. Based on the ascending and descending Sentinel-1 images with overlapping temporal and spatial coverage, two-dimensional vertical and horizontal east-west deformation was calculated and indicated that the deformation in Guandu was dominated by vertical direction. After connecting the multisensor results, long-term ground deformation spanning from January 9, 2007, to September 1, 2019, was produced and showed that the north subsiding region experienced fast followed by slow subsidence, whereas the south subsiding region experienced slow followed by fast subsidence. This difference was due to the changes of groundwater pumping centers and rates. The cumulative maximum subsidence reached 400 mm during the period of 2007-2019. The similar variations in temporal domain between the change of groundwater level and ground deformation suggested that groundwater exploitation accounted for the severe subsidence in Guandu. Our results may provide scientific evidence regarding the sound management of groundwater exploitation to mitigate potential damage to infrastructure and the environment.

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第 111 篇

标　　题： Modeling 3D Acoustic-Wave Propagation Using Modified Cuboid-Based Staggered-Grid Finite-Difference Methods With Temporal And Spatial High-Order Accuracy

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期　　刊： STUDIA GEOPHYSICA ET GEODAETICA

摘　　要： To improve the modeling accuracy and adaptability of traditional temporal second-order staggered-grid finite-difference (SFD) methods for 3D acoustic-wave modeling, we propose a modified time-space-domain temporal and spatial high-order SFD stencil on a cuboid grid. The grid nodes on a double-pyramid stencil and the standard orthogonality stencil are used to approximate temporal and spatial derivatives. This stencil can adopt different grid spacing in each spatial axis, and thus it is more flexible than the existing one with the same grid spacing. Based on the time-space-domain dispersion relation, the high-order FD coefficients are generated by using Taylor expansion and least squares. Numerical analyses and modeling examples demonstrate that our proposed schemes have higher accuracy and better stability than other conventional schemes, and thus larger time steps can be used to improve the computational efficiency in 3D case.

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WOS 号： 000583971700002

第 112 篇

标　　题：Post-Seismic Deformation Mechanism Of The July 2015 Mw 6.5 Pishan Earthquake Revealed By Sentinel-1A Insar Observation

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期　　刊：SCIENTIFIC REPORTS

摘　　要：On 3 July 2015, the Mw 6.5 Pishan earthquake occurred at the junction of the southwestern margin of the Tarim Basin and the northwestern margin of the Tibetan Plateau. To understand the seismogenic mechanism and the post-seismic deformation behavior, we investigated the characteristics of the post-seismic deformation fields in the seismic area, using 9 Sentinel-1A TOPS synthetic aperture radar (SAR) images acquired from 18 July 2015 to 22 September 2016 with the Small Baseline Subset Interferometric SAR (SBAS-InSAR) technique. Postseismic LOS deformation displayed logarithmic behavior, and the temporal evolution of the post-seismic deformation is consistent with the aftershock sequence. The main driving mechanism of near-field post-seismic displacement was most likely to be afterslip on the fault and the entire creep process consists of three creeping stages. Afterward, we used the steepest descent method to invert the afterslip evolution process and analyzed the relationship between post-seismic afterslip and co-seismic slip. The results witness that 447 days after the mainshock (22 September 2016), the afterslip was concentrated within one principal slip center. It was located 5-25 km along the fault strike, 0-10 km along with the fault dip, with a cumulative peak slip of 0.18 m. The 447 days afterslip seismic moment was approximately 2.65 x 10(17) N m, accounting for approximately 4.1% of the co-seismic geodetic moment. The deep afterslip revealed that a creeping process from steady-state secondary creeping to accelerating tertiary creep in the deep of fault. The future seismic hazard deserves further attention and research.

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第 113 篇

标　　题：Selecting Image Pairs For Structure-From-Motion By Introducing The Image Spatial Position

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期　　刊：REMOTE SENSING LETTERS

摘　　要：Image matching is a quite time-consuming task for Structure-from-Motion (SfM). In this paper, a Bag-of-Words (BoW) model that reduces the feature dimensions and introduces image spatial locations is proposed to improve the efficiency and reliability

of SfM. The whole workflow includes three steps. Firstly, principal component analysis (PCA) is used to reduce the high-dimensional features to low-dimensional features, so as to improve the efficiency of retrieval vocabulary construction. Secondly, by calculating the inverse distance weighting score of query images, a comprehensive retrieval score is constructed to improve the distinguishability between similar images. Finally, by calculating the retrieval threshold and discarding the invalid matching image pairs, the image query precision is further improved. The experimental results show that compared with the VocabTree (VT) and the Hamming Embedding (HE) methods, the proposed algorithm for image matching time is reduced by 69.5% and 72.0%, respectively, while the number of sparse point clouds of the reconstruction is increased 0.6%.

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第 114 篇

标　　题： A New Method To Simultaneously Measure The Soil-Water Characteristic Curve And Hydraulic Conductivity Function Using Filter Paper

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期　　刊： GEOTECHNICAL TESTING JOURNAL

摘　　要： The soil-water characteristic curve (SWCC) and hydraulic conductivity function (HCF) are widely used to study the hydraulic conductivity behavior of unsaturated soil. This article proposes a filter paper-based instantaneous profile method to simultaneously measure the SWCC and HCF of unsaturated soil. The method uses a small soil column that comprises several vertically stacked soil specimens sandwiched with filter papers. The water content and matric suction of the soil column are measured by weighing the soil specimens and filter papers, respectively, at regular time intervals. Therefore, the matric suction profiles and water content profiles can be obtained, and the SWCC and HCF can be calculated with the profile data. The method was applied to intact loess soil. The measured suction range is 0 to 2x10(5) kPa, and the measured hydraulic conductivity range is 10(-5) to 10(-13) m/s. Both SWCC and HCF curves display a bimodal characteristic and are consistent with previous mathematical models. This method is an inexpensive method to measure the SWCC and HCF in a large suction range.

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WOS 号： 000582333700014

第 115 篇

标　　题：Drift Path Of Green Tide And The Impact Of Typhoon Chan-Hom In The Chinese Yellow Sea Based On Goci Images In 2015

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期　　刊：ECOLOGICAL INFORMATICS

摘　　要：Since 2007, green tide disasters have occurred in Chinese Yellow Sea for 11 consecutive years. The continuous outbreak of green tides has caused various degrees of economic loss and ecological damage to coastal areas. In this study, we use GF1-WFV (GaoFen No.1-Wide Field of View) high resolution images and GOCI (Geostationary Ocean Color Imager) images comprehensively. NDVI (Normalized vegetation index), linear decomposition model of mixed pixels (LDMMP) and artificially assisted interpretation methods were used to monitor the green tide eruptions in the Yellow Sea in 2015. The impact of the typhoon Chan-hom on the green tide growth process and drift path were analyzed for the first time. The results showed that: The accuracy of extracting green tide area by LDMMP method is higher than that of NDVI. Based on GOCI images, the distribution of green tides in the study area in 2015 was obtained using the LDMMP method; From May to August, the green tide in the Yellow Sea has undergone the process of emergence-development-explosion-decline-disappearance; Typhoon Chan-hom changed the path of the green tide continuing to the north to a certain extent and drifted to the southeast, causing the center of the green tide to move to Lianyungang Eastern waters.

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WOS 号：000591929300004

第 116 篇

标　　题：Research On The Vertical Recognition Ability Of Gravity And Magnetic Data Of Point (Line) Source Model With Given Survey Accuracy

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期　　刊：CHINESE JOURNAL OF GEOPHYSICS-CHINESE EDITION

摘　　要：Gravity and magnetic exploration have been widely used in geophysical exploration because of the advantages of high efficiency, low cost and wide working range. Most researches on the vertical recognition ability of gravity and magnetic data were considered without survey accuracy. Hence, theoretical research on gravity anomalies,

magnetic anomalies and tensor vertical detection ability of isolated anomaly are still necessary with the given gravity and magnetic survey accuracy. The research on vertical recognition ability is based on forward theory of the gravity and magnetic field to study the relationship between amplitude and survey accuracy with given survey accuracy to eliminate the influence of the background field, which improves the reliability of the research results. The study shows that for isolated anomalies, the gravity tensor has a stronger vertical recognition ability than gravity anomalies at a certain shallow depth. This depth is proportional to the ratio of the gravity anomaly survey accuracy to the gravity tensor survey accuracy. The vertical magnetization magnetic tensor has a stronger vertical recognition ability than the polar magnetic anomalies at a certain shallow depth. This depth is proportional to the ratio of the polar magnetic anomalies survey accuracy to the vertical magnetization magnetic tensor survey accuracy. The magnetic field has a stronger vertical recognition ability than gravity at a certain shallow depth. This depth is proportional to the ratio of magnetization to residual density, gravity survey accuracy to magnetic survey accuracy. This result will guide the practical application of gravity and magnetic exploration.

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第 117 篇

标　　题： Seismic Complex Ray Tracing In 2D/3D Viscoelastic Anisotropic Media By A Modified Shortest-Path Method

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期　　刊： GEOPHYSICS

摘　　要： In a viscoelastic anisotropic medium, velocity anisotropy and wave energy attenuation occur and are often observed in seismic data applications. Numerical investigation of seismic wave propagation in complex viscoelastic anisotropic media is very helpful in understanding seismic data and reconstructing subsurface structures. Seismic ray tracing is an effective means to study the propagation characteristics of high-frequency seismic waves. Unfortunately, most seismic ray-tracing methods and traveltime tomographic inversion algorithms only deal with elastic media and ignore the effect of viscoelasticity on the seismic raypath. We have developed a method to find the complex ray velocity that gives the seismic ray speed and attenuation in an arbitrary viscoelastic anisotropic medium, and we incorporate them with the modified shortest-path method to determine the raypath and calculate the real and imaginary traveltime (wave energy attenuation) simultaneously. We determine that the complex ray-tracing method is applicable to arbitrary 2D/3D viscoelastic anisotropic media in a complex geologic model and the computational errors of the real and imaginary traveltime are less than

0.36% and 0.59%, respectively. The numerical examples verify that the new method is an effective and powerful tool for accomplishing seismic complex ray tracing in heterogeneous viscoelastic anisotropic media.

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WOS 号： 000618326800053

第 118 篇

标　　题： Seismic Complex Ray Tracing In 2D/3D Viscoelastic Anisotropic Media By A Modified Shortest-Path Method

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期　　刊： GEOPHYSICS

摘　　要： In a viscoelastic anisotropic medium, velocity anisotropy and wave energy attenuation occur and are often observed in seismic data applications. Numerical investigation of seismic wave propagation in complex viscoelastic anisotropic media is very helpful in understanding seismic data and reconstructing subsurface structures. Seismic ray tracing is an effective means to study the propagation characteristics of high-frequency seismic waves. Unfortunately, most seismic ray-tracing methods and traveltime tomographic inversion algorithms only deal with elastic media and ignore the effect of viscoelasticity on the seismic raypath. We have developed a method to find the complex ray velocity that gives the seismic ray speed and attenuation in an arbitrary viscoelastic anisotropic medium, and we incorporate them with the modified shortest-path method to determine the raypath and calculate the real and imaginary traveltime (wave energy attenuation) simultaneously. We determine that the complex ray-tracing method is applicable to arbitrary 2D/3D viscoelastic anisotropic media in a complex geologic model and the computational errors of the real and imaginary traveltime are less than 0.36% and 0.59%, respectively. The numerical examples verify that the new method is an effective and powerful tool for accomplishing seismic complex ray tracing in heterogeneous viscoelastic anisotropic media.

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WOS 号： 000620735000009

第 119 篇

标　　题： Depth Migration Based On Two-Way Wave Equation To Image Obs Multiples: A Case Study In The South Shetland Margin (Antarctica)

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期　　刊： GEOFLUIDS

摘　　要： With the development of marine seismic exploration, the ocean bottom seismometer (OBS) as a new seismic acquisition technology has been widely concerned. Although multiple waves are frequently viewed as noises, they may carry a wealth of subsurface information and produce a broader illumination than primary waves. To perform multiple wave imaging, we propose to utilize a two-way wave equation depth wavefield extrapolation method which is rarely used in this field. A simple dipping model is imaged by using primary and multiple waves, which proves the superiority of multiple waves in imaging over the primary waves and lays a foundation for practical application. Moreover, the comparison of multiple imaging results by reverse time migration and those by our proposed method demonstrates that our proposed method requires less storage space. In this study, we apply this migration method to actual OBS data collected in the South Shetland margin (Antarctica), where gas hydrates have been well documented. Firstly, the wavefield separation method is adopted to process the OBS data, so as to produce reliable primary and multiples waves; secondly, the ray-tracing method is used to derive the velocity field; and finally, the depth wavefield extrapolation method based on the two-way wave equation is applied to image primary and multiple waves. Migration results show that multiple waves provide a broader illumination and a clearer sediment structure than primary waves, especially for the highly shallow reflections.

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WOS 号： 000595628500003

第 120 篇

标　　题： Experimental Study On The Permeability Of Compacted Loess

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期　　刊： SOIL MECHANICS AND FOUNDATION ENGINEERING

摘　　要： In the western regions of China, loess soils are widely used as fill materials in the construction of highways and building foundations. The hydraulic conductivity of this fill material is a significant parameter for initial engineering designs, but currently there are a very limited number of investigations into this aspect. In this study, a series of tests on compacted loess soils was conducted to determine how the dry density and water content affect loess permeability. The test results show that the hydraulic conductivity decreases gradually with the final water content or with increase in the final dry density. The phenomenon is induced by a decrease in cumulative volume or void ratio, which is verified by the results of mercury intrusion porosimetry and scanning electron microscopy images. A new mathematical model is proposed for predicting the value of k in compacted loess soils, expressed as a function of water

content and void ratio.

DOI： 10.1007/s11204-020-09683-y

WOS 号： 000591229000004

第 121 篇

标　　题： Study Of The Effects Of Clay Content On Loess Slope Failure Mode And Loess Strength

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期　　刊： BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

摘　　要： The particle size of loess in the Loess Plateau varies from northwest to southeast due to wind direction which is predominantly from the northwest. The clay content of loess is significantly different in the loess area of China resulting in different physical characteristics of loess and loess failure process. To determine the failure process triggered by rainfall, a series of studies were conducted via flume and triaxial tests using loess samples with different clay contents. The effects of clay on water content (WC) change, pore-water pressure (PWP) generation, and the failure process of loess slope were analyzed. The changes in WC and PWP response to the failure process of the slope at different positions were different, and the changes in the shallow layer were found to be more prominent than those at other positions. The changes in WC and PWP gradually decreased with increasing clay content. The clay in loess also plays an important role in the failure process of the loess mass, and the failure process changed from regressive overall failure to erosion-shallow sliding failure and then to erosion failure with increasing clay content. Finally, loess strength with different clay contents was tested and discussed. The strength increased and the M value decreased gradually with increasing clay content. Based on the experimental results, it was concluded that clay in loess has a significant impact on the failure process and strength of the loess mass, and the results of the current study would provide support for loess slope mitigation.

DOI： 10.1007/s10064-020-02055-8

WOS 号： 000593029000001

第 122 篇

标　　题： Multi-Resolution Classification Network For High-Resolution Uav Remote Sensing Images

作　　者： [Cong, Ming; Xi, Jiangbo; Han, Ling; Gu, Junkai; Yang, Ligong] Changan Univ, Coll Geol Engn & Geomat, Xian, Peoples R China; [Tao, Yiting; Xu, Miaozhong] Wuhan Univ, Wuhan, Peoples R China

通讯作者： Xi, JB (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian, Peoples R China.

期　　刊： GEOCARTO INTERNATIONAL

摘　　要：High-resolution unmanned aerial vehicle (UAV) remote sensing images have super-high ground resolution. Although they provide complete and detailed surface observation data for various engineering applications, the extraction of information from complex and diverse surface scenes is challenging. Characterising surface targets with bright colours and different shapes using samples with fixed sizes and neural networks with fixed network structures at a single resolution is difficult. Therefore, a multi-resolution classification network called structure defined by sample characteristics (SDSC) network was designed in this study. After the SDSC network learned the samples using a multi-resolution strategy and the principle of maximum classification probability, the multi-resolution classification results were integrated into the final classification results to improve their credibility and accuracy. The new method has a better cognitive performance and noise resistance, as well as broad application potential, such that it is more suitable for high-spatial resolution UAV remote sensing images.

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WOS 号：000596996200001

第 123 篇

标　　题：On The Characterization Of The Shrinkage Behavior And Soil-Water Retention Curves Of Four Soils Using Centrifugation And Their Relation To The Soil Structure

作　　者：[Li, Lincui; Li, Xi-An; Lei, Haonan; Hong, Bo; Wang, Li; Zheng, Hong] Changan Univ, Coll Geol Engn & Geomat, Xian 710054, Shaanxi, Peoples R China; [Li, Xi-An] Minist Land & Resources, Open Res Lab Geotech Engn, Xian 710054, Shaanxi, Peoples R China

通讯作者：Li, XA (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian 710054, Shaanxi, Peoples R China.; Li, XA (corresponding author), Minist Land & Resources, Open Res Lab Geotech Engn, Xian 710054, Shaanxi, Peoples R China.

期　　刊：ARABIAN JOURNAL OF GEOSCIENCES

摘　　要：In this study, a consistent centrifuge procedure was applied to four soils. The height shrinkage, bulk density increase, soil shrinkage curve (SSC), and soil-water retention curve (SWRC) of the soils were analyzed. Scanning electron microscopy (SEM) tests and image processing techniques were adopted to qualitatively and quantitatively investigate the microstructure of the soils with different bulk densities. The results showed that under a matric suction ranging from 0 to 2000 kPa, the bulk density increased from an initial value of 1.30 g/cm(3) to 1.60, 1.72, 1.61, and 1.57 g/cm(3) for the soils retrieved from Chanhe, Qingyang, Yan'an, and Lvliang, respectively, resulting in corrected SWRCs considering soil shrinkage that was higher than the uncorrected SWRCs, consistent with previously published work. However, this difference was effectively reduced by retesting the soil samples. A reduction in water volume resulted in the same reduction in the bulk soil volume in the normal shrinkage state, while a shrinkage rate higher than one was found with increasing soil drying. More hydraulically active and connected macropores were detected in the low-density soil. The maximum pore diameter, total pore area ratio (PAR), pore size, and number distribution considerably changed with increasing density. The captured microstructural information is beneficial for the interpretation of the shrinkage behavior and hydraulic

properties of soil.

DOI： 10.1007/s12517-020-06273-y

WOS 号： 000595717700006

第 124 篇

标　　题： First Results From Drone-Based Transient Electromagnetic Survey To Map And Detect Unexploded Ordnance

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通讯作者： Qi, ZP (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian 710054, Peoples R China.

期　　刊： IEEE GEOSCIENCE AND REMOTE SENSING LETTERS

摘　　要： Unexploded ordnance (UXO), which causes many civilian casualties every year, has become a serious environmental problem. To deal with the problem, we have developed a new drone-based transient electromagnetic (TEM) system, which was designed for the UXO detection through very low altitude measurements. Drone-based TEM system uses the rotorcraft equipped with central loop TEM device to realize the UXO detection. The system was more safe and efficient than a ground-based TEM system in UXO detection. Compared with the airborne magnetic method or helicopter-borne TEM system, it has the advantages of low cost, flight safety, and so on. In this letter, the system characteristics are introduced in detail, providing the theoretical analysis of the system in UXO detection and verification of model data. Finally, through the UXO detection in the former weapon test base, the results show that the system is effective and successful in UXO detection.

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WOS 号： 000594634800007

第 125 篇

标　　题： Dynamic Response Characteristics Of Dry And Water-Saturated Schist Under Impact Loading

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通讯作者： Su, SR (corresponding author), Changan Univ, Sch Geol Engn & Geomat, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF MOUNTAIN SCIENCE

摘　　要： Many geological engineering hazards are closely related to the dynamic mechanical properties of rock materials. However, most existing studies on the dynamic mechanical properties of rock materials were conducted on the hard rocks such as sandstone, granite, limestone, and marble, whereas soft rocks, such as schist, are less studied. Therefore, in this study, a series of triaxial impact tests were conducted on dry and saturated schist by employing a modified triaxial split Hopkinson pressure bar system to reveal the coupling effects of water, strain rate, and triaxial confining pressure on the mechanical properties of schist. The results show that schist is a type of watersensitive

rock and the stress-strain curve of saturated schist has apparent ductility. The effects of strain rate on dynamic strain, deformation modulus and peak stress were analyzed. The results also show that the dynamic peak stress is affected by the combined softening effect and viscous effect of water under impact loading. Finally, it was found that the failure mode of schist belongs to typical axial tensile failure under uniaxial impact tests, and shear failure is the main failure mode under triaxial impact tests. With the increase in confining pressure, the failure modes of schist change from tensile failure to shear failure. This research can provide useful parameters for geological engineering hazard prevention in mountain areas.

DOI： 10.1007/s11629-019-5900-2

WOS 号： 000601557200018

第 126 篇

标　　题： Electrical Responses And Classification Of Complex Water-Flooded Layers In Carbonate Reservoirs: A Case Study Of Zananor Oilfield, Kazakhstan

作　　者： [Wang Fei] Changan Univ, Coll Geol Engn & Geomat, Xian 710064, Peoples R China; [Bian Huiyuan] Xian Univ Sci & Technol, Coll Geol & Environm, Xian 710054, Peoples R China; [Zhao Lun; Yu Jun] PetroChina, Res Inst Petr Explorat & Dev, Beijing 100083, Peoples R China; [Tan Chengqian] Xian Shiyou Univ, Coll Earth Sci & Engn, Xian 710065, Peoples R China

通讯作者： Wang, F (corresponding author), Changan Univ, Coll Geol Engn & Geomat, Xian 710064, Peoples R China.

期　　刊： PETROLEUM EXPLORATION AND DEVELOPMENT

摘　　要： Experiments of electrical responses of waterflooded layers were carried out on porous, fractured, porous-fractured and composite cores taken from carbonate reservoirs in the Zananor Oilfield, Kazakhstan to find out the effects of injected water salinity on electrical responses of carbonate reservoirs. On the basis of the experimental results and the mathematical model of calculating oil-water relative permeability of porous reservoirs by resistivity and the relative permeability model of two-phase flow in fractured reservoirs, the classification standards of water-flooded layers suitable for carbonate reservoirs with complex pore structure were established. The results show that the salinity of injected water is the main factor affecting the resistivity of carbonate reservoir. When low salinity water (fresh water) is injected, the relationship curve between resistivity and water saturation is U-shaped. When high salinity water (salt water) is injected, the curve is L-shaped. The classification criteria of water-flooded layers for carbonate reservoirs are as follows: (1) In porous reservoirs, the water cut (f(w)) is less than or equal to 5% in oil layers, 5%-20% in weak water-flooded layers, 20%-50% in moderately water-flooded layers, and greater than 50% in strong water-flooded layers. (2) For fractured, porous-fractured and composite reservoirs, the oil layers, weakly water-flooded layers, moderately water-flooded layers, and severely water-flooded layers have a water content of less than or equal to 5%, 5% and 10%, 10 degrees/0 to 50%, and larger than 50% respectively.

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WOS 号： 000603077700013

第 127 篇

标　　题：Study On Prediction Method For Postconstruction Settlement Of Loess Fill Foundation In Northern Shaanxi, China

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：In order to solve the problem of shortage of construction land in the loess hilly and gully area of northern Shaanxi, the local people usually adopted the method of excavating and filling. The postconstruction settlement was an important index to evaluate the stability of the loess fill foundation. Through laboratory test analysis, the stress-strain and the strain-time relationship of compacted loess were obtained. It showed that the stress-strain curves varied as power functions, and the relationship between strain and time was hyperbolic. Based on the layerwise summation method, a creep equation to predict the postconstruction settlement of loess fill foundation was established. The field monitoring data show that the fitting effect is better. Using this equation, the postconstruction settlement of loess fill foundation with different compaction coefficients and thickness was predicted. Finally, the stability evaluation criteria of loess fill foundation with various thickness and compaction coefficient were proposed. This method provided a new idea to solve the problem of postconstruction settlement of loess fill foundation.

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第 128 篇

标　　题：X-Ray Micro-Computed Tomography (Mu-Ct) For 3D Characterization Of Particle Kinematics Representing Water-Induced Loess Micro-Fabric Collapse

作　　者：[Yu, B.; Fan, W.; Fan, J. H.; Wei, Y. N.; Wei, T. T.] Changan Univ, Sch Geol Engn & Geomat, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Yu, B.; Fan, W.; Fan, J. H.; Wei, Y. N.; Wei, T. T.] Minist Educ, Key Lab Western Chinas Mineral Resources & Geol E, 126 Yanta Rd, Xian 710054, Shaanxi, Peoples R China; [Dijkstra, T. A.] Loughborough Univ, Sch Architecture Bldg & Civil Engn, Loughborough LE11 3TU, Leics, England

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期　　刊：ENGINEERING GEOLOGY

摘　　要：The 3D characterization of particle kinematics representing the changes in fabric observed during water-driven collapse of loess is, to the best of our knowledge, performed for the first time at the micron scale. An apparatus is specially designed to perform collapse tests on loess specimens of several millimeters in size and to capture, using X-ray tomography, particle-scale microfabric features of the sample in initial,

loaded and flooded (i.e. collapsed) states. Although similar approaches have been used to assess problems such as microstructural evolution in sand, the application of these methods to assess loess collapse behaviour at the micron scale constitutes the novelty of this work. Individual particles within the specimen in the initial and deformed configurations are identified and tracked through an iterative segmentation technique and the particle tracking method 'ID-track'. This allowed determination of particle displacement and rotation. The displacement field within the collapsed sample is found to be less uniform compared to that within the unwetted sample under loading. Coefficient of heterogeneity is defined to quantify the level of non-uniformity of the particle displacements within the deformed sample, revealing higher heterogeneity in the deformation of the collapsed sample compared to that of the unwetted sample under loading. It is also found that particles tend to rotate around axes perpendicular to, rather than parallel to, the direction of major principal stress, and the rotation magnitudes appears to be controlled largely by the size of particles while their morphology plays a minor role. The influence of porosity on the collapse process is quantified significant heterogeneous volumetric strains are observed at the single particle scale. It is also shown that the evolution of particle-to-particle contacts is much more complex than previously stated. The micron-scale investigations of individual particle kinematics following loading and wetting offer exciting new avenues for visualization and an enhanced capability for quantification of loess collapse processes.

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WOS 号： 000597310200035

材料科学与工程学院

第 1 篇

标　　题： Dense Na0.5K0.5Nbo3 Ceramics Produced By Reactive Flash Sintering Of Nanbo3-Knbo3 Mixed Powders

作　　者： [Wu, Yajuan; Su, Xinghua; An, Gai; Hong, Weixin] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Shaanxi, Peoples R China; [Su, Xinghua] Changan Univ, Engn Res Ctr, Minist Educ Transportat Mat, Xian 710061, Shaanxi, Peoples R China

通讯作者： Su, XH (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Shaanxi, Peoples R China.

期　　刊： SCRIPTA MATERIALIA

摘　　要： Dense Na0.5K0.5NbO3 ceramics are successfully produced by reactive flash sintering of the NaNbO3-KNbO3 mixed powders, which enables the chemical reaction and sintering to take place simultaneously, skipping the preparation process of Na0.5K0.5NbO3 powders that is required in conventional production. The as-prepared Na0.5K0.5NbO3 ceramics exhibit the high piezoelectric coefficient d(33). Besides the Joule heating, generation of high concentration of defects is proposed to explain the rapid reaction and sintering rates during the reactive flash sintering. This study presents a cost-effective way to prepare dense and pure ceramic materials from their basic constituents in one step at low temperature in short time. (C) 2019 Acta Materialia Inc

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WOS 号： 000491684400011

第 2 篇

标　　题： Band Bending And Valence Band Shifting Of Sub-Monolayer Tio2 Functionalized Sno2 Nanowires

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通讯作者： Wang, HB; Zhou, L; Chen, YN (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China.; Wang, HB; Ma, DY (corresponding author), Xi An Jiao Tong Univ, State Key Lab Mech Behav Mat, Xian 710049, Shaanxi, Peoples R China.; Wang, HB; Zhou, L (corresponding author), Changan Univ, Minist Educ PR China, Engn Res Ctr Pavement Mat, Xian 710061, Peoples R China.
期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS
摘　　要： Sub-monolayer TiO2 over-layers were deposited on SnO2 nanowires (NWs) by atomic layer deposition. X-ray photoelectron spectroscopy, Mott-Schottky plots and photoluminance spectra were used to investigate the band structure and the separation of electron-hole pairs at the SnO2/TiO2 interface. The results showed that the valence band maximum of SnO2 NWs shifted to lower binding energies after functionalization, and significant upward band edge bending at the interface was confirmed. The rearrangement of energy band accelerated the separation of photo-generated electron-hole pairs leading to the improvement of photocatalytic degradation rate of methyl orange (MO, C14H14N3NaO3S) under UV irradiation.
DOI： 10.1007/s10854-019-02569-2
WOS 号： 000518400500068

第 3 篇

标　　题： Influence Of Particle Size On The Microwave Absorption Properties Of Fesial/Zno-Filled Resin Composite Coatings

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China.

期　　刊：JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要：FeSiAl/ZnO-filled resin composite coatings with different FeSiAl particle sizes were fabricated by adding FeSiAl and ZnO absorbents to epoxy resin matrix. The complex permittivity and complex permeability were measured by vector network analyzer. The results show that the dielectric loss and magnetic loss increase with the increasing FeSiAl particle size, which is consistent with the attenuation coefficient. The dielectric loss mainly comes from the conductance loss and dielectric relaxation loss. Meanwhile, the magnetic loss is derived from the exchange resonance and natural resonance. The composite coating with < 30 mu m FeSiAl particle exhibits a wide effective absorption band of 3.1 GHz in 9.3-12.4 GHz and a strong absorption peak of - 15.1 dB at 11.1 GHz, when the thickness is 1.8 mm. The most promising microwave absorption performance can be ascribed to its best impedance matching and appropriate attenuation coefficient. Therefore, the suitable microwave absorption performance of the coatings could be obtained by means of adjusting the absorbent particle size and the coating thickness.

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WOS 号：000505378900008

第 4 篇

标　　题：Mn2O3/Al2O3 Cathode Material Derived From A Metal-Organic Framework With Enhanced Cycling Performance For Aqueous Zinc-Ion Batteries

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期　　刊：DALTON TRANSACTIONS

摘　　要：Rechargeable aqueous zinc-ion batteries (ZIBs) are considered to be potential candidates for large-scale energy storage due to their high capacity, low cost, high safety and environmental friendliness. A key problem encountered in Mn-based cathodes is the dissolution of Mn2+ that causes significant capacity fading. Herein, a novel Mn2O3/Al2O3 composite material with a microbundle structure was synthesized using a strategy called 'MOFs as precursors'. Uniform distribution of Mn2O3 and Al2O3 with a precise controlled Mn/Al molar ratio can be easily realized using this method. After compositing with Al2O3, the resulting material shows not only a higher capacity but also a better cycling stability (118.0 mA h g(-1) after 1100 cycles at 1500 mA g(-1)) than the pure Mn2O3. Combined with the ICP analysis, it can be deduced that Al2O3 can effectively inhibit the dissolution of Mn2+ from Mn3+ disproportionation. Our result can provide some inspiration for the modification of Mn-based materials and other materials used in zinc ion batteries or other battery systems.

DOI：10.1039/c9dt03995c

WOS 号：000509360800016

第 5 篇

标　　题：Blue Luminescence Of Bi3+ In The Double Perovskite Calamgtao6 Matrix For N-Uv Pumped White Light-Emitting Diodes

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期　　刊：JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要：A novel Bi3+ activated double perovskite CaLaMgTaO6 phosphor was synthesized and its photoluminescence properties were investigated. CaLaMgTaO6: Bi3+ could be efficiently excited in the wavelength range of 270-400 nm, and exhibit a blue emission band ascribing to the P-3(1)-S-1(0) transition of Bi3+. The maximum intensity of the excitation moves from 332 to 351 nm, and the emission band moves from 443 to 434 nm as the concentration of Bi3+ increases from 0.5 to 20 mol %, corresponding to the overlapped luminescence of Bi3+ substituting for La3+ and Ca2+ with substitution preference. Due to the energy transfer between Bi3+ ions, the concentration quenching of Bi3+ in the CaLaMgTaO6 host occurred when the concentration of Bi3+ exceeded 7.5 mol %. The energy transfer mechanism of CaLaMgTaO6: Bi3+ was estimated to be dipole-dipole interaction. Furthermore, the thermal stability of the phosphor was investigated and the corresponding activation energy DE was determined to be 0.26 eV. Due to the efficient excitation in near ultraviolet (n-UV) region and the strong blue emission, CaLaMgTaO6: Bi3+ would be a potential blue phosphor for n-UV pumped light-emitting diodes. (C) 2019 Elsevier B.V. All rights reserved.

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WOS 号：000490765400008

第 6 篇

标　　题：Corrosion Behavior Of Cu/Ni Coatings On Ti-6Al-4V Alloy After Diffused Treatment

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期　　刊：JOURNAL OF WUHAN UNIVERSITY OF TECHNOLOGY-MATERIALS SCIENCE EDITION

摘　　要：To improve the low thermal conductivities and poor wear resistances of TC4 (Ti-6Al-4V) alloy, the most widely used titanium alloy, the surface of TC4 alloys is modified by electroplating deposition of Ni and Cu layers, and then heat-treated to increase the diffusivity at the interface. In this paper, the corrosion behavior of Cu/Ni

coatings on TC4 alloy at different heat treatment processes was investigated in 3.5 wt% NaCl by the electrochemical analysis, and the microstructure and composition of corrosion products was carried out to reveal the corrosion resistance mechanism of Cu/Ni coatings. It was found that the corrosion resistance was significantly influenced by heat treatment temperature. With the increasing diffusion treatment temperature from 500 to 700 degrees C, the corrosion potential positively shifted from -330.87 to -201.14 mV, and the corrosion current density decreased from 4.02x10(-3) to 0.514x10(-3) mA/cm(2). However, when heat treatment temperature increased to 800 degrees C, the corrosion potential negatively shifted to -207.21 mV, and the current density increased to 1.62x10(-3) mA/cm(2).The diffusion behavior of Ti, Ni and Cu elements occurred and small amounts of Ni and Ti elements appeared on the specimen surface under different heat treatment temperature. Especially heattreated at 700 degrees C, the smaller pore size, dense Cu2O film, and highly stable TiO and NiO oxide layer were formed, which dramatically enhanced the corrosion resistance of Cu/Ni coatings. Finally, a novel model of corrosion resistance was proposed based on the analysis mentioned above.

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第 7 篇

标　　题： Microwave Absorption Ability Of Steel Slag And Road Performance Of Asphalt Mixtures Incorporating Steel Slag

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期　　刊： MATERIALS

摘　　要： Excessive usage of non-renewable natural resources and massive construction wastes put pressure on the environment. Steel slags, the main waste material from the metal industry, are normally added in asphalt concrete to replace traditional aggregate. In addition, as a typical microwave absorber, steel slag has the potential to transfer microwave energy into heat, thus increasing the limited self-healing ability of asphalt mixture. This paper aims to investigate the microwave absorption potentials of steel slag and the effect of its addition on road performance. The magnetic parameters obtained from a microwave vector network analyzer were used to estimate the potential use of steel slag as microwave absorber to heal cracks. Meanwhile, the initial self-healing temperature was further discussed according to the frequency sweeping results. The obvious porous structure of steel slag observed using scanning electron microscopy (SEM) had important impacts on the road performance of asphalt mixtures.

Steel slag presented a worse effect on low-temperature crack resistance and water stability, while high-temperature stability can be remarkably enhanced when the substitution of steel slag was 60% by volume with the particle size of 4.75-9.5 mm. Overall, the sustainability of asphalt mixtures incorporating steel slag can be promoted due to its excellent mechanical and microwave absorption properties.

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WOS 号： 000515503100170

第 8 篇

标　　题： Damping Property Of Cement Mortar Incorporating Damping Aggregate

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通讯作者： Tian, YG (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： MATERIALS

摘　　要： This study proposes a new cement mortar incorporating damping aggregate (DA) and investigates the mechanical properties and damping property of the cement mortar. Four types of DA were prepared, lightweight aggregate presaturated water and three types of polymer emulsion. Further, the effects of polypropylene fiber and rubber powder on the performance of the cement mortar were studied. The experimental results showed that the damping ratio of specimens containing 70% DA was approximately three times higher than that of the reference mortar, with a slight decrease in the mechanical properties. Adding fiber was more effective than rubber powder in improving the damping ratio of the cement mortar, and the optimal dosage of fiber was 0.5%.

DOI： 10.3390/ma13030792

WOS 号： 000515503100299

第 9 篇

标　　题： Investigation Of Microstructure Evolution And Phase Selection Of Peritectic Cuce Alloy During High-Temperature Gradient Directional Solidification

作　　者： [Xu, Yiku; Huang, Zhaohao; Chen, Yongnan; Xiao, Junxia; Hao, Jianmin] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Hou, Xianghui] Univ Nottingham, Fac Engn, Univ Pk, Nottingham NG7 2RD, England; [Liu, Lin] Northwestern Polytech Univ, State Key Lab Solidificat & Proc, Xian 710072, Peoples R China

通讯作者： Xu, YK (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： MATERIALS

摘　　要： In this work, a CuCe alloy was prepared using a directional solidification method at a series of withdrawal rates of 100, 25, 10, 8, and 5 mu m/s. We found that the primary phase microstructure transforms from cellular crystals to cellular peritectic coupled growth and eventually, changes into dendrites as the withdrawal rate increases. The

phase constituents in the directionally solidified samples were confirmed to be Cu2Ce, CuCe, and CuCe + Ce eutectics. The primary dendrite spacing was significantly refined with an increasing withdrawal rate, resulting in higher compressive strength and strain. Moreover, the cellular peritectic coupled growth at 10 mu m/s further strengthened the alloy, with its compressive property reaching the maximum value of 266 MPa. Directional solidification was proven to be an impactful method to enhance the mechanical properties and produce well-aligned in situ composites in peritectic systems.

DOI： 10.3390/ma13040911

WOS 号： 000520419300102

第 10 篇

标　　题： Defects, Electronic Properties, And Alpha Particle Energy Spectrum Response Of The Cd0.9Mn0.1Te: V Single Crystal

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期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要： Cadmium manganese telluride is a promising material for fabricating room-temperature nuclear radiation detectors widely used in medical imaging, environmental protection, nuclear security detection, astrophysics, and so on. The Cd0.9Mn0.1Te: V (V: CMT) crystal examined in this work was grown through the Te solution (10% excess) vertical Bridgman method. The low-temperature photoluminescence (PL) spectra indicated that the grown crystal has good quality. A simultaneous thermal excitation current spectrum was used to characterize the effect of vanadium doping on the level defects in the crystal. The current-voltage and Hall test results showed that the crystal resistivity was (3.781-6.185) x 10(10) ohm cm. The conductivity was of n type. The carrier concentration was (1.69-9.94) x 10(6) cm(-3). The Hall mobility was (3.08-9.29) x 10(3) cm(-2) V-1 s(-1). The maximum measured ratio of the light and dark currents, when the crystal was exposed to 5 mW white light, was 11. In addition, the room-temperature electron mobility-lifetime product of the middle sample was 6.925 x 10(-4) cm(2) V-1 using the Am-241@5.48 MeV alpha particle source.

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WOS 号： 000515966300003

第 11 篇

标　　题： Analyses Of Crystal Growth, Optical, Electrical, Thermal And Mechanical Properties Of An Excellent Detector-Grade Cd0.9Mn0.1Te: V Crystal

作　　者： [Luan, Lijun; Gao, Li; Lv, Haohao; Yu, Pengfei; He, Yi; Zheng, Dan] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China; [Wang, Tao] Northwestern Polytech Univ, Sch Mat Sci & Engn, Xian 710072, Shanxi, Peoples R China

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期　　刊： SCIENTIFIC REPORTS

摘　　要： A high-quality cadmium manganese tellurium (Cd0.9Mn0.1Te: V or VCMT) crystal was successfully grown via modified Te solution vertical Bridgman method with vanadium doping. The crystal structure and quality were evaluated by powder X-ray diffraction analysis. An infrared transmission spectroscope measured the transmittance of the crystal at 64%, which would suggest that the grown crystal possessed high purity and crystallinity. Ultraviolet-visible-near-infrared spectroscopy analysis obtained the forbidden band width of approximately 1.577 eV. The current-voltage test indicated that the VCMT crystal had a high resistivity of 2.07 x 10(10) Omega.cm. Mechanical properties were measured by a Vickers microhardness tester. Crack surface morphology around the indentation was recorded. Furthermore, mechanical properties, such as microhardness, fracture toughness, brittleness index and yield strength were investigated and discussed. The thermal stability of the VCMT single crystal was determined by thermogravimetric analysis. A VCMT detector was fabricated with planar configuration structure, which showed a resolution of 11.62% of the Am-241 at 59.5 keV peak.

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WOS 号： 000537154600001

第 12 篇

标　　题： Electromagnetic And Microwave Absorption Properties Of Fesial And Flaky Graphite Filled Al2O3 Composites With Different Fesial Particle Size

作　　者： [Zhou, Liang; Yu, Jiaojiao; Wang, Zhenjun; Wang, Hongbo; Huang, Julong; Mu, Wenyu; Zheng, Honggian] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Zhou, Liang; Wang, Zhenjun; Wang, Hongbo] Changan Univ, Minist Educ, Engn Res Ctr Transportat Mat, Xian 710061, Peoples R China

通讯作者： Zhou, L; Yu, JJ; Wang, HB (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： CERAMICS INTERNATIONAL

摘　　要： The increasing electromagnetic interference problems have drawn much attention to microwave absorbing materials. To satisfy the needs of practical application, FeSiAI and flaky graphite filled Al2O3 composites were sintered by hot-pressing for microwave absorption application. The effect of FeSiAl particle size on the electromagnetic and microwave absorption properties was investigated in the X-band (8.2-12.4 GHz). The results show that the dielectric properties enhance significantly with increasing FeSiAI particle size, which is attributed to the increased interfacial polarization and conductance loss. As a result of the favorable impedance matching and appropriate electromagnetic attenuation, the reflection loss (RL) of the composites filled with 25-48 mu m flaky FeSiAl achieves -15.2 dB at 10.6 GHz and the effective absorption bandwidth (RL < -10 dB) is 1.2 GHz in 10.0-11.2 GHz with a matching thickness of 1.0 mm. It indicates that FeSiAl and flaky graphite filled Al2O3 composites are potential candidates for thin-thickness microwave absorbing materials,

and the microwave absorption properties can be enhanced by adjusting absorbent particle size.

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WOS 号： 000512219600036

第 13 篇

标　　题： Spark Plasma Sintering Of Zro2-Al2O3 Nanocomposites At Low Temperatures Aided By Amorphous Powders

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期　　刊： CERAMICS INTERNATIONAL

摘　　要： In present work, ZrO2-5 wt% Al2O3 and ZrO2-10 wt% Al2O3 nanocomposites are fabricated through spark plasma sintering. Al2O3-ZrO2 amorphous powders and polycrystal Al2O3 powders and are doped in the polycrystalline ZrO2 powders, respectively. When doped with amorphous powders, the sintering of ZrO2-Al2O3 nanocomposites is promoted, and ZrO2-5 wt% Al2O3 and ZrO2-10 wt% Al2O3 nanocomposites with relative densities of 99% are obtained after spark plasma sintering at 1200 degrees C; however, when sintering of polycrystalline ZrO(2)and polycrystalline Al2O3 powders, the relative densities are merely 93%. The enhanced sinterability is due to the metastability and phase transformation of the amorphous powders, which act as sintering aids. The nanocomposites with near-theoretical density show refined microstructure with homogenous mixture of ZrO(2)and Al2O3 grains, which further leads to excellent mechanical properties. This article provides new ideas for low-temperature sintering of nanocomposites via using doping amorphous powders.

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WOS 号： 000512219600041

第 14 篇

标　　题： Laboratory Investigation On Effects Of Microwave Heating On Early Strength Of Cement Bitumen Emulsion Mixture

作　　者： [Wang, Zhenjun; Dai, Nan; Zhang, Jie; Guo, Haoyan] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Wang, Zhenjun] State Key Lab High Performance Civil Engn Mat, Nanjing 211103, Peoples R China; [Wang, Xiaofeng] Henan Prov Commun Planning & Design Inst, Zhengzhou 450052, Peoples R China

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Effects of microwave heating time, microwave power, water-cement ratio (W/C) and bitumen-cement ratio (B/C) on early strength of cement bitumen emulsion mixture (CBEM) were studied in this work. Environment scanning electron microscopy (ESEM) and Fourier Transform infrared spectroscopy (FT-IR) were adopted to analyze microstructures and compositions of CBEM. The most important factors affecting

CBEM strength were putting forward based on multiple linear regression analysis (MLRA) and grey correlation analysis (GCA). The results show that the total microwave energy is composed of microwave power and microwave radiation time. The higher the total microwave energy, the higher the surface temperature of CBEM. The effect of W/C on CBEM temperature is more significant than that of B/C. Microwave heating time and microwave power can evidently influence strength of CBEM. Microwave heating can promote cement hydration, which is beneficial to improve strength of CBEM. However, excessive microwave time can result in the decrease of CBEM strength. Temperature model based on MLRA can show linear correlation between different factors. Strength model shows quadratic correlation to microwave parameters. In summary, reasonable microwave heating is an effective technique to improve early strength of CBEM. (C) 2019 Elsevier Ltd. All rights reserved.

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第 15 篇

标　　题： Band Alignment Control In A Blue Phosphorus/C2N Van Der Waals Heterojunction Using An Electric Field

作　　者： [Zhang, Zhihui; Xie, Zifeng; Zhang, Yan; Wei, Xing; Guo, Tingting; Ni, Lei; Fan, Jibin; Weng, Yijun; Zha, Zhengdi; Duan, Li] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Liu, Jian] Shandong Univ, Sch Phys, Jinan 250100, Peoples R China; [Tian, Ye] Chinese Acad Sci, Inst Phys, Beijing 100190, Peoples R China

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期　　刊： PHYSICAL CHEMISTRY CHEMICAL PHYSICS

摘　　要： Well-controlled band engineering of a blue phosphorus/C2N van der Waals (vdW) heterojunction is investigated by density functional theory (DFT) calculations. The heterojunction has a natural type-II band alignment with a direct band gap value of 1.514 eV, which gives the enormous potential for solar cell applications. When the heterojunction is under solar illumination, the photogenerated electron-hole pairs can separate out on the disparate monolayers effectively. It induces the formation of spatially indirect excitons. Furthermore, it is found that the band gap of this heterojunction exhibits approximately linear variation with respect to the perpendicular external electric field. Very interestingly, a band alignment change from type-II to type-I occurs at an applied electric field of -0.2 V angstrom(-1). This characteristic provides an attractive possibility to obtain novel multifunctional devices.

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WOS 号： 000528810000045

第 16 篇

标　　题： Molten Salt Pyrolysis Synthesis Of Magnetic Fencn Nanorods And Their Visible-Light-Driven Photocatalytic Properties

作　　者： [Yan, Xin; Ye, Zimeng; Ning, Guotao; Li, Jintong; Kang, Bingbing; Wang, Yuanyuan]

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期　　刊： APPLIED SURFACE SCIENCE

摘　　要： Novel magnetic FeNCN nanorods were synthesized by a simple molten salt pyrolysis process. The microstructure, morphology and optical properties of the FeNCN nanorods were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-vis diffuse reflectance spectroscopy (DRS) and photoluminescence (PL) spectroscopy. The XRD results indicated that the FeNCN samples were the hexagonal crystal structure with well crystallization. The SEM results showed that the FeNCN samples were rod-like structures with the lengths ranging from 200 nm to 1000 nm. The photocatalytic activities of the FeNCN nanorods were evaluated with the degradation of Rhodamine (RhB) under visible light. The results verified that the FeNCN nanorods had good visible light photocatalytic properties, with a rate of RhB degradation of 95% in 120 min visible light illumination. More importantly, the FeNCN nanorods exhibited good magnetic properties, which was conducive to their rapid separation and reuse in photocatalytic applications.

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第 17 篇

标　　题： Dynamic Model Of Polished Stone Value Attenuation In Coarse Aggregate

作　　者： [Liu, Jingyi; Guan, Bowen; Chen, Huaxin; Liu, Kaiping; Xiong, Rui; Xie, Chao] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Guan, Bowen; Chen, Huaxin; Liu, Kaiping; Xiong, Rui] Traff Paving Mat Engn Res Ctr, Minist Educ China, Xian 710064, Peoples R China

通讯作者： Liu, JY (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： MATERIALS

摘　　要： The polished stone value (PSV) of coarse aggregate is closely related to pavement skid resistance and traffic safety. However, the determination of the PSV of coarse aggregate is conventionally a time- and energy-intensive process. To facilitate the test process of PSV in materials selection and pavement design and for the prediction of the service life of aggregate materials in practical service, here a new mathematical model of PSV attenuation in coarse aggregate, which employs a physical polishing process analysis, is proposed. The PSVs of four types of coarse aggregates (calcined bauxite, granite, basalt, and limestone) were analyzed through a polishing experiment, and the corresponding mechanism was investigated via scanning electron microscopy analysis. The modeling results are in good agreement with experimental results. The aggregate PSV is affected by both the macrotexture and microtexture of the aggregate surface. The PSV due to the macrotexture exhibits a strong negative correlation with the Vickers hardness of the aggregates and decreases exponentially as the polishing time increases.

The attenuation rate decreases as the fractal box dimension in the aggregate surface morphology increases. The primary factor influencing the macrotexture service life and the half-life is the aggregate surface morphology. The PSV due to the microtexture exhibits a strong positive correlation with the Vickers hardness of the aggregates, whereas there is a poor correlation with the aggregate surface morphology and polishing time. The proportion of the aggregate PSV due to the microtexture increases as the aggregate hardness increases. These results highlight the effectiveness of a new modeling approach that may potentially assist in predicting the anti-slip performance and durability of coarse aggregates.

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WOS 号： 000531829000079

第 18 篇

标　　题： Microstructure Evolution And Properties Of Laser Cladding Cocrfenitialx High-Entropy Alloy Coatings

作　　者： [Xu, Yiku; Li, Zhiyuan; Liu, Jianru; Chen, Yongnan; Zhang, Fengying; Wu, Lei; Hao, Jianmin] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Liu, Lin] Northwestern Polytech Univ, State Key Lab Solidificat & Proc, Xian 710072, Peoples R China

通讯作者： Xu, YK; Chen, YN (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： COATINGS

摘　　要： High-entropy alloy (HEA) coatings of CoCrFeNiTiAlx (x = 0, 0.5, 1, 1.5, 2) were prepared on the surface of AISI1045 steel by laser cladding. The effects of the Al content on the microstructure, composition, phase constitution, and wear and corrosion resistance of the coatings were investigated. The results showed that when increasing the Al element content from 0 to 0.5, the phase constitution of the CoCrFeNiTiAlx coating changed from a single Face-centered cubic (FCC) phase to Body-centered cubic 1 (BCC1) and Body-centered cubic 2 (BCC2) phases, with a small amount of Laves phase, which obviously improved the friction and corrosion resistance of the coating. With further enhancing of the Al content, the amount of BCC1 phase increased, while the BCC2 phase and the Laves phase decreased. The CoCrFeNiTiAl2 HEA coating transformed into a single BCC1 phase, with retrogressive wear and corrosion resistance. It was found that the Al-0.5 alloy coating exhibits excellent wear resistance, high hardness, and corrosion resistance in a 3.5 wt.% NaCl solution. Furthermore, the effect of the Al content on the microstructure, phase, and the relating properties of the CoCrFeNiTiAlx HEA coatings is also discussed.

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WOS 号： 000534630600070

第 19 篇

标　　题： Effects Of Al Sputtering Film On The Oxidation Behavior Of Nicraly Bondcoat

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期　　刊： COATINGS

摘　　要： In this study, the oxidation behavior of Al coated NiCrAlY bondcoat is investigated. It is known that many methods are applied to improve the lifetime of bondcoat in thermal barrier coatings. Herein, the Al sputtering method is selected to increase the Al content, which does not change the structure of bondcoat. Thin Al film of similar to 2 mu m was sputtered on the surface of bondcoat, which improved the oxidation resistance of NiCrAlY bondcoat. Experimental results showed that, after oxidation for 200 h at 1200 degrees C, the formation of a dense and continuous alpha-Al2O3/Cr2O3 multilayer was observed on the Al coated bondcoat surface. In contrast, a mixed oxides (NiO, Cr2O3 and spinel oxides) layer formed on the surface of the as-sprayed bondcoat samples. Results of the cyclic oxidation at 1050 degrees C within 204 h indicated that the Al sputtering method can improve the oxidation resistance of bondcoat. This study offers a potential way to prolong the lifetime of thermal barrier coatings and provides analysis of the oxidation mechanism.

DOI： 10.3390/coatings10040376

WOS 号： 000534630600073

第 20 篇

标　　题： Electrochemical Controllable Synthesis Of Mno2 As Cathode Of Rechargeable Zinc-Ion Battery

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期　　刊： FUNCTIONAL MATERIALS LETTERS

摘　　要： MnO2 has been considered as an ideal cathode for rechargeable zinc-ion battery due to its high theoretical capacity and low cost. Its electrochemical performance is strongly dependent on the crystal structure and morphology. In this work, MnO2 films are electrochemically synthesized through anodic electrodepositing at different temperatures. Their morphology evolves from nanofibers assembled pompons to nanosheet arrays upon increasing electrodepositing temperature. When evaluated as cathode of rechargeable zinc-ion battery, the MnO2 film electrode electrodeposited at 10 degrees C displays the best electrochemical performance due to this it shows the best morphology and electrode/electrolyte interphase stability. It can stably cycle over 1000 cycles and remains a high capacity of 102 mAh g(-1) at 1.8 A g(-1), and a capacity of 80 mAh g(-1) at high current density of 4.5 A g(-1). This work provides a new direction

to prepare MnO2 electrode with stable electrochemical cyclability.

DOI： 10.1142/S1793604720500113

WOS 号： 000537348900003

第 21 篇

标　　题： Low-Thermal-Conductivity Thermal Barrier Coatings With A Multi-Scale Pore Design And Sintering Resistance Following Thermal Exposure

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期　　刊： RARE METALS

摘　　要： High-insulation, long-life thermal barrier coatings (TBCs) decrease the service temperature of superalloys and improve the service life of gas turbines. Improvement in the thermal insulation properties of the coating mainly depends on the optimization of the TBC structure. An important challenge for TBCs is maintaining a high performance during thermal exposure without degradation, as the pore-rich structure of the topcoat would inevitably be transformed by sintering. A low-thermal-conductivity anti-sintering coating can overcome the trade-off between thermal insulation and sinter degradation. In this review, the design, preparation, and serviceability evaluation of a low-thermal-conductivity anti-sintering coating will be discussed. Furthermore, directions for potential development are introduced. This paper provides a comprehensive understanding of the structured tailoring of TBCs for better thermal insulation and anti-sintering performance.

DOI： 10.1007/s12598-020-01393-6

WOS 号： 000523088600001

第 22 篇

标　　题： Se Molarity Tuned Composition And Configuration Of Ni3Se2/Nise Core-Shell Nanowire Heterostructures For Hydrogen Evolution Reaction

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期　　刊：JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要：Well-arranged heterogeneous interface is favored to enhance the electrocatalytic activities to utilize the synergistic effects of different crystalline phases. In this work, vertical aligned single crystal Ni3Se2 nanowires (NWs) wrapped by ultra-thin NiSe nanoflakes (NFs) with well-arranged heterogeneous interfaces along axial direction were successfully in situ grown on nickel foam (Ni foam) by a simple one-step hydrothermal method without posttreatment. The growth of Ni3Se2 NWs follows a surface reaction mechanism by which NiSe reacts with reactive Ni center dot atoms on surface lattice steps of Ni3Se2 nucleuses to grow both along radial and axial directions. The configurations of the products can be tuned from NiSe NEs to the core-shell NWs dominated structures by solely modulating Se molarity in chemical precursors motivated by the accelerated reaction kinetics. The hydrogen evolution reaction (HER) performance was improved with the increase of Se molarity attributing to the increased coverage of high aspect Ni3Se2/NiSe core-shell NWs arrays, metallic conductive feature of Ni3Se2 skeleton and well-arranged heterogeneous interfaces along the axial direction. The Ni3Se2/NiSe core-shell NWs with well-arranged heterogeneous interfaces may also be beneficial to other energy or environmental applications.

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WOS 号：000507378300133

第 23 篇

标　　题：Diselenide-Crosslinked Zwitterionic Nanogels With Dual Redox-Labile Properties For Controlled Drug Release

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期　　刊：POLYMER CHEMISTRY

摘　　要：Drug delivery systems developed from zwitterionic polymers have intriguing antifouling properties. Combining these with stimuli-responsiveness, we fabricated a new type of zwitterionic nanogel with dual redox-labile properties by copolymerization of 2-methacryloyloxyethyl phosphorylcholine (MPC) and a diselenide bond-containing crosslinker through reflux precipitation polymerization. Poly(2-methacryloyloxyethyl phosphorylcholine) (PMPC)-based nanogels show high protein adsorption resistibility and colloidal stability at high salt concentrations. By incorporation of diselenide bonds into polymer networks, the nanogels are endowed with unique dual redox-labile properties that lead to their efficient degradation into short polymers either in a reducing environment (GSH) or in an oxidative environment (H2O2). Nanogels loaded with anticancer drugs (doxorubicin, DOX) display a finely controlled release behavior and low leakage of DOX under physiological conditions (15.0% in 24 h), but rapid and sufficient release under reducing conditions (88.3% in 24 h) or under oxidative

conditions (82.2% in 24 h). Cell viability assays reveal that the blank nanogels have no cytotoxicity within a wide concentration range, while DOX-loaded nanogels present a significant inhibitive effect against tumor cells.

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WOS 号： 000526705400008

第 24 篇

标　　题： Compatibilization And Toughness Modification Of Linear Aliphatic Epoxy Compound On Paving Epoxy Asphalt

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期　　刊： MATERIALS AND STRUCTURES

摘　　要： Epoxy asphalt (EA), which is usually prepared by diglycidyl ether of bisphenol A (DGEBA), curing agent and asphalt, is a kind of high-performance pavement material in highway construction. However, because of rigid molecular structure of DGEBA, poor compatibility with asphalt and high cross-linking density of three-dimensional network, cured EA usually has high strength but poor toughness especially at low temperature. In order to solve the problem of insufficient toughness of EA below glass-transition temperature (T-g) and eliminate the potential brittle fracture of EA mixture, linear aliphatic epoxy compounds, which have low viscosity, good molecular flexibility, similar solubility parameter and polarity with asphalt or DGEBA resin, can be used as phase structure controller and toughner to modify EA. By introducing a little of linear aliphatic epoxy compound, such as 1, 4-butanediol diglycidyl ether (BDDGE) or 1, 6-hexanediol diglycidyl ether (HDDGE), not only the viscosity of EA could be significantly decreased during the curing process, but also the phase compatibility of EA could be improved. An obvious reduction in storage modulus (E ') at low temperature and decreased T-g also prove that BDDGE or HDDGE modified EA have better toughness than neat EA at low temperature. The optimum amount of linear aliphatic epoxy compound based on its mixture with DGEBA should be 10-15 wt%.

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WOS 号： 000528693100004

第 25 篇

标　　题： Adhesion Improvement Between Rap And Emulsified Asphalt By Modifying The Surface Characteristics Of Rap

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Recycled asphalt pavement (RAP) can be used in highway engineering again by cold recycled technology. Due to the aged asphalt on the surface of RAP, some problems such as poor adhesion between emulsified asphalt and RAP and the low properties of emulsified asphalt recycling mixture are easy to occur. This work aims at analyzing the aging degree of asphalt from RAP surface and improving the poor adhesion between RAP and emulsified asphalt by modifying the surface characteristics of RAP. In this work, a new device was designed to delaminate off the asphalt on the surface of RAP. The aging degree of asphalt at different layers was studied then by physical properties and molecular weight distribution. Slurry of hydrated lime (Ca(OH)(2)) (S-Ca) and slurry of silane coupling agent (SCA) modified Ca(OH)(2) (S-Si-Ca) were used to modify the asphalt on the surface of RAP, respectively. The adhesion between emulsified asphalt and RAP was studied by contact angle and boiling method. Results show that the asphalt on the RAP surface can be successfully stripped into four layers through the self-designed RAP delaminating and stripping device. The aging degree of asphalt wrapped around the surface of the RAP showed a tendency to be gradually severe from outside to inside. However, asphalt at the innermost layer (L4) shows abnormal situation due to the fact that the light components are absorbed by the aggregate. In addition, reasonable dosage of SCA is determined as 3.0% in Ca(OH)(2) powder mass. Both S-Ca and S-Si-Ca can effectively reduce the contact angle and thus improve the adhesion between emulsified asphalt and RAP. Moreover, S-Si-Ca possesses the most obvious modification effect attributed to the formation of asphalt-SCA-Ca(OH)(2) structure.

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WOS 号： 000532202200004

第 26 篇

标　　题： The Damage Mechanism Of 17Vol.%Sicp/Al Composite Under Uniaxial Tensile Stress

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期　　刊： MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING

摘　　要：In this paper, the deformation, fracture and damage behavior of SiCp/Al composites are studied by experiments and finite element analysis. The crack cracking process of the material was observed by in-situ tensile test, it was found that the composite first produced microcracks near the particles, and the cracks mainly spread to depth and then to both sides. It is determined by a tensile test that the fracture mechanism of the material is the tearing of the aluminum matrix and the peeling between the particles and the matrix. The tensile damage mechanism of the composite material in three directions (rolling direction, rolling transverse direction and rolling normal direction) and different strains were determined. It is found that in the process of tensile deformation, microcracks are first formed at the defects (voids) and weak interfaces, and many fine cracks converge together to form large cracks leading to the fracture of the material, during which a few particles fall off, but there is no particle fracture. The global and local tensile tests of the composites were simulated by finite element method, the results of the stress-strain state under different strains and the effects of particles on the materials are analyzed in detail, and the validity of the test results is determined.

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WOS 号：000525797900023

第 27 篇

标　　题：Investigation Of Cotton Straw Fibers For Asphalt Mixtures

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：Cellulose fiber is commonly used to improve the properties of asphalt pavement. However, its production process is complex and costly, consumes valuable forest resources, and pollutes the environment. Cotton straw is a waste of cotton production. Large quantities of cotton straw have not yet been reasonably used. In this study, cotton straw was processed into straw fibers by a simple mechanical pulverization method with a self-made planetary blade crusher. The processing parameters of the cotton straw fibers were selected, and the performance of the cotton straw fiber asphalt mixtures was investigated. Results show, as a potential substitution for cellulose fibers, cotton straw fibers can improve the high-temperature stability, low-temperature properties, and water stability of asphalt mixtures; processing cotton straw into fibers and using them in asphalt mixtures can make better use of waste materials of cotton production and has the advantages of energy conservation, environmental protection, and abundant resources.

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WOS 号：000521115700019

第 28 篇

标　　题：Effect Of Ta Addition On Solidification Characteristics Of Cocrfenitax Eutectic High Entropy Alloys

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期　　刊：INTERMETALLICS

摘　　要：Effect of Ta addition on solidification characteristics of CoCrFeNiTax (x = 0.1-0.7) eutectic high entropy alloys were investigated. With increasing Ta content, CoCrFeNiTax alloys changed from hypoeutectic alloys with primary y phase to eutectic alloy (x = 0.43) and to hypereutectic alloys with primary Laves phase. Consequently, Ta content in primary phase significantly increased, while the content of Ta element in gamma/Laves eutectic phases slightly decreased. Meanwhile, the solidification path and solidification characteristic temperatures of CoCrFe-NiTax alloys both agreed with typical binary eutectic phase diagram, and obvious microsegregation of Ta element was only found in CoCrFe-NiTa0.1 alloy. Furthermore, the contents of Co, Cr, Fe and Ni elements in primary phases and distribution behaviors of Co, Cr, Fe and Ni elements were both different in CoCrFeNiTax alloys, which indicated that CoCrFeNiTax alloys cannot be simplified as (CoCrFeNi)-Ta pseudo binary system when analyzing distribution behaviors of Co, Cr, Fe and Ni elements.

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WOS 号：000528268500021

第 29 篇

标　　题：Phase Equilibria And Multi-Element Interaction Study In The Metal-Rich Side Of The Nb-Ti-Si-Al Quaternary System

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期　　刊：INTERMETALLICS

摘　　要：The knowledge of phase diagram is theoretical principle for compositional design. Since Ti and Al are important alloying elements for Nb-Si alloys, and Nb and Si are important alloying elements for Ti-Al alloys, Nb-Ti-Si-Al phase equilibria is prerequisite for optimal microstructural design of both Nb-Si and Ti-Al systems. In this work, key alloys were selected firstly according to calculated isothermal section based on extrapolated thermodynamic description, then key alloy ingots were prepared by arc-melting and heat treated to reach equilibrium state. Currently obtained phase equilibria data coupled with critically reviewed literature data were employed to study the element interaction of relative phases (alpha-Nb5Si3, beta-Nb5Si3, Ti5Si3, Nb3Al and TiAl et al.) in the Nb-Ti-Si-Al system. Thermodynamic parameters of these phases were modified accordingly to reproduce the determined phase relationships. Finally, the important phase equilibria features of the Nb-Ti-Si-Al system were described with several isothermal sections. The phase equilibria extending from ternary systems and new phase equilibria appearing in the quaternary space were demonstrated in this work.

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第 30 篇

标　　题：Effect Of Heat Treatment On The Interface Of High-Entropy Alloy Particles Reinforced Aluminum Matrix Composites

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期　　刊：JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要：In this paper, high entropy alloy particles reinforced 5052 aluminum matrix composites were successfully prepared by vacuum hot pressing sintering technology. Interface layers with different thickness were formed in the composites by heat treatment. The effects of heat treatment temperature and time on the interface layer of composites were systematically studied by scanning electron microscopy (SEM), energy dispersion spectroscopy (EDS), X-ray diffraction (XRD), electron probe microanalysis (EPMA) and nano-indentation. The results show that the new core-shell structure particles are dominant in the composites with long holding time at 500 degrees C heat treatment. Hardness and Young's modulus of the composites are obviously improved by the generation of the interface layer. With the increase of heat treatment time, the thickness

of the interface layer increases, and the discontinuous interface layer will obviously increase the hardness and Young's modulus of the composites, which is related to the stress concentration and the bonding degree between the interface and the matrix. (C) 2020 Elsevier B.V. All rights reserved.

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WOS 号： 000512377800028

第 31 篇

标　　题： Environment-Friendly Zno-Based Molecularly Imprinting Polymers Fluorescence Sensor For Direct Detection Of Sulfadimidine

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期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要： This work reports a molecularly imprinting polymer based on environmentally friendly and non-toxic ZnO quantum dots for the selective detection sulfadimidine. The MIP@ZnO was prepared by sol-gel method, which usedZnO quantum dots, TEOS, APTES, ammonia as signal materials, cross-linker, function monomer, and initiator, respectively. Result proved that MIP@ZnO exhibited excellent selective fluorescence quenching in the presence of sulfadimidine, good linear relationship in the range of 0-40 mu mol L-1 with a correlation coefficient (R-2) of 0.98547 was obtained, and the imprinting factor was 2.83. Furthermore, MIP@ZnO has been successfully applied for detection SM2 in real samples with the spiked recoveries ranging from 95.6 to 99.8% with RSD below 2.38%.

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WOS 号： 000531510800011

第 32 篇

标　　题： Hydrothermal Preparation Of Cqds/Mos2/Nise2 Composite As Electrode Material For Supercapacitor

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期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要： A simple hydrothermal method was used to synthesize four kinds of electrode materials (NiSe2, MoS2, MoS2/NiSe2 composite, and CQDs/MoS2/NiSe2 composite). Structures and electrochemical performance were investigated. Among the four kinds of electrode materials, CQDs/MoS2/NiSe2 composite has excellent performance. The specific capacitance of the CQDs/MoS2/NiSe2 composite can be as high as 1540.7 F g(-1) at a current density of 5 A g(-1), which is higher than that of NiSe2 (830.9 F g(-1)), MoS2 (82.2 F g(-1)) and MoS2/NiSe2 composite (1289.7 F g(-1)). After 2000 cycles, the specific capacitance of the CQDs/MoS2/NiSe2 composite can be retained by 80.6% at

20 A g(-1), indicating its good cycling stability. The experiment results show that the CQDs/MoS2/NiSe2 composite has promising electrochemical energy storage application in supercapacitors.

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WOS 号： 000530790000008

第 33 篇

标　　题： 3D Porous Self-Standing Sb Foam Anode With A Conformal Indium Layer For Enhanced Sodium Storage

作　　者： [Fan, Xiao-Yong; Jiang, Zhen; Han, Jiaxing; Sun, Ruibo; Gou, Lei; Li, Dong-Lin] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Huang, Long; Wang, Xinxin; Ding, Yuan-Li] Hunan Univ, Coll Mat Sci & Engn, Changsha 410082, Hunan, Peoples R China; [Ding, Yuan-Li] Zhejiang Univ, State Key Lab Silicon Mat, Hangzhou 310027, Peoples R China

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期　　刊： ACS APPLIED MATERIALS & INTERFACES

摘　　要： Antimony (Sb) has been considered as a promising anode for sodium-ion batteries (SIBs) because of its high theoretical capacity and moderate working potential but suffers from the dramatic volume variations (similar to 250%), an unstable electrode/electrolyte interphase, active material exfoliation, and a continuously increased interphase impedance upon sodiation and desodiation processes. To address these issues, we report a unique three-dimensional (3D) porous self-standing foam electrode built from core-shelled sbp In2O3 nanostructures via a continuous electrodepositing strategy coupled with surface chemical passivation. Such a hierarchical structure possesses a robust framework with rich voids and a dense protection layer (In2O3), which allow Sb nanoparticles to well accommodate their mechanical strain for efficiently avoiding electrode cracks and pulverization with a stable electrode/electrolyte interphase upon sodiation/desodiation processes. When evaluated as an anode for SIBs, the prepared nanoarchitectures exhibit a high first reversible capacity (641.3 mA h g(-1)) and good cyclability (456.5 mA h g(-1) after 300 cycles at 300 mA g(-1)), along with superior high rate capacity (348.9 mA h g(-1) even at 20 A g(-1)) with a first Coulomb efficiency as high as 85.3%. This work could offer an efficient approach to improve alloying-based anode materials for promoting their practical applications.

DOI： 10.1021/acsami.9b23501

WOS 号： 000535170300021

第 34 篇

标　　题： Type-Ii Tunable Sic/Inse Heterostructures Under An Electric Field And Biaxial Strain

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期　　刊： PHYSICAL CHEMISTRY CHEMICAL PHYSICS

摘　　要： In this study, first-principles calculations based on the density functional theory (DFT) are exploited to investigate the electronic capabilities of SiC/InSe heterostructures. According to our results, the SiC/InSe heterostructure possesses an inherent type-II band alignment, which displays a noticeable Stark effect on the band gap under a stable electric field. Besides, the heterostructure exhibits a low carrier effective mass and a narrower band gap when it is subject to tensile strain. More interestingly, the transition from an indirect to a direct band gap occurs when 8% of compressive strain is applied. Taken together, findings in this study indicate that the SiC/InSe heterostructure opens up a new avenue for its application in the fields of optoelectronics and microelectronics.

DOI： 10.1039/d0cp00291g

WOS 号： 000532479300047

第 35 篇

标　　题： A Superhigh-Temperature Hydrothermal Treatment To Construct Cofe2O4@C/Graphene Composite For Enhanced Lithium Storage

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期　　刊： MATERIALS TECHNOLOGY

摘　　要： Cobalt ferrite (CoFe2O4) has drawn great attraction due to its high theoretical specific capacity (916 mAh g(-1)), low cost, highlighted chemical stability and environmental benignity. However, it demonstrates poor electrochemical performance due to low instinctive electrical conductivity, huge volume expansion and serious collapse during repeated cycling. In this work, CoFe2O4@C/graphene composite is prepared through a superhigh-temperature hydrothermal treatment. Since the carbonisation process and formation of CoFe2O4 nanoparticles are simultaneously carried out in high pressure environment, which assures CoFe2O4 @C uniformly assembled on the graphene nanosheets without re-stacking. This composite delivers excellent electrochemical performance. A reversible capacity of 557.9 mAh g(-1) remained after 500 cycles at 1 A g(-1), and 395.2 mAh g(-1) maintained after 1000 cycles at 5 A g(-1), which is better than those of the most reports. This work provides a significantly simple and effective method to enhance the lithium storage of transition metal oxides.

DOI： 10.1080/10667857.2020.1763651

WOS 号： 000532484300001

第 36 篇

标　　题：Growth And Characterization Of Inclusion-Free Cdmgte Single Crystals Using Modified Bridgman Method

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期　　刊：JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要：CdMgTe crystal is a hopeful room temperature radiation detection material because of some potential advantages. The Cd0.95Mg0.05Te ingot with free of inclusion was successfully grown by a modified Bridgman method in this paper. This results was achieved by using a significant excess cadmium and in situ annealing during the growth process. The grown ingot was about 30 mm in diameter and 120 mm in length. The CdMgTe crystal had a cubic zinc-blende structure. The distribution of Mg element along growth direction was homogeneous. In the whole ingot, no inclusions were observed in IR images and as high IR transmittance as above 60% was measured. Raman scattering spectroscopy showed a good crystal quality for CdMgTe crystals. Moreover, the resistivity with 10(9) omega cm order of magnitudes for the ingot could be useful for the fabrication of room temperature radiation detector.

DOI：10.1007/s10854-020-03566-6

WOS 号：000532809400005

第 37 篇

标　　题：Investigation Of The Bonding Formation Of A Plasma-Sprayed Cast Iron Splat On A Preheated Aluminum Substrate Using An Experimentally Based Numerical Simulation Method

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期　　刊：JOURNAL OF THERMAL SPRAY TECHNOLOGY

摘　　要：In this study, the bonding formation of the cast iron splat deposited on a preheated aluminum substrate by atmospheric plasma spraying was investigated using a finite element method based on a heat transfer model built in a cylindrical coordinate system. To enhance the accuracy of calculations, thermal contact resistance (R-th) of the contact interface was incorporated into the calculation. A precise R-th value was obtained using a well-established relationship. The diameter of grains in the splat was determined by atomic force microscopy analysis. Furthermore, the physical parameters of the cast iron and the aluminum at different temperatures used in the simulation were calculated according to the composition of the materials. The calculations indicated that the interface temperature was below the substrate melting point during the entire

observation period, confirming that no melting of the aluminum substrate had occurred. Thus, the formation of splat-substrate metallurgical bonding was attributed to the enhanced interface temperature and plastic deformation rather than the melting of the substrate surface.

DOI： 10.1007/s11666-020-01044-3

WOS 号： 000532616000001

第 38 篇

标　　题： Characteristics Of The Cement Asphalt Emulsion Mixture With Early-Age Strength And Flowability

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期　　刊： FRONTIERS IN MATERIALS

摘　　要： Cement asphalt emulsion mixture (CAEM) presents low early-age strength and poor flowability, which limits its application range at a certain degree. In this paper, CAEM with high early-age strength and flowability was proposed. The flowability, compressive strength, flexural strength of CAEM at different periods and 28 days elastic modulus of CAEM were investigated. In addition, evolution of composition and microstructure of CAEM was analyzed by X-ray diffraction (XRD), scanning electronic microscope (SEM), and mercury intrusion porosimetry (MIP). The results indicated that the compressive strength of CAEM can be enhanced quickly in several hours. It could achieve 17-24 MPa at 6 h and almost reached 79-90% of the 28 days compressive strength. SEM and XRD analysis found that the hydration products in CAEM at different periods were obviously different. The hydration products of 2 h filled the micro pores of the mixture. After 28 days, the hydration products were connected to each other, resulting in a denser structure. The results of MIP analysis showed that the pore cumulative volume of CAEM was similar for 2 h and 28 days samples. These results testified that CAEM had high early-age strength.

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WOS 号： 000538500000001

第 39 篇

标　　题： Facile Route Of Nitrogen Doping In Nickel Cobalt Phosphide For Highly Efficient Hydrogen Evolution In Both Acid And Alkaline Electrolytes

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期　　刊： APPLIED SURFACE SCIENCE

摘　　要： Ternary nickel cobalt phosphide (NiCoP) is believed to be a promising water-splitting electrocatalyst owing to the synergistic effect between different transition metals. Herein, nitrogen doping NiCoP (N-NiCoP) nanowire arrays on carbon fiber paper skeleton (CFP) are synthesized by a facile hydrothermal reaction and subsequent phosphorization-nigtrogenization method. Structural characterizations and density functional theory (DFT) calculations demonstrate that N dopant prefer to replace O defects rather than P atoms in NiCoP lattice. It is illustrated that the Gibbs free energy of H (Delta G(H)*) in Ni-Co bridge sites is lowered from -0.35 eV of NiCoP to - 0.26 eV of N-NiCoP by 25.7%, moreover, the increased d-orbital electronic density of Co and Ni promotes the charge transfer of hydrogen evolution reaction (HER). Consequently, the HER performance of N-NiCoP is substantially enhanced as compared to NiCoP. For N-NiCoP, the overpotentials to reach a current density of 100 mA.cm(-2) are 149 and 162.5 mV in 0.5 M H2SO4 and 1 M KOH, respectively, and their Tafel slopes are 40.1 and 59.8 mV.dec(-1), respectively. N doping offers an effective and promising route for improved HER performance of NiCoP catalyst in acid and alkaline electrolytes.

DOI： 10.1016/j.apsusc.2020.145715

WOS 号： 000522731700085

第 40 篇

标　　题： Preparation And Properties Of Hemispherical Cdmnte Nuclear Radiation Detectors

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期　　刊： NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS

摘　　要： As a new generation of semiconductor materials, cadmium manganese telluride (CdMnTe) is a candidate material for nuclear radiation detection in environmental monitoring and industrial nondestructive testing. In general, a planar detector with symmetrical electrodes decreases energy resolution because of incomplete hole collection. To increase energy resolution, a hemispherical detector was designed with a volume of 4 x 4 x 2 cm(3). First, the infrared transmittance of the wafers was investigated, and the best wafer was chosen. Second, the planar and hemispherical detectors were prepared and subjected to I-V test and energy spectrum measurements at room temperature. The energy spectrum resolutions for the planar detector, unannealed hemispherical detectors, and annealed hemispherical detectors were 27.5%, 15.5%, and 10.9%, respectively, at uncollimated a particles (5.48 MeV) of gamma rays. The results showed that the hemispherical detectors had a higher energy resolution than the planar

detector. Rapid annealing played an important role in improving the electrode contact performance and energy resolution. The calculated electron mobility and lifetime product was 6.70 x 10(-4) cm(2)/V.

DOI： 10.1016/j.nimb.2020.03.018

WOS 号： 000525316900007

第 41 篇

标　　题： Investigation On Evolution Of Bitumen Composition And Micro-Structure During Aging

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通讯作者： Fa, CG (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Aging is an important cause of the performance decline for bitumen. Research on the composition and micro-structure contributes to a better understanding of the bitumen aging. In this study, five bitumens from different oil sources were chosen for the aging tests and then separated into four compositions. Gel permeation chromatography (GPC), Fourier transform infrared spectroscopy (FTIR), atomic force microscopy (AFM) were utilized to test molecular weight, prominent function groups and surface morphology of single composition, respectively. Moreover, prominent function groups and surface morphology of the five bitumens before and after aging were investigated by FTIR and AFM. Based on the experimental evidences, it was found that light compositions were evolved into heavy compositions and prominent function groups increased after aging. The bee structures observed by AFM on bitumen surface probably originated from asphaltenes and partial resins and they became gradually indistinguishable after aging. Besides, some sunken regions or micro-cracks appeared around the bee structures after aging. There are some correlations between composition variation and micro-structure evolution during aging. The greater the colloid index decreased, the faster the indexes of the carbonyl functions and the sulfoxide functions grew, and the peak height and roughness of surface morphology on bitumen decreased with the decline of the colloid index.

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WOS 号： 000527410200035

第 42 篇

标　　题： Effects Of Cement Contents On The Performance Of Cement Asphalt Emulsion Mixtures With Rapidly Developed Early-Age Strength

作　　者： [Tian, Yaogang; Lu, Dong; Ma, Ronghui; Yan, Xiaohui] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Lu, Dong] Harbin Inst Technol, Sch Civil Engn, Harbin 150090, Peoples R China; [Zhang, Jun] Changan Univ, Sch Construct Machinery, Xian 710061, Peoples R China; [Li, Weiguang] Changan Univ, Sch

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： This study aims to develop a new type of cement asphalt emulsion mixtures (CAEMs) by introducing high content of cement. Firstly, 4-h compressive strength and elastic modulus were adopted to evaluate the early-age strength of CAEMs. And then moisture susceptibility, high-temperature performance, frost resistance, low-temperature performance and fatigue performance were determined to characterize the pavement performance of CAEMs. Finally, the relation between 4-h compressive strength and pavement performance of CAEMs was developed. Experiment results showed that high content of cement provided a high and a rapid developed early-age strength of CAEMs. A strong linear correlation was also obtained between the early-age strength and partial pavement performance of CAEMs. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000527410200068

第 43 篇

标　　题： Interaction Between Powder Particle And Gas-Liquid Interface Of The Melt Pool During Laser Solid Forming Process

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期　　刊： OPTICS AND LASERS IN ENGINEERING

摘　　要： The three-dimensional (3-D) simulation of powder particle entering melt pool during laser solid forming (LSF) was carried out in our quest to establish a general representative model of this phenomenon. The effect of the gas-liquid interface on the motion state of the powder was analyzed, and the accuracy and universality of the model were verified using a high-speed photographic experimental approach. Further, the simulation process of the Ti-6Al-4V powder particle entering the high-temperature Ti-6Al-4V melt pool was carried out. The effects of the gas-liquid interface of the melt pool on the motion state of the powder particle and the disturbing of the powder particle on the melt pool were studied. It was found that the running speed of the particle experienced a rapid decrease and then a slower decrease in the process of entering the pool. Also, the particle serves as a transport medium of gases and carries the gases into the pool, which could form pores in the deposited layer. When the particles enter the melt pool at varied speeds, the ratio of the instantaneous speed of the particle entering the pool to the initial incident speed differs, which increases with increasing initial speed.

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WOS 号： 000530024400022

第 44 篇
标　　题： Cooperative Effects Of Free Volume And Nanocrystallite On Plastic Deformation In Bulk Amorphous Al2O3-Zro2-Y2O3
作　　者： [Xu, Xiqing; Xie, Jing; Li, Hui; Su, Xinghua; Wang, Xingang] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Wang, Mingchao] Civil Aviat Univ China, Coll Sci, Tianjin 300300, Peoples R China; [Zhai, Chenxi] Florida State Univ, FAMU FSU Coll Engn, Dept Mech Engn, Tallahassee, FL 32310 USA
通讯作者： Wang, XG (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.
期　　刊： CERAMICS INTERNATIONAL
摘　　要： Bulk amorphous Al2O3-ZrO2-Y2O3 samples are fabricated by hot pressing and heat treated at 750-950 degrees C to adjust the free volume and crystallinity degrees, and the cooperative effects of free volume and nanocrystallite on plasticity are explored. With increasing heat treatment temperature, the free volume decreases monotonically, and the nanocrystallization initiates above 800 degrees C. Under compression at 500 degrees C, the plastic strain is in linear correlation to the free volume for fully amorphous samples or amorphous/nanocrystalline composites, respectively. The larger free volume concentration is beneficial to the formation and propagation of shear bands, and achieves to larger plasticity. Although the amorphous/nanocrystalline composites have lower free volume, they display better plasticity than the fully amorphous samples, attributed to the microstress concentration at the interfaces between nanocrystalline and amorphous matrix. Due to the coexistence of tiny nanocrystallite and sufficient free volume, the sample heat treated at 850 degrees C exhibits the best plasticity with strain of 9.9%.
DOI： 10.1016/j.ceramint.2020.01.123
WOS 号： 000528481900131

第 45 篇
标　　题： Corrosion Mechanism Investigation Of Tin/Ti Coating And Tc4 Alloy For Aircraft Compressor
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通讯作者： He, GY (corresponding author), Air Force Engn Univ, Sci & Technol Plasma Dynam Lab, Xian 710038, Peoples R China.
期　　刊： CHINESE JOURNAL OF AERONAUTICS
摘　　要： It is imperative to develop multifunctional erosion and corrosion resistant coatings for compressor blades of aircraft engines in harsh environment. PVD (Physical Vapor Deposition) technology has the advances in processing erosion-resistant coatings;

however, the performance of PVD coatings to combat corrosion depends on various coating defects. Determining and comparing the corrosion performances of PVD TiN/Ti coating and uncoated TC4 alloy was the main objective of present work. The 960 h salt spray corrosion and 116 h hot corrosion tests were conducted to simulate the grounding and working environments of the aircraft compressors. The corrosion mechanisms due to the coating defects such as pinhole, columnar boundary and large grain were analyzed based on the OM, Confocal microscope, electrochemical measurements, SEM, XRD and EDS results. Owing to the disordered state associated with the columnar boundary and the coating defect, nitrogen could be easily replaced by oxygen in the hot corrosion process, these structures were channels for fast diffusion of oxygen. Moreover, the Gibbs energy changes of Ti oxidation and TiN oxidation were thermodynamically calculated according to the working condition of aircraft compressors, and considerable research effort was focused on mapping out the phase diagram of Ti, TiN and high pressure gases. The findings of this research can provide insights into developing multifunctional coatings for future aircraft engines.

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WOS 号： 000541015400010

第 46 篇

标　　题： Evaluation Of High-Temperature Performance Of Asphalt Mixtures Based On Climatic Conditions

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通讯作者： Fu, Z (corresponding author), Changan Univ, Sch Mat & Sci Engn, Xian 710064, Peoples R China.

期　　刊： COATINGS

摘　　要： The dynamic stability of a rutting test does not optimally reflect the high-temperature stability of asphalt mixtures. In this study, a rutting test was performed over a long duration (4 h) at different temperatures (40, 50, 60, 70 degrees C) for three asphalt mixtures, namely, matrix AC-16, SMA-16, and modified AC-16 asphalt mixtures. Subsequently, the temperature rutting rate was obtained after considering the annual temperature conditions of Guangdong and Beijing in China. Because the conditions of the rutting test were different from that of the actual pavement, the rut depth was calculated using a modified temperature rutting rate. This modification considered four factors: wheel trace distribution, temperature, pavement thickness, and loading rate. The calculation of the temperature rutting rate considered the climatic conditions and utilized the rutting deformation data from hour 1-4 of the rutting tests, during which the asphalt mixture was in a stable creep period. Thus, the high-temperature stability of the asphalt mixture was reflected more scientifically by the temperature rutting rate than the dynamic stability. The high-temperature rut-resistance of the asphalt mixture was found to improve significantly after the introduction of two additives (anti-rutting agent and lignin fiber). The modified formula for rut depth can realistically predict the annual rutting depth for three asphalt mixtures in a one-way driving pavement.

DOI： 10.3390/coatings10060535
WOS 号： 000553988200001

第 47 篇
标　　题： Dynamic Characteristics And Chloride Resistance Of Basalt And Polypropylene Fibers Reinforced Recycled Aggregate Concrete
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通讯作者： Cao, H (corresponding author), Nantong Univ, Sch Transportat & Civil Engn, Nantong 226019, Jiangsu, Peoples R China.
期　　刊： ADVANCES IN POLYMER TECHNOLOGY
摘　　要： Fiber polymer has been extensively used to improve the mechanical properties and durability of concrete. However, the studies of the effect of fiber polymer on the dynamic performance of recycled aggregate concrete (RAC) is still very limited. In this study, we prepared two types of RAC formulations: RAC reinforced with basalt fibers (BFs) and RAC reinforced with polypropylene fibers (PPs), and compared the effects of fiber types and contents on the air void content, workability (slump), mechanical properties (compressive and flexural strength), dynamic characteristics (dynamic modulus of elasticity and damping ratio), and chloride resistance of RAC. The experimental results showed that the air void content and slump value decreased with the increase of replacement percentage of RCA and fiber contents. Adding PPs provided a more negative effect on the slump of RAC than BFs. The mixtures containing 0.2% PPs and BFs both obtained the highest flexural strength. The addition of PPs was more effective than BFs in improving the damping ratio of RAC, and the mixtures containing 0.3% PPs and BFs both obtained the highest damping ratio. Compared to the RAC without addition of fiber, the charge passed of specimen with addition of PPs approximately increased by 45%, while the specimen with addition of BFs approximately increased by 30%, when the fiber content was 0.3%. This study demonstrates the potential of using fiber to promote the dynamic properties of RAC.
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WOS 号： 000542628600002

第 48 篇
标　　题： Effect Of Metallic-Waste Aggregates On Microwave Self-Healing Performances Of Asphalt Mixtures
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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Some metallic waste, such as steel slag, has great potential for microwave heating to heal asphalt mixtures as an excellent microwave absorbing material. Prior to this study, hot braised steel slag (HBSS) was firstly selected from three kinds of metallic wastes according to the microwave heat releasing test results. Afterwards, the self-healing performance of the purpose-designed asphalt mixtures was evaluated by cyclic crack-healing tests with the semi-circular bending method. During microwave heating, the temperature distribution and thermal diffusion of asphalt mixtures were observed using an infrared camera. The spatial distribution of the HBSS inside the asphalt mixtures was analyzed using X-ray computed tomography (CT). Results indicated that the asphalt mixtures with a 60% replacement in volume by HBSS of coarse aggregate (4.75-9.5 mm) produced better healing performance after 30 s heating. The infrared images indicated thermal diffusion behavior and confirmed the temperature of mixtures can be increased by microwave. The three-dimensional reconstruction data based on X-ray CT scan demonstrated the HBSS was uniformly distributed inside the asphalt mixtures, and as such it converted the energy of microwave irradiation effectively into thermal energy.

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WOS 号：000527309800060

第 49 篇

标　　题：Star-Shaped Thienoviologens For Electrochromism And Detection Of Picric Acid In Aqueous Medium

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期　　刊：DYES AND PIGMENTS

摘　　要：Two star-shaped thienoviologens with good redox and emission properties are reported. The results indicate that the increasing number of thiophene rings can strongly weaken the electron-accepting ability and make its first reduction wave shifted to more negative position, accompanying the decrease of the fluorescence quantum yield. The star-shaped thienoviologens were used as electroactive materials to fabricate electrochromic devices, which showed three-colour changes modulated by the different voltages. The star-shaped thienoviologens were used to detect the picric acid (PA) in aqueous medium with good sensitivity and selectivity (K-sv, (5a)= 1.94 x 10 5 L/mol; K-sv, (5b) = 5.38 x 10(4)L/mol) due to their special molecular architecture and cathodic conjugated scaffold.

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WOS 号： 000525304400015

第 50 篇
标　　题： Effect Of B4C Addition On The Oxidation Behavior Of Borosilicate Glass Repairing Coating For C/C Brake Materials
作　　者： [Deng, Juanli; Hu, Kaiyue; Lu, Baofu; Li, Hao; Wang, Jiahao] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China; [Deng, Juanli; Ma, Xu; Fan, Shangwu; Zhang, Litong; Cheng, Laifei] Northwestern Polytech Univ, Sci & Technol Thermostruct Composite Mat Lab, Xian 710072, Shaanxi, Peoples R China
通讯作者： Fan, SW (corresponding author), Northwestern Polytech Univ, Sci & Technol Thermostruct Composite Mat Lab, Xian 710072, Shaanxi, Peoples R China.; Hu, KY (corresponding author), Changan Univ, Xian 710064, Shaanxi, Peoples R China.
期　　刊： CERAMICS INTERNATIONAL
摘　　要： The thermal properties of the borosilicate glass repair coating with B4C as a ceramic additive were analyzed, and the changes of thermal expansion, density, and porosity of the glass materials were investigated to characterize the physical characteristics of the repair coating. The results showed that this repair coating displayed variable oxidation resistance and self-healing property at temperatures from 700 to 900 degrees C, depending on the B4C content. The B2O3 generated from B4C can be dissolved into the borosilicate glass, which could significantly change the coefficient of thermal expansion and the softening temperature of the glass. When B4C content was 25 wt%, the coating with the lowest porosity and oxygen permeability was formed. A model of structure transition of the oxidation-resistant mechanism of the B4C added borosilicate glass coating was discussed.
DOI： 10.1016/j.ceramint.2020.02.248
WOS 号： 000533511200019

第 51 篇
标　　题： Investigation Of Adhesion Properties Between Asphalt And Calcined Bauxite Aggregate
作　　者： [Guan, Bowen; Wu, Jiayu; Tian, Haitao; Liu, Jingyi; Liu, Jianan; Xiong, Rui] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Yang, Fa] Yunnan Commun Investment & Construct Grp Co, 37 Qianxing Rd, Kunming 650011, Yunnan, Peoples R China
通讯作者： Guan, BW (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.
期　　刊： JOURNAL OF MATERIALS IN CIVIL ENGINEERING
摘　　要： This article presents a study evaluating the adhesion properties between asphalt and calcined bauxite. Limestone and granite were also compared with calcined bauxite. For this purpose, asphalt bond strength, surface free energy, and phase angle of asphalt and aggregate were tested. The chemical reaction and mechanical adhesion of asphalt-aggregate were also investigated using Fourier transform infrared spectroscopy (FTIR) and a surface roughness test. The results showed that the higher the alumina

content of the calcined bauxite, the greater the adhesion. The adhesion properties of asphalt and aggregate were ranked as follows: limestone > calcined bauxite > granite. Based on the results of the gray correlation analysis, it can be concluded that the intermolecular interactions between asphalt and aggregate play a major role in adhesion. The interlocking caused by surface texture also affects adhesion to some extent. The larger work of adhesion and the more complex surface texture of calcined bauxite with higher alumina content are the main reasons for its higher adhesion. Calcined bauxite with low alumina content should be treated to enhance adhesion before it is used in asphalt mixtures for wearing courses.

DOI： 10.1061/(ASCE)MT.1943-5533.0003170

WOS 号： 000536131200039

第 52 篇

标　　题： Microstructure Evolution And Mechanical Properties Of Fecocrnicuti(0.8)High-Entropy Alloy Prepared By Directional Solidification

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通讯作者： Xu, YK (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： ENTROPY

摘　　要： A CoCrCuFeNiTi(0.8)high-entropy alloy was prepared using directional solidification techniques at different withdrawal rates (50 mu m/s, 100 mu m/s, 500 mu m/s). The results showed that the microstructure was dendritic at all withdrawal rates. As the withdrawal rate increased, the dendrite orientation become uniform. Additionally, the accumulation of Cr and Ti elements at the solid/liquid interface caused the formation of dendrites. Through the measurement of the primary dendrite spacing (lambda(1)) and the secondary dendrite spacing (lambda(2)), it was concluded that the dendrite structure was obviously refined with the increase in the withdrawal rate to 500 mu m/s. The maximum compressive strength reached 1449.8 MPa, and the maximum hardness was 520 HV. Moreover, the plastic strain of the alloy without directional solidification was 2.11%, while the plastic strain of directional solidification was 12.57% at 500 mu m/s. It has been proved that directional solidification technology can effectively improve the mechanical properties of the CoCrCuFeNiTi(0.8)high-entropy alloy.

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WOS 号： 000557047400001

第 53 篇

标　　题： Effects Of Thermal Degradation On Polymer Modified Asphalt Binders During Storage And Transportation

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Currently, more and more polymer modified asphalt binders (PMA) were used in road engineering in China. There are still many unqualified phenomena in the test of PMA samples on the construction site, which causes a confusion of suppler. To obtain the high quality of asphalt pavement, the effects of thermal degradation on PMA during storage and transportation become very important. This paper investigates physical properties and molecular structure of PMA samples by a series of test. The results of conventional tests indicated that time, temperature and oxygen concentration (thermal degradation test in thin air (TDTTA) and TFOT) have great effects on the deterioration of asphalt performance. For TDTTA or TFOT, the PMA exhibit performance erosion with time increasing. Moreover, the influences of temperature on physical properties of three PMA can be ranked as follows:163 degrees C> 150 degrees C> 130 degrees C. Compared with the effects of TDTTA on physical properties of three PMA, the TFOT has a more significant effect on physical properties of three PMA. The reason is that many scholars main focus on the study of conditions of high oxygen concentrated. Moreover, fourier transform infrared spectroscopy (FTIR) displayed that there were no chemical reaction found in three PMA. For TDTTA or TFOT, the degradation reaction of polymer in three PMA can clearly present base on analysis results of gel permeation chromatography (GPC) and FTIR. The performance erosion of PMA is more obvious in the air/oxygen compared with performance erosion of PMA in the thin air/oxygen, but the performance degradation cannot be ignored when the air/oxygen is lack during the process of practical applications. (C) 2020 Elsevier Ltd. All rights reserved.

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第 54 篇

标　　题：Investigation On Characteristics And Properties Of Bagasse Fibers: Performances Of Asphalt Mixtures With Bagasse Fibers

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Bagasse from sugar industry waste contains plenty of nature fiber materials and the application of nature fibers in hot mix asphalt has become a more attractive alternative for the construction of road pavement. The aim of this work focuses on investigating the characteristics of bagasse fibers and performances of asphalt mixtures blended with bagasse fibers, compared with lignin fibers. The microstructure, components and properties of bagasse fibers were studied by Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectrometer (FTIR), X-ray diffraction (XRD) and thermogravimetric analysis (TGA). The oil absorbing test and heat resistance test were carried out to evaluate the adsorbability and heat resistance of bagasse fibers. In

addition, the Marshall stability, high temperature stability, low temperature cracking resistance and water susceptibility of AC-13 and SMA-13 mixtures blended with fibers were comparatively evaluated by a series tests. Results show that the bagasse fibers have corrugated surface and irregular lumens and contain cellulose, hemicellulose, and aromatic polymers, mostly composed of amorphous and natural polysaccharide components similar to lignin fibers. The thermostability of bagasse fibers is slightly better than that of lignin fibers while the adsorbability of the latter is greater than that of the former. The high temperature stability and low temperature cracking resistance of asphalt mixtures can be greatly improved by adding bagasse fibers. The pavement performances of asphalt mixtures with bagasse fibers are basically close to that of asphalt mixtures with lignin fibers. Hence, bagasse fibers can be described as an environmentally friendly alternative for future pavement construction. (C) 2020 Elsevier Ltd. All rights reserved.

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第 55 篇

标　　题： Dielectric Properties And Electromagnetic Interference Shielding Effectiveness Of Al2O3 -Based Composites Filled With Fesial And Flaky Graphite

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通讯作者： Zhou, L; Wang, HB (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要： Al2O3-based composites filled with FeSiAI and flaky graphite (FG) were prepared by hot-pressed sintering. The dielectric properties and electromagnetic interference shielding effectiveness were investigated. As the mass ratio of FeSiAI to FG decreases from 4:1 to 0:5, the real (epsilon') and imaginary (epsilon '') parts of complex permittivity increase significantly. The increased epsilon' values are ascribed to the enhancement of interfacial polarization and electronic polarization, and the elevated conductance loss and relaxation loss lead to the increased epsilon '' values. Due to the formation of conductive network and the increasing electrical conductivity, the electromagnetic shielding effectiveness is significantly improved with increasing the percentage of flaky graphite, and absorption plays a dominant role in the electromagnetic interference shielding mechanisms. The FeSiAl/FG-filled Al2O3 composite with the ratio of FeSiAI to FG 0:5 exhibits the maximum shielding effectiveness of 30.4 dB in the X-band, denoting the composites have wide potential application for large scale in military and commercial fields. (C) 2020 Elsevier B.V. All rights reserved.

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第 56 篇

标　　题：Tribology And Corrosion Properties Investigation Of A Pulse Electrodeposition Duplex Hard-Particle-Reinforced Ni-Mo Nanocomposite Coating

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期　　刊：SURFACE & COATINGS TECHNOLOGY

摘　　要：In this work, Ni-Mo-SiC-TiN composite coatings were prepared by pulse electrodeposition. Through analyzing the effect of particle content on the phase structure and morphology of NiMo coatings, the relationship between nanoparticles co-deposition amount and the mechanical properties and corrosion resistance of Ni matrix composite coatings was evaluated. The results show that the coating prepared at an electrolyte concentration of 20 g/L is flat and dense presenting the highest particle content. The crystallite size ranging from 28.27 nm to 11.85 nm is affected by different nanoparticle concentrations. As shown by the Tafel polarization and wear test, the incorporation of two hard particles improved the coating performance, and the corrosion current density was reduced by 74% to 1.84 mu A/cm(2). The wear rate decreased from 10.196 x 10(-4) mm(3)/N.m to 2.65 x 10(-4) mm(3)/N.m, and the average friction coefficient decreased to 0.11. The duplex hard particles play a bearing and hindering role during friction and corrosion. Based on the co-deposition kinetic model, a five-step pulse deposition model referring to nanoparticles was established. It is found that SiC/TiN particles co-deposited to the preferential Ni (111) crystal face and subordinate Ni (200) face. And the good binding ability between the matrix and the nanoparticles results in a high load transfer effect, thus enhancing the tribological properties of the coating. Moreover, the interaction between the duplex nanoparticles was further discussed.

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WOS 号：000532676600059

第 57 篇

标　　题：Effect Of Curing On Mechanical Properties Of Cement-Stabilized Coral Sand In Marine Environment

作　　者：[Chen, Mingyuan; Geng, Jiuguang; Shang, Tao] Changan Univ, Sch Mat Sci & Engn, Xian, Peoples R China; [Xiong, Haocheng] Univ Sci & Technol Beijing, Natl Ctr Mat Serv Safety, Beijing, Peoples R China; [Xue, Cheng] CCCC Second Highway Engn Co Ltd, Xian, Peoples R China; [Abbas, Montasir] Virginia Tech, Blacksburg, VA USA

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：The use of coral sand prepared from cement-stabilized materials can significantly reduce the cost, construction period, and damage to the environment caused by stone

mining. The choice of water in mixing and curing the cement-stabilized materials on islands should be considered. Cement-stabilized coral sand was tested in three different preparation and maintenance systems in the marine environment. The compressive strength, weight change, and chloride ion concentration change in cement-stabilized coral sand with different cement content were measured after 7 d, 28 d, 60 d, and 90 d, respectively. The microstructure of specimens was observed by XRD and SEM. Results show that the compressive strength of specimens in the seawater mixing and seawater curing system developed 0.9 MPa faster than that in the fresh water mixing and curing system at an early stage. But the compressive strength of specimens in seawater mixing and seawater curing shrank later, being 0.5 MPa lower than that in fresh water mixing and curing. The cement content was positively correlated with the free chloride ion reaction and mass growth rate. For road construction on islands, the mixing and curing of cement-stabilized coral sand with seawater should be given priority in the early stage.

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WOS 号： 000559291100001

第 58 篇

标　　题： Interaction Between Y-Al-Si-O Glass-Ceramics For Environmental Barrier Coating Materials And Ca-Mg-Al-Si-O Melts

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期　　刊： CERAMICS INTERNATIONAL

摘　　要： Y2O3-Al2O3-SiO2 (Y-Al-Si-O, YAS) glass is a highly promising material offering resistance against calcium magnesium aluminosilicate (Ca-Mg-Al-Si-O, CMAS) corrosion, and it is an excellent candidate for environmental barrier coating (EBC). In this study, influence of composition on YAS glass properties and CMAS corrosion resistance at 1300 degrees C was investigated, and the result indicated that most sets of YAS glass possessed the superior CMAS resistance than yttrium disilicate. The increase of Y2O3 content and decrease of Al/Si ratio both resulted in a higher nucleation rate during heating. Moreover, when YAS was subjected to the molten CMAS corrosion, two types of corrosion restraining behaviors were observed. One is the generation of anorthite layer on YAS with high-optical basicity, and the recession depth becomes less than that of yttrium disilicate. Stacking of anorthite grains obstructs the diffusion of Y to the corrosion front, which inhibits the corrosion. The other mechanism involves the generation of calcium yttrium cyclosilicate layer at similar to 1270 degrees C first on YAS with low-optical basicity. Next, with the increase in the temperature, the reaction changes to generate an amorphous phase. Moreover, the layer acts as a barrier to

restrain the corrosion. Furthermore, the difference between the two corrosion behaviors was explained based on the optical basicity (OB) theory calculation, and a YAS composition region with excellent resistance toward CMAS corrosion was predicted. The region with an OB higher than that of CMAS shows superior CMAS resistance, in particular, for the portion with a lower difference in values of OB between the two substances.

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WOS 号： 000537570200127

第 59 篇

标　　题： Early-Stage Road Property Improvements Of Cold Recycled Asphalt Emulsion Mixture With Microwave Technology

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通讯作者： Wang, ZJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： Cold recycled asphalt emulsion mixture (CRAEM) is widely used in construction and building materials. However, it is necessary to improve road performance at an early curing age for quickly open traffic. In this work, early-stage road properties (at 3 or 7-day curing age) of CRAEM with different heat treatment method (room temperature treatment, oven treatment and microwave treatment) were investigated and compared. The morphology and demulsification behavior of CREAM were also investigated with environmental scanning electron microscope (ESEM) and optical microscopy. Back propagation (BP) neural networks were used to simulate indirect tensile strength (ITS) of CRAEM after microwave irradiation. The gray correlation analysis (GCA) was used to compare the effects of microwave irradiation time on earlystage road properties of CRAEM. The results show that mechanical property is improved due to microwave irradiation. BP neural network can accurately predict early-stage mechanical properties of CRAEM. Microwave radiation has a positive effect on improving the water stability of CRAEM, but the improvement on TSR of CREAM is limited. The linear model can predict dynamic stability of CRAEM under different microwave parameters. The crack resistance at low temperature by microwave radiation is limited. Microwave radiation not only accelerates cement hydration, but also promotes the demulsification of asphalt emulsion. Microwave radiation has the highest influence on rutting resistance at high temperature and ITS performance of CRAEM; while its effect on water stability and crack resistance at low temperature of CRAEM is relatively less.

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第 60 篇

标　　题：Multi-Scale Microstructural Investigation Of A Laser 3D Printed Ni-Based Superalloy

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期　　刊：ADDITIVE MANUFACTURING

摘　　要：The heterogeneous microstructure of a laser 3D printed Ni-based superalloy was examined at multiple length scales. The sub-millimeter-sized columnar crystal grains are composed of micron-sized cellular colonies. The crystal grains grow in epitaxy with the substrate under the large temperature gradient and high cooling rate. The cell boundaries, decorated with gamma/gamma' eutectics, mu-phase precipitates and high density of dislocations, show enrichment of gamma' forming elements and low-angle misorientations. Dislocations trapped in the intra-cellular regions are characterized as statistically stored dislocations with no detectable contribution to lattice curvature, and are the results of the interaction between dislocations and gamma' precipitates.

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WOS 号：000555840200005

第 61 篇

标　　题：The Effect Of Copper Content On The Mechanical And Tribological Properties Of Hypo-, Hyper- And Eutectoid Ti-Cu Alloys

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通讯作者：Xu, YK; Chen, YN (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊：MATERIALS

摘　　要：Titanium alloys are widely used in aerospace, chemical, biomedical and other important fields due to outstanding properties. The mechanical behavior of Ti alloys depends on microstructural characteristics and type of alloying elements. The purpose of this study was to investigate the effects of different Cu contents (2.5 wt.%, 7 wt.% and 14 wt.%) on mechanical and frictional properties of titanium alloys. The properties of titanium alloy were characterized by tensile test, electron microscope, X-ray diffraction, differential scanning calorimetry, reciprocating friction and wear test. The results show

that the intermediate phase that forms the eutectoid structure with alpha-Ti was identified as FCC Ti2Cu, and no primary beta phase was formed. With the increase of Cu content, the Ti2Cu phase precipitation in the alloy increases. Ti2Cu particles with needle structure increase the dislocation pinning effect on grain boundary and improve the strength and hardness of titanium alloy. Thus, Ti-14Cu shows the lowest elongation, the best friction and wear resistance, which is caused by the existence of Ti2Cu phases. It has been proved that the mechanical and frictional properties of Ti-Cu alloys can be adjusted by changing the Cu content, so as to better meet its application in the medical field.

DOI： 10.3390/ma13153411

WOS 号： 000559124900001

第 62 篇

标　　题： Comparison Of Discontinuous Yielding Phenomenon And Adiabatic Temperature Rising Effect Of Ti-5553 Alloys Prepared By Powder Metallurgy And Ingot Metallurgy

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通讯作者： Zhao, QY (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： RARE METAL MATERIALS AND ENGINEERING

摘　　要： Discontinuous yielding phenomenon (DYP) and adiabatic temperature rising (ATIZ) effect were investigated for Ti-5553 (Ti-5Al-5Mo-5V-3Cr) alloys prepared by powder metallurgy (PM) and ingot metallurgy (IM) approaches during hot compression testing conducted at the temperature range of 700 similar to 1100 degrees C and the strain rate range of 0.001 similar to 10 s(-1). The results show that the magnitude of yield drop exhibits a positive correlation to strain rate but nearly a negative correlation to deformation temperature for both PM and 1M alloys, and the occurrence of DYP in the alloys is elucidated by the dynamic theory. IM alloy shows a higher degree of yield drop than PM alloy under the same condition because of low initial dislocation density in as-cast state and the subsequently promoted newly-generated mobile dislocation from grain boundary. A strong positive correlation between ATR effect and strain rate but intensive negative correlation between ATR effect and deformation temperature are discovered for the two alloys. PM alloy shows a lower degree of ATR effect under the same processing condition than IM alloy as a result of its lower deformation resistance and higher deformation compatibility.

WOS 号： 000569928800003

第 63 篇

标　　题： Growth And Characterization Of Room Temperature Radiation Detection Material Cd0.95Mg0.05Te

作　　者： [Yu, Pengfei; Jiang, Biru; Chen, Yongren; Qi, Yongwu; Wang, Lei; Tang, Jia; Lu, Hanyue; Liu, Yuanpei; Chen, Yongyang; Liu, Wenfei; Zheng, Jiahong; Luan, Lijun] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Yu, Pengfei; Jie, Wanqi] Northwestern Polytech Univ, State Key Lab Solidificat Proc, Xian 710072,

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期　　刊： JOURNAL OF CRYSTAL GROWTH

摘　　要： Recently, researchers were interesting in exploring alternative materials for well-studied CdZnTe which was the key material of radiation detection. Cadmium Magnesium Telluride (Cd1-xMgxTe) crystal was regarded as promising one for room temperature X-ray and gamma-ray detectors due to some potential advantages. In this paper, two large-size Cd0.95Mg0.05Te ingots with 30 mm diameter and over 100 mm length were successfully grown by a modified vertical Bridgman method. Two modifications, including Cd excess or Te-rich condition and the accelerated crucible rotation technique (ACRT), were applied in growing process to decrease defects, enhance resistivity and homogenize component distribution. The results indicated that both ingots had a cubic zinc-blende structure. The distribution of Mg element in the ingots along axial direction was very homogeneous. The energy band gap of Cd0.95Mg0.05 was close to Cd-0.9 Zn0.1Te. Low density of Te inclusions (10(3) cm(-3) order of magnitudes) and high IR transmittance (over 60%) showed the good crystal quality. Raman scattering spectroscopy also showed a good crystal quality for Cd0.95Mg0.05Te crystals. Thus, Cd0.95Mg0.05 crystals could be a promising radiation detector material.

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WOS 号： 000575117200008

第 64 篇

标　　题： Performance Damage Characteristics Of Asphalt Mixture Suffered From The Sulphate-Water-Temperature-Load Coupling Action

作　　者： [Xiong, Rui; Chu, Ci; Guan, Bowen; Sheng, Yanping] Changan Univ, Sch Mat Sci & Engn, Xian, Peoples R China

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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： In order to evaluate the macro-mechanical performance of asphalt mixture suffered from the sulphate-water-temperature-load coupling action, the self-designed asphalt mixture dynamic water-salt attack apparatus was adopted for the accelerated simulation of real service conditions in sulphate enrichment environment. Splitting test at room temperature and low temperature was conducted for assessing the performance of asphalt mixture suffered from still water immersion and multi-factor coupling action. Then the performance damage characteristics of asphalt mixture under different conditions were explored. The multi-linear regression analysis and t-test were applied to determine the significance of factors on the performance of asphalt mixture. The performance deterioration mechanism of asphalt mixture exposed to dynamic water and sulphate attack was preliminarily analysed. The results show that the sulphate-water-temperature-load coupling action plays an important role in the macro-mechanical performance deterioration of asphalt mixture and dynamic water further accelerates the deterioration process of sulphate attack to asphalt mixture. The

dynamic water scouring times, temperature and sulphate solution concentration have a significant impact on the performance of asphalt mixture. The decreasing adhesion between asphalt and aggregate, along with exterior/interior sulphate crystallisation erosion contributes the important inducement for the performance deterioration of asphalt mixture.

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WOS 号： 000557959700001

第 65 篇

标　　题： Dielectric And Microwave Absorption Properties Of Resin-Matrix Composite Coating Filled With Multi-Wall Carbon Nanotubes And Ti(3)Sic(2)Particles

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期　　刊： JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS

摘　　要： Lightweight resin-matrix composite coatings filled with multi-wall carbon nanotubes (MWCNTs) or/and Ti(3)SiC(2)particles were fabricated, and the microstructure and complex permittivity of the coatings were detected. Owing to the synergistic effect of MWCNTs and Ti(3)SiC(2)absorbents, the complex permittivity is effectively adjusted and the impedance matching is further optimized, ensuring the introduction of the incident electromagnetic waves. Meanwhile, the dipole movement, charge accumulation, micro-current and multiple scattering result in a much stronger dielectric loss and conductance loss to consume the incident electromagnetic waves. As a consequence, compared with MWCNTs/resin and Ti3SiC2/resin coatings, the MWCNTs-Ti3SiC2/resin coating exhibits favorable microwave absorption performance with a wider effective absorption bandwidth and much lower minimum reflection loss.

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WOS 号： 000559375500011

第 66 篇

标　　题： Gate/Cds Heterostructure With Tunable Electronic Properties Via External Electric Field And Biaxial Strain

作　　者： [Jia, Yifan; Zhang, Yan; Wei, Xing; Guo, Tingting; Fan, Jibin; Ni, Lei; Weng, Yijun; Zha, Zhengdi; Li, Ting; Duan, Li] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Liu, Jian] Shandong Univ, Sch Phys, Jinan 250100, Peoples R China; [Tian, Ye] Chinese Acad Sci, Inst Phys, Beijing 100190, Peoples R China

通讯作者： Duan, L (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要：This article aims to investigate the electronic properties of GaTe/CdS heterostructure using first-principles calculations based on density functional theory (DFT). A direct band gap of 0.804 eV and type-II band alignment are formed at the GaTe/CdS van der Waals heterobilayer interface, which is beneficial to the spatial effective separation of photogenerated electron-hole pairs. The external electric field can prominently modify the band structure of the GaTe/CdS heterobilayer, occurring indirect-gap to direct-gap and semiconductor to metal transitions under critical electric field. Besides, the biaxial strain also makes a pivotal contribution to the band gap modulation, arising direct-gap to indirect-gap and semiconductor to metal transitions within the range of elastic response. Our results suggest that GaTe/CdS heterostructure is a promising candidate for application in future nanoelectronics and optoelectronics device and also provide some valuable information for future experimental research.

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WOS 号：000546584700005

第 67 篇

标　　题：Mechanical And Dielectric Properties Of Reduced Graphene Oxide Nanosheets/Alumina Composite Ceramics

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期　　刊：CERAMICS INTERNATIONAL

摘　　要：Reduced graphene oxide (rGO) nanosheets/alumina (Al2O3) composite ceramics were fabricated by hot-pressing sintering. The density, porosity, microhardness, flexural strength and complex permittivity were investigated to study their mechanical and dielectric properties. The results revealed that the rGO nanosheets were uniformly distributed in the Al2O3 matrix and that the composite ceramics were highly dense at 3.67-3.99 g/cm(3). Due to low rGO hardness and elevated porosity, the microhardness exhibits a decreasing trend as the rGO content increases. The flexural strength first increased and then decreased with the escalation of rGO content, and the highest strength of 313.75 MPa was obtained at 3 wt%, increasing by 37.61% relative to that of the hot-pressing sintered Al2O3 ceramic. Owing to the enhanced interfacial polarization, dipole polarization, polarization relaxation loss and conductance loss, the real part and imaginary part of complex permittivity increase from 10.40 to 52.73 and from 0.08 to 28.86 as the rGO content rose from 0 wt% to 4 wt%, respectively.

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WOS 号：000542949400010

第 68 篇

标　　题：Runoff Purification Effects Of Permeable Concrete Modified By Diatomite And Zeolite Powder

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：Diatomite and zeolite powder exhibit cellular structures that are beneficial to absorb pollutants in road surface runoff. In this work, the runoff purification effects of permeable concrete modified by diatomite and zeolite powder were studied. First, magnesium dihydroxide was used to modify diatomite; then the modified diatomite and the zeolite powder were innovatively adopted as binders to prepare permeable concrete. In addition, compressive strength, effective porosity, purification effect, and environmental scanning electron microscopy (ESEM) tests, as well as gray correlation analysis, were carried out. Finally, the optimal dosages of modified diatomite and zeolite powder in permeable concrete were suggested. The results show that diatomite (modified diatomite) and zeolite powder can improve the compressive strength, effective porosity, and runoff purification effects of permeable concrete. In addition, the 10% modified diatomite and the 3% zeolite powder exhibit the highest correlation with the properties of modified permeable concrete.

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第 69 篇

标　　题：Effect Of The Characteristics Of Lightweight Aggregates Presaturated Polymer Emulsion On The Mechanical And Damping Properties Of Concrete

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：In this paper, the mechanical and damping properties of concrete modified with lightweight aggregates (LAs) presaturated polymer emulsion were investigated. The effect of four variables, namely, LA type, maximum LA particle size, LA presaturated different polymer emulsions, and the sand ratio of concrete, on the mechanical and dynamic behavior were analyzed. Test results indicated that the damping ratio of concrete prepared using shale aggregates was lower than that of concrete prepared using

clay aggregates, but has higher mechanical properties. The mechanical and damping properties of concrete decreased when the maximum LA particle size increased, especially after the particle size exceeded 20 mm, at which decreasing tendency became obvious. Concrete modified with LAs presaturated styrene-acrylic polymer emulsion had a higher damping ratio than concrete modified with LAs presaturated polyvinyl alcohol polymer emulsion. The damping ratio of concrete decreased as the sand ratio increased, and the compressive strength of concrete peaked at 40% sand ratio. The results of scanning electron microscope and energy dispersive spectrometer (SEM-EDS) showed that the free and constrained layers formed during the mixing process of concrete, which could provide damping capacity effectively and reveal the damping mechanism of the concrete. (C) 2020 Elsevier Ltd. All rights reserved.

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第 70 篇

标　　题： External-Strain Induced Transition From Schottky To Ohmic Contact In Graphene/Ins And Graphene/Janus In2Sse Heterostructures

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期　　刊： JOURNAL OF SOLID STATE CHEMISTRY

摘　　要： The application of 2D materials in FETs inevitably involves contact with metals, which can dramatically affect the performances of electronic devices. Hence, controlling contact performances to form low-resistance Ohmic contact between the metal electrode and semiconductor materials is crucial. Therefore, the vdW stackings of G/InS, G/SIn2Se and G/SeIn2Se heterostructures are designed and investigated by density functional theory, the results indicate that the Schottky barrier height (SBH) of three heterostructures are 0.17 eV, 0.31 eV and 0.53 eV, respectively. Moreover, the SBH can be significantly modulated by external biaxial strain. Meanwhile, the tunneling barriers can be reduced through controlled the interface distance. Considering the Schottky barrier and the tunneling barrier, the G/InS heterostructures has the best performance and controllability. These theoretical studies not only provide fundamental properties of G/InS, G/SIn2Se and G/SeIn2S vdW heterostructures, but also provide new strategy for designing high-performance FETs based on G/InS and G/In2SSe heterostructures.

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WOS 号： 000557766200044

第 71 篇

标　　题： Study On Self-Lubricating Mos2/Tio2 Coating Synthesized On Tc4 Surface By Micro -Arc Oxidation

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期　　刊：RARE METAL MATERIALS AND ENGINEERING

摘　　要：The design and preparation of antifriction coating on titanium alloy surface is one of the important technologies to improve the wear resistance of titanium alloy components and ensure the safety in service. In order to solve the problems of uneven dispersion of antifriction agents and poor adhesion of coating caused by easy agglomeration in titanium alloy antifriction coating, this paper adopts one-step micro-arc oxidation technology to in situ synthesize MoS2/TiO2 composite ceramic coating with anti -wear effect on the surface of titanium alloy. The effects of sulfur source concentration on microstructure and wear resistance of the coating was discussed. The results show that MoS2/TiO2 composite ceramic film has been successfully prepared by micro-arc oxidation with Na2S and Na2MoO4 as sulfur source and molybdenum source, respectively. By controlling Na2S concentration, nano-MoS2 particles with small size and uniform distribution can be generated in situ, and the content and morphology of MoS2 can be regulated. With the increase of Na2S concentration, the coating becomes compact and the roughness decreases. When the addition amount reaches 60 g/L, the coating turns into loose due to sulfur precipitation and the roughness increases. Due to the uniform distribution of MoS2 particles on the surface and inside of the coating, the abrasion resistance of the obtained coating is improved by 395.4% and 129.4% compared with the conventional micro -arc oxidation coating and the coating prepared by directly adding MoS2 particles into the electrolyte, respectively. At the same time, adhesion (reaching 723.8 N) increases by 87.1% compared with that of the traditional micro -arc oxidation, indicating that this technology not only guarantees good self-lubrication effect, but also improves adhesion of the coating and matrix. The results can provide new ideas and research methods for the design and preparation of titanium alloy wear-resistant coatings.

WOS 号：000576197200039

第 72 篇

标　　题：Low-Temperature Rheological Properties And Microscopic Characterization Of Asphalt Rubbers Containing Heterogeneous Crumb Rubbers

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期　　刊：MATERIALS

摘　　要：Asphalt rubbers mixed with untreated and plasticized crumb rubbers and a

compounding coupling agent were investigated in this study. The low-temperature rheological properties of asphalt rubbers at different aging levels were tested using a dynamic shear rheometer (DSR). An interconversion between linear viscoelastic material functions was used to obtain converted evaluation indexes for the asphalt rubbers at low temperatures. Lastly, the physicochemical characteristics and the microscopic morphology of the asphalt rubbers were evaluated using Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM), respectively. In conclusion, the storage moduli of the asphalt rubbers containing heterogeneous crumb rubbers increased with the plasticized crumb rubber content and the aging level. The converted relaxation moduli were consistent with the change trend of the storage moduli, and the relaxation rate decreased as the plasticized crumb rubber content and the aging level increased. The process of mixing the base asphalt with crumb and plasticized crumb rubbers was physical blending, and the effect of aging on the absorption peak change of asphalt rubber with plasticized crumb rubbers was less than that of asphalt rubber with ordinary crumb rubbers. Aging deteriorated the blending between the crumb rubber and the base asphalt, and a distinct interface appeared between the crumb rubber and the base asphalt. The particle cores of the plasticized crumb rubber in the asphalt rubber were difficult to maintain. Furthermore, as the plasticized crumb rubber content increased, more fine particles stripped off the plasticized crumb rubber after aging.

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WOS 号： 000579981400001

第 73 篇

标　　题： Si Quantum Dots Assist Synthesized Microflower-Like Si/Mos2 Composites For Supercapacitors

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通讯作者： Zheng, JH; Cheng, KK (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.; Zheng, JH (corresponding author), Changan Univ, Minist Educ, Engn Res Cent Pavement Mat, Xian 710064, Peoples R China.

期　　刊： CRYSTALS

摘　　要： The microflower-like Si/MoS2 composites were fabricated using Si quantum dots (QDs) to assist a facile hydrothermal method. The electrochemical performance of Si/MoS2 composite in symmetric and asymmetric systems was studied. Electrochemical characterization revealed that the Si/MoS2 composite electrode in a three-electrode system has a high specific capacitance of 574.4 F center dot g(-1) at 5 A center dot g(-1). Furthermore, the Si/MoS2 composite electrode in a two-electrode system had the maximum energy density of 27.2 Wh center dot kg(-1) when a power density of 749.1 W center dot kg(-1) was achieved. Therefore, this investigation proves the Si/MoS2 composite microflower-like structure should be a promising candidate electrode material for supercapacitors.

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WOS 号： 000581392500001

第 74 篇
标　　题： Damage Mechanism And Interfacial Transition Zone Characteristics Of Concrete Under Sulfate Erosion And Dry-Wet Cycles
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通讯作者： Zheng, SN (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.; Gan, VJL (corresponding author), Hong Kong Univ Sci & Technol, Dept Civil & Environm Engn, Hong Kong 999077, Peoples R China.
期　　刊： CONSTRUCTION AND BUILDING MATERIALS
摘　　要： The durability of concrete structures under sulfate attack is of paramount importance to the structural safety and serviceability. Previous relevant researches have considered concrete as a single phase and homogeneous material in experiments without analyzing its multi-phase and heterogeneous properties. In addition, the damage mechanism of concrete under sulfate attack at the microscopic level, i.e., interfacial transition zone (ITZ), was not fully explored in literature. Therefore, this paper provided a comprehensive investigation on the damage mechanism and ITZ characteristics of concrete under sulfate attack and dry-wet cycles. Two typical sulfate attack conditions were examined in an experimental study, which includes 10% Na2SO4 and 10% MgSO4 solutions (by mass), respectively. The deterioration process of concrete was investigated by inspecting the visual change, corrosion resistance coefficient, and ions transportation. Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), and Atomic Force Microscopy (AFM) were also utilized to analyze the micro-topography change and corrosion products of concrete. The results indicate that the porosity of ITZ increases with the dry-wet cycles in tap water, and the concrete microstructure can be compensated by sulfate solutions, in which cases the compensation of C30 concrete is more remarkable than that of C60. 10% Na2SO4 solution is found to exhibit a stronger compensation effect than 10% MgSO4 solution. However, such compensation effect cannot offset the sulfate erosion damage on the microstructure of concrete. As a result, the porosity and initial cracks of ITZ continue to expand, and finally accelerate the cracking process and deterioration of concrete. It is also found that that under the combined effect of sulfate corrosion and dry-wet cycles, the roughness of ITZ increases with exposure time together with the largest increase in tap water. This study provides new insights and deeper understanding into the deterioration process and ITZ-link characteristics of concrete under sulfate erosion, the results of which serve as a decision basis for more durable concrete structure design. (C) 2020 Elsevier Ltd. All rights reserved.
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第 75 篇

标　　题： Electric Field And Uniaxial Strain Tunable Electronic Properties Of The Insb/Inse Heterostructure

作　　者： [Wang, Zhu; Zhang, Zhihui; Zhang, Yan; Wei, Xing; Guo, Tingting; Fan, Jibin; Ni, Lei; Duan, Li] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Sun, Fangwen] Univ Sci & Technol China, Sch Phys, Hefei 230026, Peoples R China; [Liu, Jian] Shandong Univ, Sch Phys, Jinan 250100, Peoples R China; [Tian, Ye] Chinese Acad Sci, Inst Phys, Beijing 100190, Peoples R China

通讯作者： Duan, L (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： PHYSICAL CHEMISTRY CHEMICAL PHYSICS

摘　　要： In this study, the InSb/InSe heterostructure is systematically examined in terms of its electronic properties through first-principles calculations. According to our findings, the InSb/InSe heterostructure is a kind of unique direct band gap semiconductor, which has inherent type-II band alignment, resulting in significant photogenerated electron-hole pair separation in space. When the external electric field is applied, the Stark effect is observed in the band gap. Interestingly, in the application of the -0.3 V angstrom(-1)electric field, such a heterostructure is transformed into type-I from type-II. Simultaneously, the band gap is also effectively controlled by uniaxial strain. In particular, high carrier mobility is obtained at a compressive strain of 4% on theY-axis. To sum up, based on the results in the present work, the InSb/InSe heterostructure can be potentially used in nanoelectronic and optoelectronic devices.

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WOS 号： 000572458900046

第 76 篇

标　　题： Engineering And Rheological Properties Of Asphalt Binders Modified With Microwave Preprocessed Gtr

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通讯作者： Xu, OM (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Many researches and field applications have proven that binders modified with ground tire rubber (GTR) can significantly improve rutting resistance potential and durability of asphalt pavement. However, GTR modified asphalt binder has higher viscosity and poorer hot storage stability than base one resulting in construction troubles, such as more energy consumption, extra stirring, reduction in asphalt mixtures performance and etc. The objective of this study was to investigate the engineering and rheological properties of binders prepared with microwave preprocessed GTR at high service temperature, medium temperature, and low temperature, respectively. The experiment

included two particle sizes of GTR and five microwave preprocessing radiation intensities. The dynamic shear rheometer (DSR), force ductility test (FDT) and hot storage test were performed to evaluate the effect of radiation intensities and particle sizes of GTR on the engineering and rheological characteristics from low to high temperature. The test results show that microwave preprocessed GTR modified binders presented a reduction trend in composite viscosity, as well as rutting resistance potential after exposing to microwave radiation. In addition, fatigue and low temperature tension properties were jointly affected by microwave radiation intensities and GTR particle size. Otherwise, lower phase separation tendency compared with binder modified with GTR without microwave radiation was observed in this study. Thus, comprehensive consideration of radiation intensities and GTR particles sizes were recommended to apply in the field.

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WOS 号： 000540841400046

第 77 篇

标　　题： Investigation On Solution Heat Treatment Response And Gamma ' Solvus Temperature Of A Mo-Rich Second Generation Ni Based Single Crystal Superalloy

作　　者： [Ai, Cheng; Xi, Liguo; Sun, Yanghui; Sun, Zhiping; Chen, Yongnan] Changan Univ, Sch Mat Sci & Engn, Engn Res Ctr Transportat Mat, Xian 710064, Shaanxi, Peoples R China; [Wang, Bo] Jiangsu Longda Superalloy Mat Ltd Co, Wuxi 214105, Jiangsu, Peoples R China; [Zhang, Jun; Su, Haijun; Yang, Wenchao; Liu, Lin] Northwestern Polytech Univ, State Key Lab Solidificat Proc, Xian 710072, Shaanxi, Peoples R China

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期　　刊： INTERMETALLICS

摘　　要： A multi-step solution heat treatment regime of a Mo-rich Ni based single crystal superalloy (Alloy Mo) was designed, and the effect of each solution heat treatment step on microstructure, microsegregation degree and phase transformation characteristic temperatures of Alloy Mo was investigated by experimental analysis and dynamic calculation (via DICTRA). Homogenizations of microstructure and Re element in as-cast Alloy Mo were obtained via first step solution heat treatment (lowest temperature and shortest time) and last step solution heat treatment (highest temperature and longest time), respectively. In addition, appropriate diffusion length for dynamic calculation of homogenization of Re element was determined. Meanwhile, solution heat treatment increased the solidus temperature of as-cast Alloy Mo, while it had less effect on liquidus temperature and gamma' solvus temperature. Moreover, as compared with W-rich single crystal superalloys, effects of solution heat treatment on both solidus temperature and gamma' solvus temperature of Mo-rich single crystal superalloy were lower. Additionally, gamma' solvus temperatures of Mo-rich single crystal superalloys were lower than those of W-rich single crystal superalloys.

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WOS 号： 000567771200004

第 78 篇

标　　题： Dislocation Reaction Mechanism Of Microcrack Formation In (Cd, Mn) Te Crystal

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通讯作者： Luan, LJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian, Peoples R China.

期　　刊： JOURNAL OF CRYSTAL GROWTH

摘　　要： The formation of a faulted dipole shaped like a letter Z (Z-shape) and a microcrack shaped like a letter S (S-shape) was investigated in (Cd, Mn) Te single crystal by transmission electron microscopy. Dislocations around the microcrack were determined as perfect dislocations and Shockley partial dislocations (partials) by different two-beam conditions. The nipped stair rod dislocation was produced by the interaction of two partials lying on mutually inclined {111} planes. The faulted dipole was generated by two partials moving toward the opposite directions on parallel {111} planes. Owing to the locking effect of Z-shape faulted dipole, the S-shape micro-crack occurred along [11 (1) over bar] direction.

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WOS 号： 000566907700005

第 79 篇

标　　题： Graphene Oxide Modified By Zirconium Dioxide To Enhance The Corrosion Resistance Of Zinc/Aluminum Coatings

作　　者： [Liu, Shenglin; Zhu, Yongsheng; Zheng, Xueping; Lai, Xinyue; Jia, Runnan; Yuan, Xiangsheng] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China

通讯作者： Zhu, YS (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： DIAMOND AND RELATED MATERIALS

摘　　要： In order to improve the corrosion resistance and microhardness of Zinc/Aluminum coatings (Zn/Al coatings), ZrO2, GO and ZrO2 + GO hybrid nanofillers structures were introduced into the Zn/Al coatings respectively. The effect of nanofillers filled in the Zn/Al coatings on the structure, corrosion resistance and micro-hardness was analyzed. The gamma-(2, 3-epoxy propylene oxide) propyltrimethoxysilane (KH-560) was used to modify the surface of nanofillers. The results from FT-IR, XRD and XPS revealed that the KH-560 was successfully grafted onto the surface of nano-fillers. Electrochemical test showed that the nanofillers structure could significantly improve the corrosion resistance of Zn/Al coatings. Compared with ZrO2 nanoparticles, GO was more effective in shielding the corrosive medium. The ZrO2 + GO hybrid nanofillers structure achieves a synergistic effect, showing the best corrosion resistance of all the coatings. In the microhardness test, the introduction of nanofillers structure

significantly improved the hardness of Zn/Al coatings, and ZrO2 + GO hybrid coatings showed the highest hardness value.

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WOS 号： 000571207900010

第 80 篇

标　　题： High-Throughput Design Of Fiber Reinforced Cement-Based Composites Using Deep Learning

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通讯作者： Wang, ZJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： CEMENT & CONCRETE COMPOSITES

摘　　要： As the combinatorial space of a composite is virtually infinite and cannot be explored completely, a deep-learning method was proposed for high-throughput fiber-reinforced cement-based composites (FRC) design. First, a deep hierarchy network was developed to measure the relationship between the experimental variables and the FRC properties. A gradient-based high-throughput method based on the deep hierarchy network was then proposed to design FRCs, which were expected to have one or more certain properties. At last, a fine-tuning method was employed to guarantee its transferability for all types of FRCs. The results showed that the proposed method was able to design cement-fiber-water-curing-aging systems for carbon fiber reinforced cement-based composites (CFRCs). The fine-tuning method could transfer the CFRC model to design other FRCs. Thus, the proposed method showed promise for releasing the composite material property optimization from labor-consuming and low-efficiency laboratory tests.

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WOS 号： 000577296900004

第 81 篇

标　　题： Xtalcamp: A Comprehensive Program For The Analysis And Visualization Of Scanning Laue X-Ray Micro-/Nanodiffraction Data

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期　　刊：JOURNAL OF APPLIED CRYSTALLOGRAPHY

摘　　要：XtalCAMP is a software package based on the MATLAB platform, which is suitable for, but not limited to, the analysis and visualization of scanning Laue X-ray micro-/nanodiffraction data. The main objective of the software is to provide complementary functionalities to the Laue indexing software packages used at several synchrotron beamlines. The graphical user interfaces allow the easy analysis of characteristic microstructure features, including real-time intensity mapping for a quick examination of phase, grain and defect distribution, 2D color-coded mapping of microstructural properties from the output of other Laue indexing software, crystal orientation visualization, grain boundary characterization based on orientation/misorientation calculation, principal strain/stress analysis, and strain ellipsoid representation, as well as a series of additional toolkits. As an example, XtalCAMP is applied to the microstructural investigation of a solution-heat-treated Ni-based superalloy manufactured using a laser 3D-printing technique, and a deformed natural quartzite from Val Bregaglia in the Central Alps.

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WOS 号：000577178000025

第 82 篇

标　　题：Laboratory Investigation Of Aging Resistance For Rubberized Bitumen Modified By Using Microwave Activation Crumb Rubber And Different Modifiers

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通讯作者：Chen, HX (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊：MATERIALS

摘　　要：Different modification methods, such as adding modifiers and pretreating crumb rubber, have been developed to achieve decent engineering properties and reduce the viscosity of rubberized bitumen. This study evaluated the influence of the modification methods on the aging resistance for rubberized bitumen. Two types of crumb rubber-a 40-mesh crumb rubber and a microwave-pretreated crumb rubber-and two kinds of modifiers-Sasobit and Trans-polyoctenamer-were selected to prepare rubberized bitumen. The samples were subjected to a Thin-Film Oven Test for the simulation of the short-term aging condition, while a Pressure-Aging-Vessel test was used to simulate the long-term aging condition. The indexes of rubberized bitumen, including softening point, elastic recovery ratio, maximum load, ductility, fracture energy, phase angle, and dynamic modulus, were tested before and after aging. The result showed that trans-polyoctenamer displayed the best resistance to short-term aging, while Sasobit significantly improved the fracture energy of rubberized bitumen after short-term aging. Microwave pretreated partially destroyed the internal structure of crumb rubber, leading

to a decrease of short-term aging resistance for rubberized bitumen. Compared with short-term aging, the changing trends of various indexes were basically same, except the discrepancy of properties indexes was reduced after long-term aging.

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WOS 号： 000586654500001

第 83 篇

标　　题： Microstructures And Mechanical Behavior Of Beta-Type Ti-25V-15Cr-0.2Si Titanium Alloy Coating By Laser Cladding

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期　　刊： MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING

摘　　要： Preparing a flame-resistant coating with high adhesion to the titanium substrate is a feasible method to prevent titanium fire. In this work, Ti-25V-15Cr-0.2Si, which is a beta stabilized titanium alloy with excellent flame-resistant properties, was fabricated on a Ti-6Al-4V substrate by laser cladding with aim to improve the flame resistance of the Ti-6Al-4V substrate. The microstructure, mechanical properties and strengthening mechanisms of the laser cladded samples were studied. An excellent metallurgical bond is formed between the substrate and the cladded layers and a reasonable transition of composition and microhardness from the substrate to the Ti-25V-15Cr-0.2Si cladded layers is obtained. An effective relationship between dilution ratio and composition was established to predict the composition evolution of transition zone in the cladded layers. Microstructural characterization confirmed a direct transformation from alpha+beta bi-phase in Ti-6Al-4V substrate to single beta phase in Ti-25V-15Cr-0.2Si laser cladded zone throughout the cladding interface. The room-temperature tensile testing along both parallel and vertical to cladding interfaces showed that the cladded samples exhibit tensile strength exceeding 900 MPa and elongation of >9% (reaching 90% and 70%, respectively, the corresponding ones of wrought Ti-6Al-4V substrate), indicating the very good mechanical performance of the laser cladded samples.

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WOS 号： 000576183800003

第 84 篇

标　　题： Properties Of Paving Epoxy Asphalt With Epoxy-Terminated Hyperbranched Polyester

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通讯作者： Xu, PJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian, Peoples R

China.; Xu, PJ (corresponding author), Elect Power Res Inst Yunnan Power Grid Co Ltd, Kunming, Yunnan, Peoples R China.

期　　刊：ROAD MATERIALS AND PAVEMENT DESIGN

摘　　要：Epoxy asphalt is a high performance pavement material, but the poor toughness of epoxy asphalt at low temperature has limited its utilisation. Hyperbranched polyester (HBP) is a spherical polymer with highly branched structures, which can effectively improve the toughness of epoxy asphalt. However, hydroxyl-terminated HBP would accelerate the reaction rate of epoxy asphalt because of the rapid reaction between hydroxyl groups of HBP and epoxy groups of resin. We modified the hydroxyl end groups of HBP as epoxy end groups to avoid its curing reaction with epoxy resin and further reduce the viscosity of epoxy asphalt. Epoxy-terminated HBP also has good compatibility with epoxy resin to improve phase structure uniformity of epoxy asphalt. Moreover, with the help of hyperbranched structure, epoxy-terminated HBP still can improve the toughness of epoxy asphalt, which can be proved by the fracture surface morphology, mechanical properties, and dynamic thermomechanical properties.

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第 85 篇

标　　题：Quantitative Distribution Characteristics Of Force Chains For Asphalt Mixtures With Three Skeleton Structures Using Discrete Element Method

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通讯作者：Chang, MF (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China.

期　　刊：GRANULAR MATTER

摘　　要：Three digital specimens of asphalt mixtures (AC-13, SMA-13 and OGFC-13) were reconstructed to conduct a virtual simple performance test using the discrete element method. The distribution characteristics of force chains were investigated by a statistical method. The results indicate that it is reasonable and feasible to analyze the mesoscopic responses of asphalt mixtures using digital models. The probability distribution of the normal force chains varies with loading time and the variation laws are consistent at four loading times. And the probability distribution of the shear force chains decays exponentially. Besides, the maximum probability distributions of the normal and shear force chains decrease with increasing timestep. OGFC-13 has the maximum probability distributions of the normal and shear force chains, which are 0.34186 and 0.55884, respectively. The proportions of the strong force chains decrease over the loading time, and AC-13 has a maximum proportion of 49.41% for the three asphalt mixtures at four loading times. In addition, the angle distributions of the force chain are mainly near 90 degrees, and the average ratio of the normal contact force to the mean normal contact force increases with increasing loading time at 90 degrees. Finally, the angle

distribution proportions in the first and second quadrants are much greater than those in the third and fourth quadrants. Graphic abstract

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WOS 号： 000585190500001

第 86 篇

标　　题： Preparation And Performance Of Antifreeze Adhesive Materials For Asphalt Pavement

作　　者： [Xia, Huiyun; Zhao, Xu; Wu, Yongchang; Song, Lifang; Yan, Minjie; Wang, Fengyan; Chen, Huaxin] Changan Univ, Engn Res Ctr Transportat Mat, Sch Mat Sci & Engn, Minist Educ, Xian 710064, Peoples R China; [Yuan, Teng] Xinjiang Transportat Planning Surveying & Design, Urumqi, Peoples R China

通讯作者： Xia, HY; Chen, HX (corresponding author), Changan Univ, Engn Res Ctr Transportat Mat, Sch Mat Sci & Engn, Minist Educ, Xian 710064, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： A new type of environmentally-friendly Anti-Freeze Filler (AFF) was prepared in this work firstly. The main components of the AFF included in carrier, deicing chemicals and surface modifier. Additionally, a corrosion retardant was employed to mitigate the impact on the environment. Various characterization methods were used to optimize the proportion of each component in the AFF, including ice-melting test, penetration test, corrosion test, specific surface area test and scanning electron microscope test. The anti-freeze asphalt concrete (AFAC) was prepared with AFF, and its engineered performance was tested. The results of engineered performance test indicated that both high-temperature and low-temperature performances of AFAC decreased with the increase of the AFF content, but still met the specification requirements. The AFAC had better water stability, when the replacement rate of filler is less than 75%. The ice-adhesion pulling/shearing tests indicated that the pulling and shearing strength of the AFAC was about 50% lower than that of the controlled sample within the test temperature of 0(similar to) -10 degrees C. An environment-induced deterioration of AFAC's anti-freezing ability was evaluated with an environment simulation platform based on the climate conditions in central China. With the environmental deterioration came to the fifth cycle, the pulling strength of the AFAC was still 25% lower than the controlled specimen at -3 degrees C. (C) 2020 Published by Elsevier Ltd.

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第 87 篇

标　　题： Preparation And Properties Of Novel Superabsorbent Polymer (Sap) Composites For Cementitious Materials Based On Modified Metakaolin

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通讯作者： Tan, YW; Chen, HX (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Shaanxi, Peoples R China.

期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Superabsorbent polymer (SAP) is becoming the most promising internal curing material for cementitious materials. However, commercial SAP products, most of which are designed for hygiene products, controlled drug release, and agriculture, usually impair the strength of cementitious materials. In view of this, a novel type of poly(acrylic acid-co-acrylamide) SAP composites based on modified metakaolin (MK) was prepared for cementitious materials in this work. Modified MK, acrylic acid (AA) and acrylamide (AM) were polymerized by initiating of ammonium persulfate (APS). The kinetics characteristics of the fabricated SAP composites were studied by absorption and desorption in different solutions. The microstructures and phase compositions of SAP composites, as well as the mechanical properties of SAP-modified cement mortar were characterized by a suite of complementary techniques, including Xray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and compressive strength test. Results show that the modification of silane coupling agent (SCA) and xanthan gum (XG) can increase the recombination degree between MK and copolymers. The water retentions of self-developed SAP composites, SAP-N-1 and SAP-N-2, are much better than those of two commercial SAPs in alkaline solution and cement filtrate, respectively. The maximum absorbency of SAP-N-2 in sodium hydroxide solution is even greater than that in tap water. When SAP saturated with absorbed tap water is placed in saturated lime water, SAP-N-2 can release only 0.49% water at a 4 h soaking period. Furthermore, either of the commercial SAPs has negative effects on the strength of cement mortar at 7 d and 28 d curing ages, while compared with the reference mortars, the incorporation of the SAP-N-2 increases the 28 d compressive strength of the mortars by about 8% to 16%. (C) 2020 Published by Elsevier Ltd.

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第 88 篇

标　　题：Effects Of Polycarboxylate Superplasticiser On The Early Hydration Properties Of Magnesium Oxychloride Cement

作　　者：[Wu, Jiayu; Guan, Bowen; Chen, Huaxin; Tian, Haitao; Liu, Jianan; Xiong, Rui] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China

通讯作者：Guan, BW (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China.

期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Magnesium oxychloride cement (MOC) exhibits better mechanical properties with a faster hydration rate than ordinary Portland cement (OPC). However, the rapid setting property of MOC limits its application in engineering applications. In this work, polycarboxylate superplasticiser (PCE) was used to improve the workability of MOC and its effect on the early hydration properties of MOC paste was investigated. The hydration process for MOC with five different PCE dosages of 0%, 0.4%, 0.6%, 0.8%, and 1% by weight of MgO was analysed using electrodeless resistivity. Optical microscopy was used to obtain the flocculation of fresh MOC paste and its rheological

properties were tested to investigate its workability. X-ray diffraction (XRD) and scanning electron microscopy (SEM) were used to analyse the effects of PCE on the phases and microstructures of the MOC paste. The results reveal that PCE significantly improves the rheological properties of MOC. The setting time of the MOC paste was retarded due to the PCE adsorbed on the cement particle surface, which prevented MgO particles from reacting with water. Meanwhile, MOC in the presence of certain PCE contents showed excellent mechanical properties due to a mass of formed gel-like 5MgO-MgCl2-8H(2)O crystals. (C) 2020 Published by Elsevier Ltd.

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WOS 号： 000573807800014

第 89 篇

标　　题： Type-Ii Band Alignment A1N/Inse Van Der Waals Heterostructure: Vertical Strain And External Electric Field

作　　者： [Zhang, Ru; Zhang, Yan; Wei, Xing; Guo, Tingting; Fan, Jibin; Ni, Lei; Weng, Yijun; Zha, Zhengdi; Li, Ting; Duan, Li] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Liu, Jian] Shandong Univ, Sch Phys, Jinan 250100, Peoples R China; [Tian, Ye] Chinese Acad Sci, Inst Phys, Beijing 100190, Peoples R China

通讯作者： Duan, L (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： APPLIED SURFACE SCIENCE

摘　　要： The electronic characteristics of the AlN/InSe van der Waals heterostructure (vdWH) were investigated via employing density functional theory calculations. The vdWH has an indirect band gap with a connatural interlaced-gap type-II band alignment, so the electrons and holes are able to spatially dwell in the InSe and A1N layer, respectively. Especially, the AlN/InSe vdWH owns a higher carrier mobility for both electrons and holes reaching up to 10(3) cm(2) V-1 s(-1). Additionally, the electronic properties of the vdWH can be adjusted by vertical strains as well as external electric fields. When imposing a moderate perpendicular electric field, the band gaps of the vdWH vary linearly. It brings a transformation from semiconductor to metal. This work demonstrates that the novel two-dimensional (2D) AlN/InSe vdWH is a vigorous nominee for optoelectronic and nanoelectronic applications.

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第 90 篇

标　　题： Investigation On Rejuvenation Methods Of Aged Sbs Modified Asphalt Binder

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通讯作者： Cong, PL (corresponding author), Changan Univ, Minist Educ, Sch Mat Sci & Engn, Xian 710064, Peoples R China.

期　　刊： FUEL

摘　　要： SBS modified asphalt binder (SBSMA) is widely used because of its excellent

pavement performance. Recycling application for aged SBSMA has drawn increasing attention. In this study, aged SBSMA was rejuvenated with different rejuvenation methods, including the use of rejuvenator (RA), original SBSMA, base asphalt (SK-70) and original SBSMA mixed with SK-70. The conventional performance and rheological behavior of different rejuvenated SBSMA were investigated. The microscopic changes were analyzed by using Gel permeation chromatography (GPC), Fourier transform infrared (FTIR) spectroscopy and Fluorescence microscopy (FM). Results revealed that RA and original SBSMA have significant effect on the improvement of the physical-rheological and microstructures of aged SBSMA, but SK-70 did not exhibit good rejuvenation effect. The conventional tests showed that the addition of RA greatly improved the low temperature ductility and elastic recovery rate of aged SBSMA. Moreover, it was proved that RA could increase the creep compliance and improve the stress relaxation ability of aged SBSMA according to physical rheological parameters. This result indicated that RA improved the cracking resistance of aged SBSMA at low temperature. Based on the microscopic test results, it was found that RA not only could regulate the internal components of aged SBSMA, but also restore the network structure of aged SBSMA. Furthermore, the SBS polymer content indices and the softening indices are closely correlated with the performances of the rejuvenated SBSMA. From the analysis, it is necessary to rejuvenate the aged SBSMA by softening base asphalt and restoring the network structure of SBS copolymer.

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WOS 号： 000559767600007

第 91 篇

标　　题： Photocatalytic Performance Of Doped Tio2/Ac Coating And Its Uv Stability Research

作　　者： [Liu, Guanyu; Xia, Huiyun; Niu, Yanhui; Zhao, Xu; Zhang, Gengtong; Song, Lifang; Chen, Huaxin] Changan Univ, Sch Mat Sci & Engn, Minist Educ, Engn Res Ctr Transportat Mat, Xian 710064, Peoples R China

通讯作者： Xia, HY; Chen, HX (corresponding author), Changan Univ, Sch Mat Sci & Engn, Minist Educ, Engn Res Ctr Transportat Mat, Xian 710064, Peoples R China.

期　　刊： PROGRESS IN ORGANIC COATINGS

摘　　要： Based on the porous structure of activated carbon (AC) and the photo-oxidation behavior of TiO2, a visible-lightresponsive photocatalytic coating with UV stability was constructed by loading Fe/N/Co-TiO2@AC (DTC) on waterborne acrylic coating. The DTC with adsorption and degradation synergistic effect was prepared by a simple mechanochemistry method and characterized by UV-vis, SEM, XRD, and BET. The nitric oxide (NO) removal efficiency of DTC was 51.6 % under visible light in 2 h. Besides, under the same conditions, the NO removal efficiency of the DTC coating still reached 45.8 %. Further, to investigate the UV stability of DTC coating, different coatings were prepared with the same dosage of DTC, TiO2@AC (TC), and TiO2. The UV stability of the coatings was tested with a color difference, degree of chalking, adhesion strength, hardness, and impact resistance as evaluation indicators. The results showed that the DTC coating exhibited the best UV stability. The photooxidation of organic binder on the coating surface before and after aging was micro-characterized by

SEM and FT-IR, and the UV stability improvement mechanism was revealed.

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WOS 号： 000573041100007

第 92 篇

标　　题： Surface Termination Effects On The Electrical Characteristics Of La2O3/Al2O3 Nanolaminates Deposited By Atomic Layer Deposition

作　　者： [Fan, Ji-Bin; Ling, Shan-Ya; Duan, Li; Zhang, Yan; Guo, Ting-Ting; Wei, Xing; He, Qing] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [Liu, Hong-Xia] Xidian Univ, Sch Microelect, Key Lab Wide Band Gap Semicond Mat & Devices, Xian 710071, Peoples R China

通讯作者： Fan, JB (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： CHINESE PHYSICS B

摘　　要： Effects of initial surface termination on electrical characteristics of La2O3/Al2O3 nanolaminates deposited by atomic layer deposition are studied by conductive atomic force microscopy working in contact mode and standard electrical characterization methods. It is found that, compared with La2O3/Al2O3 nanolaminates with LaOx as termination, lower interface trap density, less current leakage spots, and higher breakdown voltage are obtained in the La2O3/Al2O3 nanolaminates with AlOx as termination after annealing. A clear promotion of interface silicate layer is observed for La2O3/Al2O3 nanolaminates with AlOx as termination compared with LaOx as termination under the same annealing condition. In addition, the current conduction mechanism in La2O3/Al2O3 nanolaminates is considered as the Poole-Frenkel conduction. All results indicate that the AlOx is a more appropriate termination to deposit La2O3/Al2O3 nanolaminates on Si substrate, which is useful for the high-kappa process development.

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WOS 号： 000589113900001

第 93 篇

标　　题： Effect Of Copper-Doping On Linio2 Positive Electrode For Lithium-Ion Batteries

作　　者： [Kong, Xiang-Ze; Li, Dong-Lin; Ren, Xu-Qiang] Changan Univ, Inst Energy Mat & Device, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Kong, Xiang-Ze; Lahtinen, Katja; Kallio, Tanja] Aalto Univ, Sch Chem Engn, Dept Chem & Mat Sci, FI-00076 Espoo, Finland

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期　　刊： JOURNAL OF THE ELECTROCHEMICAL SOCIETY

摘　　要： LiNiO2 (LNO) is one of the most potential alternatives to LiCoO2 in Li ion batteries (LIBs). However, it still suffers from poor cyclability. Meanwhile, the recycling processes of LIBs are widely investigated to enable effective recycling for the growing amounts of LIB waste. Cu is one of the dominating impurities in LIB recycling

fractions. In this work, LNO and 0.2 mol% Cu-doped LNO are studied. Cu-doping is demonstrated to stabilize the LNO lattice structure, reduce cation mixing and improve the reversibility of phase transitions during electrochemical processes. Consequently, the rate capability of LNO is improved by Cu-doping, especially at high C-rates. The Cu-doped LNO shows much higher capacity retention of 85% than that of 66% for the undoped LNO at the current density of 100 mAg(-1) after 100 cycles in a voltage window of 2.5-4.5 V. Our results show that a possible Cu contamination in the Ni fraction of the LIB material recovery process can be used to enhance the electrochemical properties of newly synthetized Ni-based positive electrode materials.

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WOS 号： 000593472100001

第 94 篇

标　　题： Hot Deformation Behavior And Mechanism Of As-Cast Ti-5553 Alloy With Coarse Grains

作　　者： [Zhao Qinyang; Chen Yongnan; Xu Yiku] Changan Univ, Xian 710064, Peoples R China; [Bolzoni, Leandro; Fei Yang] Univ Waikato, Hamilton 3240, New Zealand

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期　　刊： RARE METAL MATERIALS AND ENGINEERING

摘　　要： The hot deformation behavior of as-cast Ti-5553 (Ti-5Al-5Mo-5V-3Cr) alloy with coarse grain was investigated in the temperature range of 700 similar to 1100 degrees C and strain rate range of 0.001 similar to 10 s(-1) by Gleeble-3800 thermal physical simulator. The results show that the flow stress is sensitive to both temperature and strain rate, and the flow curves display various softening modes under different conditions. The activation energy map and constitutive relationship are constructed for the alloy, and the average deformation activation energy is calculated as 447.2 kJ/mol. The hot processing map is established based on the dynamic materials model with the identification of underlying mechanisms at various processing regions. Two peak domains are identified in the hot processing map: 800 similar to 975 degrees C/0.001 similar to 0.01 s(-1) and 1000 similar to 1100 degrees C/0.01 similar to 0.1 s(-1) and the flow instability region locates at the region where the strain rate is higher than 1 s(-1). External cracking, adiabatic shear banding and/or flow localization are observed in the region of low-temperature deformation and flow instability, and these conditions should be avoided in actual processing. The mechanism at the peak efficiency domain is dynamic recovery (DRV) or the combination of DRV and dynamic recrystallization (DRX), and the region with the occurrence of extensive DRX is recommended as the optimal processing window for the alloy at high temperature about 1100 degrees C and medium-low strain rate about 0.01 s(-1).

WOS 号： 000596957900001

第 95 篇

标　　题： Corrosion Resistance Of Plasma-Sprayed Fe-Based Coatings By Using Core-Shell

Structure Powders

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期　　刊：JOURNAL OF MATERIALS RESEARCH AND TECHNOLOGY-JMR&T

摘　　要：Fe-based amorphous powder and shell-core-structured composite powder prepared by ball-milling Fe-based amorphous powder with 10 wt.% Ni/Al powder, were used to fabricate Fe-based amorphous coating and Fe-based amorphous composite coating by plasma spray process, respectively. X-ray diffraction (XRD) analysis results showed that the composite coating was comprised of multi-component amorphous Fe62.8Ni13.6Cr9.9Mo8.6Si1.6C2.3B0.9 layer and crystalline Ni3Al layer. Compared with Fe-based amorphous coating, the composite coating exhibited a more compact structure. The corrosion resistance of Fe-based amorphous coating, which was tested by potentiodynamic polarization method in 3.5 wt.% NaCl solution, was significantly improved by using shell-core-structured composite powder. The composite coating showed lower corrosion current density (12.5 mu A/cm(2)) and passive current density (9.0 mA/cm(2)) than Fe-based amorphous coating. The improved corrosion resistance of the composite coating is attributed to the dense structure and the formation of passivation film. (C) 2020 The Authors. Published by Elsevier B.V.

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WOS 号：000606411600009

第 96 篇

标　　题：Microwave Heating Improvement Of Asphalt Mixtures Through Optimizing Layer Thickness Of Magnetite And Limestone Aggregates

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期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：The key to the development of microwave deicing technology in asphalt pavement engineering is to improve the heating efficiency using less magnetite aggregate with regards to the aggregate resource shortage. In this work, four asphalt mixtures with different magnetite layer thickness (MALT) by volume of the limestone aggregate were prepared. The microwave heating capacity test of magnetite aggregate was carried out firstly. Surface temperature, heat distribution, radiation depth, deicing time, and thermal diffusion for asphalt mixtures were also investigated. Results show that 4.75mm-9.5 mm is considered as the most suitable sieve size according to its higher microwave heating efficiency (MHE) and the highest proportion in aggregate gradation. The

reduction of MALT in asphalt mixture can significantly improve the MHE ascribed to higher thermal conversion and utilization, related to the lower microwave reflectivity and shorter propagation path of internal heat to the surface obtained through adjusting MALT. The heat distribution of asphalt mixture with thinner MALT was more unevenly, which can be mainly attributed to the higher heat generating rate. Besides, the heat generated by the upper layer can be quickly transferred to limestone aggregate layer and thus the heat depth can not be used to represent the depth of radiation. In addition, both MALT and initial temperature have effect on the heat diffusion. The reason behind the higher deicing efficiency for asphalt mixture with thinner MALT was owing to both higher MHE and higher heat transfer efficiency. (c) 2020 Elsevier Ltd. All rights reserved.

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第 97 篇

标　　题： Modified Asphalt Based On Polyethylene With Broad Molecular Weight Distribution

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The incorporation of polyethylene has been shown to improve the rheological properties of asphalt pavement, but other problems are often encountered, such as dispersion, and PE modified asphalt increases the mixing and compaction temperature, resulting in high energy consumption and pollution. In this study, A kind of polyethylene composed of three components was prepared. The performance of asphalt modified by polyethylene (VPEO) of high polydispersity index (PDI) was studied. The asphalt modified by VPEO had lower penetration and ductility, and higher softening point than that of matrix asphalt. The VPEO reduced the viscosity of asphalt during construction stage and enhanced simultaneously the viscosity in the serve stage. The colloidal theory is used to explain the viscosity reduction mechanism of endgroup double bond polyethylene. The rheological properties were improved after adding polyethylene (VPEO). A homogeneous dispersion of the VPEO in the asphalt was observed by fluorescence microscopy. The ratios of the three components in the polyethylene were varied to study their effects on the rheological properties. VPE3 improved significantly the anti-rutting ability and elastic modulus of asphalt. The results show that the ratio between the three components can be adjusted for different pavement requirements. (C) 2020 Published by Elsevier Ltd.

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第 98 篇

标　　题：Internal Transport And Corrosion Behaviors Of Sulfate Corrosion Media Carried By Recycled Aggregate In Concrete

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Recycled aggregate (RA) will inevitably carry corrosion media, primarily due to the parent concrete suffered long-term sulfate attack. In this paper, the RA was replaced by a self-made mortar rod immersed in a Na2SO4 solution to investigate the internal transport and corrosion behaviors of sulfate corrosion media carried by RA in concrete. Four parameters, namely, cementitious materials of the mortar rod, corrosion concentration of the mortar rod, water-cement (W/C) ratio of the cement mortar, and cementitious materials of the cement mortar, were considered. The content of sulfate ions and depth of the sulfate ions diffusion were measured. Test results showed that when the corrosion concentration was higher than 5%, the migration distance and SO4 content increased significantly. Similarly, when W/C exceeded 0.6, the migration distance and SO4 content also increased significantly. The addition of fly ash and granulated blast-furnace slag could significantly inhibit the transport of sulfate ions in cement mortar. Scanning electron microscopy-energy dispersive spectrometer (SEM-EDS) and X-ray diffraction (XRD) analysis results showed that the corrosion products were mainly ettringite and gypsum. The closer the distance to the mortar rod, the more the sulfate ions diffused into the cement mortar and the more corrosion products were obtained.

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第 99 篇

标　　题：Dual Effect Of Aluminum Doping And Lithium Tungstate Coating On The Surface Improves The Cycling Stability Of Lithium-Rich Manganese-Based Cathode Materials

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期　　刊：ACTA CHIMICA SINICA

摘　　要：The layered lithium-rich manganese-based cathode material has been widely concerned because of it's advantages such as a specific discharge capacity greater than 250 mAh.g(-1) and a high discharge platform, and is expected to become the next-generation lithium ion battery cathode material. However, lithium-rich manganese-based cathode materials have poor cycle stability, low coulombic efficiency

for the first charge and discharge, and low rate performance. The most important thing is that the problem of faster voltage decays on the discharge platform has not been effectively solved, The current it is mainly to improve the performance by element doping modification and surface coating, so it is very important to find suitable doping elements and coating materials. The common coating material is mainly to prevent direct contact between the electrolyte and the positive electrode material to improve the cycle stability, and it is difficult to slow down the attenuation of the discharge voltage platform. Al-doping lithium-rich manganese-based Li1.2Mn0.54-xAlxNi0.13Co0.13O2 (x=0, 0.03) cathode material was prepared by sol-gel method and Li2WO4 surface coating by one-step liquid phase method. The required materials were confirmed by X-ray diffractometer (XRD), energy disperse spectroscopy (EDS) and scanning electron microscope (SEM) tests, and then the effects of Al-doping and Li2WO4 coated double-effect modification on the electrochemical performance of lithium-rich manganese-based cathode materials were studied by electrochemical test system. The results show that Al doping significantly improves the cycling stability of lithium-rich manganese-based cathode materials, and the coating Li2WO4 significantly improves its rate performance and discharge platform voltage attenuation. In 5% Li2WO4 coated Li1.2Mn0.51Al0.03Ni0.13Co0.13O2 cathode material in charge and discharge voltage 2.0 similar to 4.8 V, and under the current density 1000 mA.g(-1), the specific capacity is still as high as about 110 mAh.g(-1). At the same time, the specific capacity retention rate was 78% after 300 cycles at the current density of 100 mA.g(-1), and the voltage decay of the discharge platform significantly slowed down during the cycle.

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WOS 号： 000595611900013

第 100 篇

标　　题： Interfacial Fabrication Of Cnts/Pvdf Bilayer Actuator With Fast Responses To The Light And Organic Solvent Vapor Stimuli

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期　　刊： MACROMOLECULAR MATERIALS AND ENGINEERING

摘　　要： A multiple stimuli-responsive actuator with an ability of rapid and sensitive responding is highly desirable for the development of biomimetic actuation applications. Herein, a bilayer actuator with fast and sensitive responses to acetone vapor and light stimuli is reported based on polyvinylidene fluoride (PVDF) membrane with a hierarchical porosity and macroscopic carbon nanotubes (CNTs) assembled film. The CNTs film

with uniform and tunable thickness is prepared by a macroscopic interfacial assembly strategy and transferred integrally onto the PVDF membrane. Under the infrared light, this CNTs/PVDF bilayer actuator can bend rapidly within 1 s and generate large stress. Moreover, for the acetone vapor stimuli, the actuator bends within 0.19 s and also reverses in 1.24 s to the initial state, showing sensitive and fast responses to acetone stimuli, as well as outstanding stability and repeatability.

DOI： 10.1002/mame.202000502

WOS 号： 000590587200001

第 101 篇

标　　题： Investigation On Properties Of Cement Bitumen Emulsion Mortars (Cbem) In Consideration Of Emulsifier Types

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通讯作者： Wang, ZJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.; Wang, ZJ (corresponding author), Changan Univ, Engn Res Ctr Pavement Mat, Minist Educ China, Xian 710061, Peoples R China.

期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： In order to investigate the influences of emulsifier types on properties of cement bitumen emulsion mortars (CBEM), anionic and cationic emulsifiers were used to prepare CBEM in this work. Influences of anionic and cationic bitumen emulsions on workability, mechanical properties, and viscoelastic property of CBEM were studied. The workability of CBEM was evaluated by fluidity and extensibility tests. The mechanical properties were assessed by compressive strength and flexural strength tests. XRD was used to analyze the phase before and after bitumen emulsion was added. The viscoelastic property was studied by a dynamic mechanical analyzer (DMA). The results show that CBEM prepared by cationic bitumen emulsion (CBE) has better workability. The mechanical properties of CBEM are negatively affected by bitumen emulsion. The impact on the compressive strength of CBEM prepared by CBE is higher. Bitumen emulsion can significantly improve the viscoelastic property of CBEM. With the increase of bitumen emulsion dosage, the loss factor of CBEM increases. The viscoelastic property at low frequency is better than that at high frequency. In contrast to CBEM prepared by CBE, CBEM prepared with anionic bitumen emulsion (ABE) possesses better viscoelastic property.

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WOS 号： 000598507600006

第 102 篇

标　　题： Quantitative Evaluation Of Cement Emulsified Asphalt Mortar And Aggregate Adhesion Performance With Dynamic Mechanical Analysis

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通讯作者： Wang, ZJ (corresponding author), Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Low adhesion between emulsified asphalt mortar and aggregate can enormously result in poor properties of emulsified asphalt mixture. The adhesion performance can also be directly influenced by the viscosity of cement emulsified asphalt mortar (CEAM). In this work, Brookfield viscometer was used to test the viscosity of CEAM with different cement content, temperature and mixing time. Then, influence degree of each factor on viscosity was determined by gray correlation analysis (GCA) and significance test. Furthermore, dynamic mechanical analysis (DMA) was used to quantitatively evaluate the adhesion between CEAM and aggregate. Besides these, scanning electron microscope (SEM), energy dispersive X-ray (EDX), alkali content test, Fourier transform infrared spectroscopy (FT-IR) were adopted to analyze the interaction between cement and emulsified asphalt. The results show that the viscosity of CEAM increases with the increase of the cement content, mixing time and temperature. The cement content has the highest effect on the viscosity of CEAM, followed by mixing time; and temperature has a lowest effect. When the cement content is less than 50%, hydration products in the mixture can improve the fatigue life of CEAM. While it is higher than 50%, the adhesion is weakened and the fatigue life is shortened. Cement hydration and asphalt emulsion demulsification can mutually promote, which generates a network structure and improves the adhesion performance of CEAM to aggregate. (C) 2020 Elsevier Ltd. All rights reserved.

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第 103 篇

标　　题： Two Cd(Ii)-Organic Frameworks For The Highly Luminescence Sensitive Detection Of Cr-Vi Ions In An Aqueous Medium

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期　　刊： JOURNAL OF SOLID STATE CHEMISTRY

摘　　要： Two novel cadmium-based luminescent metal-organic framework (LMOFs), {[Cd(PIAD)(H2O)]center dot H2O}(n) (1) and [Cd(PIAD)](n) (2), has been successfully assembled by H(2)PIAD a solvothermal method. Complex 1 possesses a 2D layered structure with a binodal 4,4-connected net. Complex 2 presents a 3D dense-packing structure with a binodal 5,5-connected net. Meanwhile, complex 1 exhibits highly efficient luminescent sensing towards CrO42- and Cr2O72- ions with the detection limits of 2.12 x 10(-4) and 2.02 x 10(-5) M, respectively, and the mechanisms of the quenching effect are studied in detail.

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WOS 号： 000584669200013

第 104 篇

标　　题：Cnts/Tio2 Composite Membrane With Adaptable Wettability For On-Demand Oil/Water Separation

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期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：Pre-wetting induced separation membranes are of great significance due to their unique property for separating oil/water mixtures. Herein, we have presented a facile strategy to prepare a separation membrane by integrating carbon nanotubes (CNTs) and titanium dioxide nanoparticles (TiO2 NPs). The obtained CNTs/TiO2 composite membrane has presented smart wettability to activate on-demand separation for expected components from oil/water mixtures. In addition, it can maintain its separation efficiency above 99.1% even after ten cyclic separations. It is rather remarkable that this composite membrane has taken on excellent separation performance with the flux up to 40,000 L m(-2) h(-1) bar(-1) for water-in-dichloromethane emulsion and separation efficiency above 98.89%, which has surpassed most of the reported separation membranes to date. Furthermore, the CNTs/TiO2 membrane has feathered excellent corrosion resistance ability under harsh conditions (HCl, NaOH, NaCl) for 7 days, and can show stable permeation flux and efficiency towards various emulsions. This work will provide further guidance for developing CNTs-based membranes in order to realize task-oriented oily water treatment. (C) 2020 Elsevier Ltd. All rights reserved.

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第 105 篇

标　　题：Novel Two-Dimensional Ga(In)S1-Xsex As High-Efficiency Oer Catalysts For Photocatalytic Water Splitting

作　　者：[Zhang, W. X.; Shi, C. H.] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [He, C.] Xi An Jiao Tong Univ, Sch Mat Sci & Engn, State Key Lab Mech Behav Mat, Xian 710049, Peoples R China

通讯作者： He, C (corresponding author), Xi An Jiao Tong Univ, Sch Mat Sci & Engn, State Key Lab Mech Behav Mat, Xian 710049, Peoples R China.

期　　刊： JOURNAL OF SOLID STATE CHEMISTRY

摘　　要： The suitable band gap, abundant absorption utilization in sunlight, excellent carrier separation for efficient surface activity and sufficient driving force for redox reaction are fundamental to a promising water splitting photocatalyst. Here, the photocatalytic properties of Ga(In)S1-xSex (0 <= x <= 1) monolayers are investigated systematically by DFT calculations since they are proposed as photocatalysts of highly efficient and spontaneous water splitting. The results reveal that Ga(In)S1-xSex monolayers possesses widely band gaps from 2.41 eV to 3.35 eV, and the band alignment exhibits suitable band positions for redox reaction of water splitting. Meanwhile, the free energies of reaction on these monolayers are all downhill indicating that OER of water splitting is a thermodynamically favored reaction. Thus, Ga(In)S1-xSex monolayers exhibit excellent photocatalytic efficiency and are excellent candidates for photocatalyst. Especially, Janus Ga(In)S1-xSex (x = 0.5) could effectively separate electrons and holes, due to the internal electric field formed by the asymmetric structure. The findings open up a new avenue for designing novel 2D OER catalysts for photocatalytic water splitting.

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WOS 号： 000600992000055

第 106 篇

标　　题： Preparation And Performance Assessment Of Asphalt Emulsion Modified By The Fabricated Sbs Latex

作　　者： [He, Rui; Liang, Yingping; Gao, Lining; Chen, Huaxin; Yang, Ben; Geng, Jiuguang] Changan Univ, Sch Mat Sci & Engn, Xian 710061, Peoples R China; [He, Rui] Shanxi Transportat Technol Res & Dev Co Ltd, Taiyuan 030032, Peoples R China; [Guo, Fengjun] Shanxi Prov Expressway Grp Ltd Liabil Co, Taiyuan 030006, Peoples R China

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Polymer modified asphalt emulsion (PMAE) has recently been proven to be one of the most effective methods to overcome the common distress of asphalt surface treatments, such as abrasion, rutting, ravelling, and poor durability. Because of the limited research studies about the preparation of PMAE using SBS latex, a new method to prepare SBS latex was developed and the feasibility of using it in preparing SBS latex modified asphalt emulsion (SBS-LMAE) was verified in this study. The optimized swelling parameters for linear SBS solutions were swelling 24 h at the temperature of 50 degrees C with the toluene/SBS (T/S) mass ratios of 2.5 : 1 to 2.0 : 1 which was determined according to the analysis of viscosity and Tyndall effect. After that, the SBS latex with favorable dispersivity and stability was successfully fabricated with the T/S ratio of 2.0 : 1. At last, the well-specified SBS-LMAE was prepared using the fabricated latex and tested for its conventional performances and microstructure. The results show that

the SBS-LMAE samples all meet the main requirements of PMAE for microsurfacing and possess appropriate uniformity and stability.

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第 107 篇

标　　题： Lowering The Schottky Barrier Height Of G/Wsse Van Der Waals Heterostructures By Changing The Interlayer Coupling And Applying External Biaxial Strain

作　　者： [Zhang, W. X.; Yin, Y.] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [He, C.] Xi An Jiao Tong Univ, Sch Mat Sci & Engn, State Key Lab Mech Behav Mat, Xian 710049, Peoples R China

通讯作者： He, C (corresponding author), Xi An Jiao Tong Univ, Sch Mat Sci & Engn, State Key Lab Mech Behav Mat, Xian 710049, Peoples R China.

期　　刊： PHYSICAL CHEMISTRY CHEMICAL PHYSICS

摘　　要： Graphene-based van der Waals (vdW) heterostructures composed of two-dimensional transition metal dichalcogenides (TMDs) and graphene show great potential in the design and manufacture of field effect transistors. However, the Schottky barrier generated by the contact between metal and semiconductor hinders the conduction of electrons, so it is necessary to effectively adjust the Schottky barrier and form a low-resistance Ohmic contact. Based on first-principles calculations, graphene/WSSe (G/WSSe) heterostructures have been established and the corresponding electronic properties have been studied. Firstly, these heterostructures form an n-type Schottky contact with a SBH of 0.35 eV and a p-type Schottky contact with a SBH of 0.66 eV at their respective interfaces. In addition, the Schottky contact can be significantly adjusted by changing the interlayer coupling or applying an external biaxial strain, and an Ohmic contact could also be formed under the biaxial strain. This study not only offers a basic understanding of G/WSSe heterostructures, but also provides a reference for the application of G/WSSe heterostructures in optoelectronic and nanoelectronic devices.

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WOS 号： 000592983900014

第 108 篇

标　　题： Study On Mesoscopic Mechanics Of Recycled Asphalt Mixture In The Indirect Tensile Test

作　　者： [Sheng, Yanping; Jia, Haichuan; Chen, Huaxin; Zhao, Xiaorui; Wang, Runzhi] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China; [Lv, Hongli; Meng, Jiandang] Henan Dept Transportat, Div Highway, Management Off, Puyang Hebi Highway Sect, Hebi 410902, Henan, Peoples R China

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Reclaimed asphalt pavement (RAP) mainly contains asphalt binder and aggregates, and the RAP materials used in paving roads could save virgin materials. This paper studied

the following: asphalt mixture with different RAP material contents was prepared; then the indirect tensile test was carried out, and the mesoscopic model of the recycled asphalt mixture was reconstructed digitally. Discrete element method (DEM) of indirect tensile test was carried out to analyze the mechanical properties of recycled asphalt mixture in mesoscopic perspective. The results showed that there were some gaps between the simulation result of the digital specimen model and the test value of the recycled asphalt mixture, but the velocity vector and the law of force chain development of the recycled asphalt mixture could be explained in mesoscopic perspective. It proved that the virtual simulation test of the mechanical test was effective. The damage process of recycled asphalt mixture was analyzed in mesoscopic perspective, and the unification of mechanical response and macroscopic appearance was completed. Meanwhile, the simulation method of mesoscopic mechanics was an effective supplement to traditional tests, and guided tests method theoretically.

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WOS 号： 000603576900005

第 109 篇

标　　题： Morphological Evolution Of Ti2Cu In Ti-13Cu-Al Alloy After Cooling From Semi-Solid State

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期　　刊： JOURNAL OF ALLOYS AND COMPOUNDS

摘　　要： The mechanical performance of Ti-13Cu-Al alloy is highly determined by its microstructure, which is significantly affected by the cooling process from semi-solid state as it induces peritectic solidification and the subsequent eutectoid transformation of the alloy. This work investigated the effects of cooling rates on the morphology of Ti2Cu phase and mechanical properties of Ti-13Cu-Al alloy after cooling from semi-solid state (beta+L phase). Different cooling mediums have been considered, including furnace cooling (0.5 degrees C/s), air cooling (50 degrees C/s) and water cooling (150 degrees C/s), corresponding to a slow, normal and rapid cooling process, respectively. It is found that alpha+Ti2Cu phases are uniformly distributed in the alloy after different cooling processes, and the morphology of Ti2Cu phase is controlled by the peritectic solidification and eutectoid transformation. Specifically, the thickness and the volume fraction of primary Ti2Cu phase are larger than the sample cooling from beta phase field when the cooling rate is the same. The morphology of Ti2Cu phase varies from laths + blocky + sheaves to short laths + blocky + rodlike as the cooling rate gradually increases. It is further revealed that the beta/L interface provides a fast

channel for solute atom diffusion, and the peritectic Ti2Cu phase provides a favorable nucleation site for the precipitation of eutectoid Ti2Cu. Based on the tensile property and hardness examinations, the mechanical properties of the Ti-13Cu-Al alloy show a clear dependency with the precipitation of Ti2Cu phase after cooling from semi-solid state, indicating the importance of cooling mode from semi-solid state on the microstructure and mechanical properties of the alloy. (C) 2020 Elsevier B.V. All rights reserved.

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建筑工程学院

第 1 篇

标　　题： Seismic Performance Analysis Of Self-Centering Concentrically Braced Steel Frame Structures

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期　　刊： SHOCK AND VIBRATION

摘　　要： To study the seismic performance of self-centering concentrically braced frame (SC-CBF) structure, the static elastoplastic analysis, low-cycle repeated loading analysis, and elastoplastic time-history analysis were conducted for a four-story SC-CBF structure, compared with the traditionally concentrically braced frame (CBF) structure. The influences of different GAP stiffnesses and cross-sectional areas of prestressed tendon were investigated on the self-centering and seismic performance of the SC-CBF structure. The results show that the SC-CBF structure has a strong lateral resistance, a small base shear under earthquake action, and a slight residual drift after unloading. The SC-CBF structure has a better ductility than the CBF structure. The displacement of the SC-CBF structure under the action of rare and extremely rare earthquakes is large, and the structure can dissipate more energy; the interstory drift is large, but the residual drift is small, exhibiting its ideal seismic and self-centering performance. However, the mechanical behavior of prestressed tendons is significantly affected by the stiffness of the GAP. The mechanical and seismic performances of the overall structure are slightly affected by the stiffness of the GAP, but the cross-sectional area of the prestressed tendons has a remarkable influence on the overall performance of the structure.

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第 2 篇

标　　题： Experimental Study Of High-Strength Steel Fiber Lightweight Aggregate Concrete On Mechanical Properties And Toughness Index

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： In this paper, three different kinds of steel fibers, being micro (M), end-hooked (H), and corrugated (C), commonly used in engineering applications, are added to high-strength lightweight aggregate concrete (HLAC) to study the effects of steel fiber and volume content ratio of fiber on the compressive, splitting tensile, and flexural strength of HLAC. The range of steel fiber volume content fraction studied is 0.5% to 2.0%. The research shows that different types of steel fiber have different effects on the mechanical properties and toughness of HLAC. M steel fibers have the best reinforcing performance on the mechanical properties. The study also shows that the toughness of M steel fibers is the best with the same fiber content. The toughening effect of H and C steel fibers can only reach 2/3 and 1/2 of M steel fibers, respectively. At the end of this paper, the unified strength formula and toughness index of these three kinds of high-strength steel fiber lightweight aggregate concrete (HSLAC) with different fiber contents are given to provide a reference for engineering practice and design.

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第 3 篇

标　　题： Ce(Iii) Nanocomposites By Partial Thermal Decomposition Of Ce-Mof For Effective Phosphate Adsorption In A Wide Ph Range

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期　　刊： CHEMICAL ENGINEERING JOURNAL

摘　　要： A series of hierarchical micro/nano Ce-based composites were derived from Ce-MOF via thermal treatment in N-2 atmosphere. Different from conventional complete decomposed materials, forming cerium oxide in air, Ce-MOF that calcinated in N-2 at lower temperatures (400 degrees C or 500 degrees C) showed a partial thermal decomposition with high percent content of Ce(III). Even though the complete decomposed products held higher surface areas, the partial decomposed samples exhibited extremely higher phosphate uptake, with working capacity 2-4 times higher than that of ceria. The results implied a predominant effect of different valence states on phosphate removal by Ce-based materials, in which Ce(III) species were demonstrated playing the major role to form binding with phosphate. The maximum adsorption

capacity (189.4 mg/g) was achieved by Ce-MOF-500(S) with wide applicable scope of pH ranging from 2 to 12 and great selectivity for phosphate in the presence of competing anions. Remarkably, Ce-MOF-500(S) described obvious enhanced phosphate adsorption ability under alkaline condition. This was due to the fact that the hydrolyzed Ce(III) species brought more active sites in the form of hydroxyl groups for ligand exchange with phosphate. Furthermore, based on the analysis of FTIR, XPS, XRD and zeta potential, electrostatic attraction, ligand exchange and surface precipitation were confirmed as the main adsorption mechanisms for partial decomposed samples, while electrostatic attraction was the main mechanism for complete decomposed samples.

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WOS 号： 000494799900160

第 4 篇

标　　题： Effect Of Inner Pipe Type On The Heat Transfer Performance Of Deep Buried Coaxial Double-Pipe Heat Exchangers

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期　　刊： RENEWABLE ENERGY

摘　　要： In the present study, based on the currently used deep-buried coaxial double-pipe heat exchange systems for closed loop heat extraction, the influence of several inner pipe types on the heat transfer performance of buried pipe systems is analyzed. The deep-buried coaxial double-pipe with a smooth inner pipe used in current practice was taken as an example, and a full-scale three-dimensional (3D) numerical model coupling the heat transfer processes inside and outside the pipe was established by using a depth of 50 m and taking into account the modeling workload. Based on this model, full-scale 3D numerical models of coaxial double-pipes with spiral and corrugated pipes as the inner pipe types were established, and numerical analysis of heat transfer was performed. The results indicated that the heat transfer capacity of the buried pipe system can be improved by changing the shape of the inner pipe. However, the influence of the inner pipe type on heat transfer was far lower than that of the water flow rate circulating inside the buried pipe system and the initial ground temperature.

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第 5 篇

标　　题： Numerical Investigation On Low-Velocity Impact Response Of Cfrp Wraps In Presence Of Concrete Substrate

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期　　刊： COMPOSITE STRUCTURES

摘　　要： Under the levels of low-velocity impact far below those considered by current design codes, the carbon fiber-reinforced polymer (CFRP) wraps externally bonded for retrofitting reinforced concrete (RC) columns might suffer severe damage. In this study, explicit finite element method was used to fill the knowledge gap, which was verified by experimental tests. Twenty-four transverse impact scenarios related to a CFRP-retrofitted RC column-to-impactor system were investigated, which were designed according to the different combinations of a series of parameters, namely incident kinetic energy of impactor, CFRP thickness, and shape of impactor. The energy distribution among the different parts in the system was presented. The contact force time histories obtained from the scenarios indicated that a damage threshold load associated with a prescribed shape of impactor existed in the case of the CFRP wraps with concrete substrate. Furthermore, the significant differences among the roles of the parameters were revealed, and the reasons behind the differences were analyzed.

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第 6 篇

标　　题： Shear Behavior Of Large-Scale Deep Beams With Lightweight-Aggregate Concrete

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期　　刊： ACI STRUCTURAL JOURNAL

摘　　要： Fifteen lightweight-aggregate concrete (LWAC) deep beams subjected to symmetric concentrated loading were tested for the study of shear behavior and size effect. The test variables include beam depths (h ranged from 500 to 1400 mm [19.7 to 55.2 in.]), shear span-depth ratios (a/h = 0.75, 1.00, and 1.50), and bearing plate widths (130 and 200 mm [5.12 and 7.88 in.]). The test results showed that all specimens failed in shear-compression mode. As a/h increased, the specimen failure gradually occurred more gently. Additionally, the bearing plate width had a slight influence on the crack pattern of the specimens. The normalized shear strength at failure decreased by approximately 37.1% when h increased from 500 to 1400 mm (19.7 to 55.2 in.), indicating remarkable size dependence. The accuracy and applicability of four current codes and two size-effect models were then verified by the test results. A comparison study revealed that the ACI 318-14 code and Tan-Cheng's model are more accurate in predicting the size effect on the shear strength of LWAC deep beams, while estimations from AASHTO LRFD are over-conservative for specimens with an a/h of 1.5.

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第 7 篇

标　　题：Cyclic Tests Of Fully Prefabricated Concrete-Filled Double-Skin Steel Tube/Moment-Resisting Frames With Beam-Only-Connected Steel Plate Shear Walls

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期　　刊：THIN-WALLED STRUCTURES

摘　　要：This paper proposes a fully prefabricated concrete-filled double-skin steel tube/moment-resisting frame with beam-only connected steel plate shear walls system. To realize the fully prefabricated construction of such a system, high-strength bolts are used for the beam -to-column joints, the column-to-column joints and the frame-to-wall joints. To reduce the additional forces of the boundary columns that are derived from the tension force action of the buckled steel plate shear wall (SPSW), beam-only connected SPSWs are proposed for this system. To evaluate the seismic performance of the proposed system, cyclic tests on three 1/2-scaled specimens were conducted in this paper. The damage observation, failure mechanism, and hysteretic behaviour of the test specimens are investigated and compared. The results show that the beam-only-connected steel plate shear walls (BSWs) enhanced the lateral resistance, initial stiffness and ductility of the fully prefabricated concrete-filled double -skin steel tube/moment-resisting frames. The specimens with BSWs tolerated more than a 5% story drift ratio, which was larger than the value of the bare frame, which increased with increasing numbers of BSWs, and the increment between each specimen was approximately equal. A similar finding was also observed in the initial stiffness, lateral resistance and ductility ratio. Furthermore, theoretical formulas are developed to estimate the lateral resistance of the BSWs and the bolt connections between the frame and the BSWs, and these proposed formulas are validated by the test results.

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第 8 篇

标　　题：Microscopic Parameters Of Scanning Electron Microscope Image Of Steel Structure

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期　　刊：ACTA MICROSCOPICA

摘　　要：In the traditional two-dimensional microstructure characterization, the linear intercept on the scanning electron micrograph (SEM) is the most commonly used measurement method to deteunine the carbide grain size and adjacency in the Q345-Q390 steel structure cemented carbide, But this requires cumbersome and subjective measurements, and strictly depends on the quality of micrographs and the deteunination and definition of grain boundaries. Steel structure cemented carbide is a composite

material composed of hard phase Q345 and bonding phase Q390 with large differences in properties. Therefore, its mechanical properties include infounation such as integral number of receivers, grain size, adjacency and grain distribution Significant influence. Therefore, the microstructure characterization of Q345-Q390 steel carbide is very important. This article uses an automatic image analysis program with two key technologies, namely the maximum category variance method and an improved watershed algorithm. This method is used for Q345-16Q390 Carbide image analysis can easily obtain consistent microstructure parameters. Then two different methods of quantity weighting and area weighting are used to characterize the average grain size of Q345. In this paper, the finite element method is used to numerically analyze the stress and strain of the microstructures of four Q345-Q390 composites with different grain sizes under tensile load. And the statistical results simulate the values of the equivalent Young's modulus and its equivalent Poisson's ratio, and the obtained parameters are in accordance with the models of Hashin-Shtrikman and Zimmeunan, thus proving the consistency of the conclusions. And from the technical level to explore and solve the accuracy of the finite element method, provides a new idea and new method for the microscopic parameter simulation of Q345-Q390 cemented carbide. The experimental results show that the predicted value of the equivalent Poisson's ratio is in good agreement with the relationship between the upper and lower limits of Zimmeunan. The overall trend of the equivalent Poisson's ratio increases with the increase of the Q390 content.

WOS 号： 000533554100007

第 9 篇

标　　题： Experimental Study On Static And Dynamic Compression Mechanical Properties Of Filled Rock Joints

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期　　刊： LATIN AMERICAN JOURNAL OF SOLIDS AND STRUCTURES

摘　　要： The static and dynamic compression mechanical properties of the prefabricated artificial filled rock joints specimens with different fillings and different joint thicknesses are tested, respectively. Then, the strength, deformation, wave propagation and energy dissipation laws of the filled joints are analyzed. The experimental results show that the static and dynamic compression strength of filled joints increases with the strength of filling materials while decreases with the filling thickness. The deformation characteristics of filled joints under static and dynamic compression are positively

correlated with the properties of filling materials and the thickness of filled joints. With the increasing of the filling thickness, the reflection coefficient increases while the transmission coefficient decreases. With the increase of the strength of the fillings, the reflection coefficient decreases while the transmission coefficient increases. The energy dissipation ratio decreases with the increase of the filliing thickness and increases with the increase of the strength of the filling material.

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第 10 篇

标　　题： Experimental Study On Seismic Response Of Subway Station Built In Loess

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期　　刊： LATIN AMERICAN JOURNAL OF SOLIDS AND STRUCTURES

摘　　要： The present investigation is concerned with the dynamic seismic response of subway station built in loess site by a series of shaking table tests. Firstly, according to the Bockingham pi theorem, the scale ratio is determined and then the model system is designed. Then, based on the geological environment and seismological background of Xi'an, the input ground motions and loading scheme are determined. On the basis of the test data, the acceleration responses of model system, strain response characteristics of the structure, distribution of dynamic soil pressure between loess and structure, the settlement of model ground and the seismic damage mode of model system are analyzed systematically. The results show that the peak accelerations in model soil increase gradually from the bottom to the top of the soil. The peak tensile strains measured at the top and bottom of the center columns are larger than those obtained at the side walls, while the peak tensile strains in the floor slab are the smallest. Moreover, the relationship between structure uplift and soil pressure difference can be fitted by exponential function.

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第 11 篇

标　　题： Research On The Bond Behavior Of Preplaced Aggregate Concrete-Filled Steel Tube Columns

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期　　刊： MATERIALS

摘　　要： In order to investigate the bond behavior of preplaced aggregate concrete-filled steel

tube (CFT-PAC) columns and the difference of bond behavior between CFT-PAC columns and normal concrete-filled steel tube (CFT-NC) columns, a total of 11 columns were prepared and the push-out tests were conducted. The experimental parameters included the type of concrete (preplaced aggregate concrete and normal concrete), concrete strength (C40, C50 and C60), cross-section dimension (D = 219 mm, 299 mm and 351 mm) and the thickness of steel tube (t = 6 mm and 8 mm). The results indicated that the CTF-PAC columns had a similar load-slip curves with CFT-NC columns. The bond stresses of the CFT-PAC columns were higher than that of the PAC-NC columns at the same concrete strength. Increasing compressive strength of PAC increased the critical bond strength and bond strength of CFT-PAC columns. With an increase of the L/D ratio, both of the slip corresponding to peak load and bond strength of CFT-PAC columns exhibited an increasing trend. A rise in the D/t ratio led to a decrease in the bond stress of CFT-PAC columns and an increase in slip corresponding to the peak load of CFT-PAC columns. The proposed bond stress-slip relationship model considerably matched the bond stress-slip relationship of CFT-PAC columns.

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第 12 篇

标　　题： Numerical Study Of Ground Vibrations Caused By Cylindrical Wave Propagation In A Rock Mass With A Structural Plane

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期　　刊： SHOCK AND VIBRATION

摘　　要： Stress wave which is caused either by an explosion in a borehole or by an accidental explosion in a tunnel is supposed to be considered under certain circumstances when it propagates through the surrounding rock masses which contain holes in cylindrical form. Studying the ground motion induced by the cylindrical wave propagation is of practical significance for underground rock engineering and underground energy exploitation. The current study presents a numerical study on the ground motion caused by cylindrical P-wave propagation across a rock mass with a structural plane using a discrete element numerical method, UDEC. Firstly, the accuracy and validity of the cylindrical wave propagation simulation in UDEC and of the induced ground vibration are confirmed by comparison with the theoretical results for a special case that there is no structural plane in a rock mass. Secondly, cylindrical wave propagation across a rock mass with a structural plane is simulated, and then, the particle velocity on the ground surface is subsequently obtained. Finally, parametric researches are carried out on the influence of the monitoring point's position, the structural plane stiffness, and the frequency of incident wave on the peak particle velocities (PPVs) of the ground vibrations.

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第 13 篇
标　　题： Influence Of Beam-To-Column Linear Stiffness Ratio On Failure Mechanism Of Reinforced Concrete Moment-Resisting Frame Structures
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期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： The design philosophy of a strong-column weak-beam (SCWB), commonly used in seismic design codes for reinforced concrete (RC) moment-resisting frame structures, permits plastic deformation in beams while keeping columns elastic. SCWB frames are designed according to beam-to-column flexural capacity ratio requirements in order to ensure the beam-hinge mechanism during large earthquakes and without considering the influence of the beam-to-column stiffness ratio on the failure modes of global structures. The beam-to-column linear stiffness ratio is a comprehensive indicator of flexural stiffness, story height, and span. This study proposes limit values for different aseismic grades based on a governing equation deduced from the perspective of member ductility. The mathematical expression shows that the structural yielding mechanism strongly depends on parameters such as material strength, section size, reinforcement ratio, and axial compression ratio. The beam-hinge mechanism can be achieved if the actual beam-to-column linear stiffness ratio is smaller than the recommended limit values. Two 1/3-scale models of 3-bay, 3-story RC frames were constructed and tested under low reversed cyclic loading to verify the theoretical analysis and investigate the influence of the beam-to-column linear stiffness ratio on the structural failure patterns. A series of nonlinear dynamic analyses were conducted on the numerical models, both nonconforming and conforming to the beam-to-column linear stiffness ratio limit values. The test results indicated that seismic damage tends to occur at the columns in structures with larger beam-to-column linear stiffness ratios, which inhibits the energy dissipation. The dynamic analysis suggests that considering the beam-to-column linear stiffness ratio during the design of structures leads to a transition from a column-hinge mechanism to a beam-hinge mechanism.
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第 14 篇
标　　题： Seismic Performance Of Predamaged Rc Columns Strengthened With Hpfl And Bsp Under Combined Loadings
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期　　刊： ENGINEERING STRUCTURES

摘　　要： This paper presents an experimental investigation of the seismic behavior of coupling predamaged reinforced concrete (RC) columns strengthened with high-performance ferrocement laminate (HPFL) and bond steel plate (BSP) that are subjected to combined loadings. A total of four specimens were fabricated. After they were predamaged with corrosion and an earthquake environment, they were strengthened with HPFL and BSP, and then tested under four different combined loadings, separately, which are unidirectional compression, bending, and shear (CBS); bidirectional CBS; unidirectional compression, bending, shear, and torsion (CBST); and bidirectional CBST. Their seismic behavior, including failure mode, bearing capacity, ductility, energy dissipation, stiffness degradation, damage index and residual displacement, was analyzed. The results revealed that the coupling predamaged RC columns still had retrofit value and that the retrofitting method utilized in this paper was effective. After repairing with HPFL and BSP, the bearing capacity can be significantly improved especially for torsional specimens, which increased by more than 100%. Other seismic behavior like ductility coefficient, stiffness, and single cyclic energy dissipation can be recovered well. In addition, the horizontal eccentricity had a negative effect on the seismic behavior of specimens, while the negative effect was reduced after strengthening.

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第 15 篇

标　　题： Experimental Study On Contact Angle And Pore Characteristics Of Compacted Loess

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期　　刊： ARABIAN JOURNAL OF GEOSCIENCES

摘　　要： To further understand the permeation and pore distribution properties of compacted soil, the contact angle measurements and mercury intrusion porosimetry under different compaction conditions were performed. Experimental results show that the wettability of the compacted loess decreased slightly, but it was not significantly changed when the number of poundings increased from 10 to 75. The contact angle had a significantly linear positive correlation with the dry density and the volume of micropores, whereas it had a linear negative correlation with the total pore volume per unit mass and the volumes of macropores and mesopores. The distribution of different pore sizes varied depending on the compaction process. The macropore volume of the compacted loess

samples decreased sharply when the number of poundings increased and almost became zero after 30-40 poundings. The mesopore volume decreased consistently until it reached a steady state. In contrast, the small pore volume increased firstly, reaching the peak value at the 30th-40th pounding, and then decreased until it reached a steady state. Finally, the micropore volume increased slightly at the beginning and then decreased slightly, with a peak value comparable to that of the small pores. During the compaction process of these samples, large deformations occurred when the number of poundings was less than 30-40, and the deformation was mainly caused by the reduction of macropores and mesopores. Relatively small deformations occurred when the number of poundings was greater than 30-40, and the deformation was mainly caused by the reduction of small pores.

DOI： 10.1007/s12517-020-5106-5

WOS 号： 000514574600004

第 16 篇

标　　题： Nondimensional Parametric Method For Studying Lateral Cyclic Response Of Offshore Monopiles In Sand

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期　　刊： MARINE GEORESOURCES & GEOTECHNOLOGY

摘　　要： A monopile is the most widely used foundation type for offshore wind turbines. Long-term cyclic loading from wind and waves creates an accumulated displacement and changes in the stiffness, which are critical in the serviceability limit state. Design codes present little information in this regard. A series of model tests were conducted to further explore cyclic response of a stiff pile in drained sand subjected to 10,000 cycles. The improved nondimensional groups were applied to interpret the resulting data. The test results show that the accumulated residual displacement and cyclic stiffness increased with the number of cycles, depending on the load characteristics and sand densities. On this basis, two explicit models for predicting the accumulated residual displacement and unloading stiffness due to cyclic lateral loading were developed in a nondimensional form. The application of the improved models for laboratory tests and field-scale piles was also demonstrated.

DOI： 10.1080/1064119X.2020.1717696

WOS 号： 000511818800001

第 17 篇

标　　题： Cyclic Testing Of Bolt-Weld Joints Reinforced By Sleeves Connecting Circular Cfst Columns To Steel Beams

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： This study examined the design of joints reinforced by sleeves for connecting circular concrete-filled steel tube columns to steel beams. Six half-scale specimens, including four bolt-weld joints reinforced by sleeves and two bolt and stiffened end-plate joints, were designed and tested under cyclic loading to evaluate the seismic behavior of these joints. The joint construction and beam-column stiffness ratio were taken as the main parameters in the tests. The seismic behaviors, including the failure modes, hysteretic curves, ductility, strength and stiffness degradation, and energy dissipation, were investigated. The experimental results showed that no obvious bolt loosening, fracture, or widespread weld cracking appeared in the joints reinforced by sleeves. Furthermore, the joint strength and stiffness were markedly increased by the sleeves in the joint core area. Overall, most specimens exhibited full hysteresis loops and excellent ductilities, the equivalent viscous damping coefficients were 0.263 similar to 0.532, and the ductility coefficients were 1.77 similar to 3.42. The interstory drift ratios satisfied the requirements specified by technical regulations. The connections of these types exhibit favorable energy dissipations and can be effectively utilized for building construction in earthquake-prone areas. This research should contribute to the future engineering applications of concrete-filled steel tube to composite structure.

DOI： 10.1155/2020/9674128

WOS 号： 000514439100001

第 18 篇

标　　题： Change-Point Multivariable Quantile Regression To Explore Effect Of Weather Variables On Building Energy Consumption And Estimate Base Temperature Range

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期　　刊： SUSTAINABLE CITIES AND SOCIETY

摘　　要： Mean regression analysis may not capture associations that occur primarily in the tails of the outcome distribution. In this study, we focused on multiple weather factors to find the extent to which they impact heating-related gas consumption at higher quantiles. We used change-point multivariable quantile regression models to investigate distributional effects and heterogeneity in the gas consumption-related responses to weather factors. Subsequently, we analyzed quantile regression coefficients that corresponded to absolute differences in specific quantiles of gas consumption associated with a one-unit increase in weather factors. We found that the association of weather factors and gas consumption varied across 19 quantiles of gas consumption distribution. Heterogeneities varied between case study buildings: right tails of gas

consumption for the community and educational buildings were more susceptible to weather factors than those of the healthcare building. The base temperature of the community buildings across quantiles of gas consumption indicated a flat trend, but the uncertainty ranges were relatively large compared with those for the community and educational buildings. The developed method in this study can be widely utilised to identify the most important factors and the extent to which they affect gas consumption at specific quantiles.

DOI： 10.1016/j.scs.2019.101900

WOS 号： 000508361800026

第 19 篇

标　　题： Properties Of Lightweight Aggregate Concrete Reinforced With Carbon And/Or Polypropylene Fibers

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期　　刊： MATERIALS

摘　　要： The impact of carbon and polypropylene fibers in both single and hybrid forms on the properties of lightweight aggregate concrete (LWAC), including the slump, density, segregation resistance, compressive strength, splitting tensile strength, flexural strength, and compressive stress-strain behavior, were experimentally investigated. The toughness ratio and ductility index were introduced for quantitatively evaluating the energy-absorbing capacity and post-peak ductility. A positive synergistic effect of hybrid carbon and polypropylene fibers was obtained in terms of higher tensile strength, toughness, and ductility. The toughness ratio and ductility index of hybrid fiber-reinforced LWAC were increased by 26%-37% and 12%-27% compared with plain LWAC, respectively. The fiber in both single and hybrid forms had a smaller effect on the linearity ascending branch of the stress-strain curves, whereas the post-peak patterns in terms of the toughness and ductility for the hybrid fiber-reinforced LWAC were significantly improved when the fiber in hybrid form.

DOI： 10.3390/ma13030640

WOS 号： 000515503100147

第 20 篇

标　　题： Development And Investigation Of A New Low-Cement-Consumption Concrete-Preplaced Aggregate Concrete

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期　　刊： SUSTAINABILITY

摘　　要： Reducing consumption of cement in concrete will achieve huge benefits in decline of carbon emission, conservation of natural resources and reduction of the cost of

concrete. In this paper, the low-cement-consumption concrete, preplaced aggregate concrete (PAC), is prepared and 12 types of mixtures including four water-binder ratios (W/B) and three sand-binder ratios (S/B) are designed to detect the effect of W/B and S/B on the mechanical properties and failure mechanism of PAC. Experimental and analytic results indicate that the cubic compressive strength of PAC, splitting tensile strength of PAC and elastic modulus of PAC decrease with increase in W/B and S/B. At a similar compressive strength, more than 20% increment of elastic modulus of PAC is achieved when compared with normal concrete (NC); the descent stage of stress-strain curves of PAC are steeper than that of NC and the peak strains of PAC is lower than that of NC. Guo's model with suitable values of parameters a and b can be used to describe the stress-strain relationship of PAC. Replacing NC by PAC in concrete structures will save 15-20% cement and achieve great environmental and economic benefits.

DOI： 10.3390/su12031080

WOS 号： 000524899601023

第 21 篇

标　　题： Simulating Study On Mechanical Properties Of Rock Wool Board For Thermal Insulation On External Walls

作　　者： [Li, Xiaoguang; Liu, Jinjin; Fan, Xin; Qin, Jinyi; Zhang, Rui; Cao, Ren; Wang, Panqi; Huo, Xiaoliang] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： Rock wool board (RWB) is widely used in construction of exterior insulation worldwide. Fiber diameter, solid volume fraction (SVF), and contact degree among the fibers significantly influence the RWB physical properties. Herein, the effects of these factors on the mechanical properties of RWB were investigated using the GeoDict software. First, the fiberization process resulted in a finer fiber diameter, and the SVF of RWB increased with decreasing pore sizes. In addition, both the fiber diameter and SVF significantly influenced the RWB shear strength. Furthermore, in compliance with the Chinese standards of compression, tensile, and shear strength, the SVF of RWB with a 10.5 mu m fiber diameter did not exceed 4.72%, 4.04%, and 5.4%, respectively. The novel method proposed herein can be used for optimizing the RWB manufacturing process.

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WOS 号： 000517593500001

第 22 篇

标　　题： Damage And Degradation Of Concrete Under Coupling Action Of Freeze-Thaw Cycle And Sulfate Attack

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：In this study, the mechanical behaviors, failure characteristics, and microstructure of concrete containing fly ash (FA) against combined freeze-thaw cycles and sulfate attack were studied compared with normal concrete, and the formation rates of corrosion products during coupling cycles were investigated. Results showed that, during the coupling action of freeze-thaw cycles and sodium sulfate solution, concrete containing 10% fly ash exposed in 5% sodium sulfate solution exhibited better freeze-thaw resistance. Meanwhile, the variation of compressive strength of concrete during the coupling cycles could be divided into two stages, including the strength enhancement stage and the strength reduction stage. Moreover, the proportion of micropores and capillary pores decreased obviously during combined freeze-thaw cycles and sulfate attack, and excessive concentration of sodium sulfate solution led to more macropores after high-frequency freeze-thaw cycles.

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WOS 号：000517594300006

第 23 篇

标　　题：Longitudinal Shear Behaviour Of Composite Slabs With Profiled Steel Sheeting And Ecc

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期　　刊：ENGINEERING STRUCTURES

摘　　要：This paper studies the longitudinal shear behaviour of composite slabs composed of profiled steel sheeting and engineered cementitious composite (ECC), i.e., referred to as ECC composite slab in the following. A total of eleven full-scale ECC composite slab specimens were designed and tested under four-point flexural loading. The main testing parameters included the shear span ratio, the thickness of the steel sheeting, the depth of the composite slab, and the arrangement of the shear studs. The influence of these parameters on the failure modes and the longitudinal shear resistance of the specimens were evaluated based on the test results. The behaviour of the ECC composite slab was compared with that of the composite slab with traditional concrete topping. The formulae for calculating the longitudinal shear resistance and the ultimate shear bond stress of ECC composite slabs were proposed according to the m-k method and the partial shear connection (PSC) method, and the predictions agreed well with the test results. Finally, an advanced finite element model (FEM) was established and validated against the test results, which further proved that adopting shear studs as end anchorage could significantly improve the longitudinal shear resistance of an ECC composite slab.

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WOS 号：000510612600036

第 24 篇

标　　题：A Comparative Study Of The Physiological And Biochemical Properties Of Tomato (Lycopersicon Esculentum M.) And Maize (Zea Mays L.) Under Palladium Stress

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通讯作者：Wang, LQ (corresponding author), Chinese Acad Sci, Inst Geog Sci & Nat Resources Res, Key Lab Land Surface Pattern & Simulat, Beijing 100101, Peoples R China.

期　　刊：SCIENCE OF THE TOTAL ENVIRONMENT

摘　　要：There is great concern about the environmental impact and toxicity of palladium (Pd) because of its widespread use in automotive catalytic converters and other applications. Pd migrates and transforms in the environment and is absorbed by plant roots where it affects plant growth and eventually enters the food chain. Here we explored the effects of Pd on the physicochemical and biochemical characteristics of C3 (tomato) and C4 (maize) plants. We measured physicochemical and biochemical properties, including chlorophyll, protein, soluble sugar, antioxidant enzymes. malondialdehyde, proline, and root activity, in tomato and maize seedlings after cultivation in different concentrations of PdCl2 solution (0, 0.2, 0.5, and 1 mM) in order to observe how Pd stresses them. Results showed that, with increasing Pd concentration, chlorophyll a and chlorophyll b contents and root activity decreased. Meanwhile, malondialdehyde, proline, protein, and soluble sugar contents increased. After cultivation in 1 mM PdCl2, the Pd contents in the roots, stems, and leaves of tomato seedlings were 12.389, 1.132, and 0206 mg/g, respectively. In general, Pd has significant effects on the physiological and biochemical properties of both tomato and maize. Additionally, tomato seedlings were more sensitive to Pd stress, photosynthesis in maize was less inhibited by Pd and the antioxidant capability of maize was stronger. These results indicated that maize (C4 plant) exhibited a higher tolerance to Pd than tomato (0 plant). Pd migration in tomato was observed and the translocation factor (TF) was calculated. The values of TFstem/root, TFleaf/root, TFleaf/stem, and TFshoot/root were 0.09, 0.02, 0.18, and 0.11 in tomato seedlings, respectively. Pd accumulated most in the roots, followed in turn by stems, leaves, and only trace amount of Pd was transferred into shoots. (C) 2018 Elsevier B.V. All lights reserved.

DOI：10.1016/j.scitotenv.2019.135938

WOS 号：000508129700138

第 25 篇

标　　题：Compressive Strength Of Earth Block Masonry: Estimation Based On Neural Networks And Adaptive Network-Based Fuzzy Inference System

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期　　刊：COMPOSITE STRUCTURES

摘　　要：Estimating the compressive strength of earth block masonry is an essential aspect of structural design. Artificial neural networks and an adaptive network-based fuzzy inference system were utilized in this study to predict the compressive strength of earth block masonry per three parameters: height-to-thickness ratio, and compressive strength of blocks, and compressive strength of mortars. Seventy-two datasets were collected from experiments and references to train and test two respective models. The prediction results are compared against empirical calculation results to validate the proposed technique for determining earth block masonry compressive strength.

DOI：10.1016/j.compstruct.2019.111731

WOS 号：000508631700014

第 26 篇

标　　题：Effects Of Brick Content On Crushing Behavior Of Subgrade Backfill Material Composed Of Construction Waste

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期　　刊：JOURNAL OF MATERIALS IN CIVIL ENGINEERING

摘　　要：The use of construction waste as a subgrade backfill material is a very promising approach to solve the problems of the rapidly increasing amount of construction waste and the shortage of construction materials. This paper considers the correlation between the brick content and the crushing behavior of construction waste. First, the composition and physical parameters of construction waste from Xi'an City in northwest China were investigated. Secondly, crushing tests on the coarse particles were conducted to determine the crushing ratios of samples with different brick contents. Crushing over the entire range of particle sizes was tested, and the mass changes for the different size categories were measured. The deviation indices of the samples were then calculated. The crushing ratio and the deviation index fluctuated with the brick content. Finally, the particles in the samples were observed by using a stereomicroscope for visual inspection. The appropriate brick content is suggested, and the California bearing ratio (CBR) test values of the corresponding samples meet the required specifications. The research can be used as a reference for the reuse of construction waste.

DOI：10.1061/(ASCE)MT.1943-5533.0003078

WOS 号：000526721700042

第 27 篇

标　　题：Investigation And Application Of A New Low-Carbon Material (Preplaced Aggregate Concrete) In Concrete-Filled Steel Tube Stub Columns

作　　者：[Lv, Jing; Zhou, Tianhua; Li, Kunlun] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China

通讯作者：Lv, J (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊：SUSTAINABILITY

摘　　要：As a new low-carbon material, development of preplaced aggregate concrete (PAC) will achieve huge economic and social benefits. However, few existing research is focused on applying PAC in structural elements. This paper is attempt to apply PAC in concrete-filled steel tube (CFST) stub columns and the bearing behaviors of PAC-filled steel tube (PACFST) stub columns under axial compression are also experimentally investigated. The results indicate that the failure modes of PACFST stub columns are all drum-like failure mode which are analogous to that of CFST stub columns. The axial load-axial strain curves of PACFST stub columns can be roughly divided into elastic stage, elastic-plastic stage and plastic stage. Under the similar ultimate load, the ultimate strains are a bit smaller than that of CFST stub columns. Comparison of the results of ultimate load of PACFST stub columns calculated using the existing relevant standards for the bearing capacity calculation methods of CFST stub columns, GB 50936 and JGJ 138 are much more suitable to assess the bearing capacity of PACFST stub columns. Approximately 15%-20% saving in cement consumption will be accomplished with popularization and utilization of PACFST stub columns as compared with CFST stub columns.

DOI：10.3390/su12051768

WOS 号：000522470900069

第 28 篇

标　　题：Analysis To Determine Flexural Buckling Of Cold-Formed Steel Built-Up Back-To-Back Section Columns

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通讯作者：Li, YC (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊：JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要：In the current AISI standard, the modified slenderness method (MSM) is proposed for the design of cold-formed steel (CFS) built-up columns. According to the available literature, such a method has been extensively adopted in hot-rolled steel research, and usually generates very conservative strength estimates. Nonetheless, there are few corresponding theoretical studies into CFS built-up columns. In this situation, this paper presents a new analytical approach to establish a computing method for the flexural buckling bearing capacity of the CFS built-up back-to-back section column. To achieve this goal, a new flexural buckling model is proposed to establish the kinematic relationship of single profiles. In addition, shear panels are employed at the location of screws to consider the discrete shear deformation restraint effect. The shear rigidity of the shear panels is determined using the cross-sectional shear stress transfer path. Then, based on the energy method, a computing method is derived. Further, simplifications

are made to the formula to allow easier use in practical engineering situations. To verify the derived formula a finite-element model (FEM) is developed and validated using the available test results. Then, based on the developed FEM, parametric studies are conducted to verify the derived formula. In addition, the performance of the derived formula is further verified by comparing the corresponding ultimate strength based on the direct strength method (DSM) expressions using available test results and FEM parametric studies. The comparison and validation results show the following: (i) the derived formula can predict the critical flexural buckling load as well as the corresponding budding strength based on the DSM expression, and (ii) with an increase in screw spacing, the MSM will result in very conservative strength estimates for CFS built-up back-to-back section columns. (C) 2019 Elsevier Ltd. All rights reserved.

DOI： 10.1016/j.jcsr.2019.105898

WOS 号： 000536123900001

第 29 篇

标　　题： Effect Of Aggregate Size On Strength Characteristics Of High Strength Lightweight Concrete

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通讯作者： Wu, T (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Shaanxi, Peoples R China.

期　　刊： MATERIALS

摘　　要： Effects of aggregate size on the mechanical properties of lightweight concrete (LC) were investigated. Four gradings of lightweight aggregate (LWA) were designed and used to prepare the specimens for compressive strength, splitting tensile strength, and flexural strength tests. An estimating method for compressive strength of LC was then established. The compressive strength of tested LC was up to 95 MPa at 90-day curing time. The test results suggested that the absence of medium-size particles decreased the compaction of LC, therefore the density and compressive strength were negatively affected. Specimens having single size of aggregate showed lower splitting tensile and flexural strengths than that having three sizes of LWA. The parameters of the estimating model were determined according to the test results, and the compressive strength predictions of estimation model were compared with the results from other literature.

DOI： 10.3390/ma13061314

WOS 号： 000529208000053

第 30 篇

标　　题： Experimental Study On The Seismic Behavior Of A Steel-Concrete Hybrid Structure With Buckling Restrained Braces

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：The damage to a concrete wall caused by a strong earthquake is generally concentrated at the bottom of the concrete wall, which seriously threatens the safety of the steel-concrete hybrid structure and is very difficult to repair after an earthquake. In this paper, a steel-concrete hybrid structure with buckling restrained braces at a scale of 1/10 is constructed and tested on a shaking table. First, the mechanical properties of the BRBs are obtained through a static reciprocating loading test. Then, the dynamic properties and seismic response of the steel-concrete hybrid structure with BRBs are obtained through shaking table tests. The results show that (1) the energy dissipation capacity of the BRBs is very good, and none of the BRBs buckle during the shaking table tests; (2) the steel beams and columns are basically in an elastic state; (3) all the cracks on the concrete wall are microcracks, which are widely distributed in floors 1-8 of the concrete walls; (4) the maximum interstory drift angle reaches 1/40, which indicates that the ductility of the steel-concrete hybrid structure is very good. In conclusion, BRBs can significantly improve the seismic performance of the steel-concrete hybrid structures.

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WOS 号：000522898500001

第 31 篇

标　　题：Feasibility Of Using Aluminum Alloy Bars As Near-Surface Mounted Reinforcement For Flexural Strengthening Of Reinforced Concrete Beams

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期　　刊：STRUCTURAL CONCRETE

摘　　要：Aluminum alloys (AAs) possess various advantageous properties such as good corrosion resistance and high ductility and have recently gained interest in strengthening reinforced concrete (RC) structures. This paper investigates the potential application of AA bars as the near-surface mounted (NSM) reinforcement in flexure strengthening of RC beams. A total of seven RC beams including one reference specimen and six specimens strengthened with NSM AA bars were designed and loaded monotonically up to failure. The tensile steel reinforcement ratio, NSM reinforcement ratio, precracking load, and bonding area of NSM reinforcement were selected as the main test variables. Results suggest that both the flexural capacity and stiffness of the strengthened beams improved with the use of NSM AA bars compared to the reference beam, and all the strengthened concrete beams exhibited a ductile failure mode. Nevertheless, increases in flexural load carrying capacities were modest when the AA bars were used as NSM reinforcement. Furthermore, an analytical model, which combined the sectional analysis method and interfacial stress analysis model, was developed to predict the load versus mid-span deflection relationship of the concrete beams strengthened with NSM AA bars. The developed model was also capable of

predicting the load-strain relationships in AA reinforcement. Good agreements were achieved between the analytical results and experimental results.

DOI： 10.1002/suco.201900361

WOS 号： 000566152500001

第 32 篇

标　　题： Experimental And Analytical Study On Uniaxial Compressive Fatigue Behavior Of Self-Compacting Rubber Lightweight Aggregate Concrete

作　　者： [Lv, Jing; Zhou, Tianhua; Li, Kunlun] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China; [Du, Qiang] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China

通讯作者： Lv, J (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In view of the excellent deformation capacity and energy absorption capacity, rubber particles had potential possibility to improve the fatigue properties of lightweight aggregate concrete (LC). However, the fatigue properties of LC containing rubber particles were not adequately understood. This paper focused on the effect of rubber particles on the uniaxial compressive fatigue properties of self-compacting rubber lightweight aggregate concrete (SCRLC). The results of uniaxial compressive fatigue tests indicated that fatigue life and fatigue strain of SCRLC added generally with increase of rubber particles substitution percentage, fatigue strain of SCRLC also raised with number of cycles increased. Analyses results indicated that the fatigue life of SCRLC conformed to two-parameter Weibull distribution. Based on the experimental results, fatigue equation of SCRLC was established by double logarithmic fatigue equation. From the curves of lgS-lgNf of SCRLC, it could be discovered that increasing of rubber particles substitution percentage in SCRLC resulted in a decrease of fatigue limit strength, but the stress level at fatigue life of 2 x 10(6) increased firstly and then decreased. The highest stress level of SCRLC would be obtained as rubber particles substitution percentage was 30%. By comprehensive consideration, under the same strength level, the fatigue properties of SCRLC was better than that of LC.

DOI： 10.1016/j.conbuildmat.2019.117623

WOS 号： 000527320400042

第 33 篇

标　　题： Investigation On The Design Method Of Shear Strength And Lateral Stiffness Of The Cold-Formed Steel Shear Wall

作　　者： [Nie, Shaofeng; Zhou, Tianhua; Zhang, Yang; Zhang, Ben; Wang, Shuo] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： The assembled cold-formed steel stud shear walls are the main lateral force resisting

members of cold-formed steel residential buildings. In this paper, three cold-formed steel shear walls with different types of sheathings (gypsum board and OSB board) were tested under the monotonic lateral loading. The failure modes, the shear strength, and the load-displacement curves of the shear walls were obtained and analyzed to investigate the relationship between screws and shear walls. The test results showed that the material types of the sheathings influence the shear strength of the CFS shear wall greatly. The sum of shear strengths of CFS shear walls with one-side gypsum board and CFS shear walls with one-side OSB board is close to that of the CFS shear wall with the both-sided board (one side is gypsum board and the other side is OSB board). The shear strength of the screws between the board and the CFS stud plays a decisive role in the shear strength of the CFS shear wall, which is usually governed by the shear strength of the screw connections. The design methods of the shear strength and the lateral stiffness of the CFS shear walls were proposed and evaluated by comparing the calculated results with the test results. The comparison results demonstrated that the modified design method of shear strength is conservative and feasible to predict the shear strength of the CFS shear wall. The design method of the lateral stiffness of the CFS shear wall is available to calculate the lateral displacement of the CFS shear wall under the elastic stage, but it is not useful under the nonelastic stage. The proposed design methods can be served as a reference for engineering practice.

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WOS 号： 000524590500006

第 34 篇

标　　题： Effect Of Temperature Variation And Pre-Sustained Loading On The Bond Between Basalt Frp Sheets And Concrete

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期　　刊： MATERIALS

摘　　要： The coupled effects of temperature variation and pre-sustained loading on the bond between basalt fiber reinforced polymer (BFRP) sheets and a concrete substrate were studied. Single lap-shear test specimens were exposed to temperatures of 15, 30, 40, 50, and 60 degrees C for 3 h with pre-sustained loading at 35% of the ultimate load capacity (F-u). Compared with the case of 15 degrees C, the interfacial fracture energy of the specimens at 30 and 40 degrees C increased by 46% and 11%, respectively,

whereas those reduced by 73% and 77% at 50 and 60 degrees C, respectively. The coupled effects of temperature and pre-sustained loading on the effective bond length are insignificant for the specimens at both 15 and 30 degrees C and the effective bond length increased to 300 mm when the temperature exceeded 40 degrees C. The failure crack still occurred in the concrete substrate at the temperatures of 15 and 30 degrees C, and changed to the debonding of the adhesive layer from the concrete substrate at the temperature above 30 degrees C.

DOI： 10.3390/ma13071530

WOS 号： 000529875600048

第 35 篇

标　　题： Research On The Fractal Characteristics And Energy Dissipation Of Basalt Fiber Reinforced Concrete After Exposure To Elevated Temperatures Under Impact Loading

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期　　刊： MATERIALS

摘　　要： The fractal characteristics and energy dissipation of basalt fiber reinforced concrete (BFRC) with five kinds of fiber volume contents (0.0%, 0.1%, 0.2%, 0.3%, 0.4%) after exposure to different temperatures (20 degrees C, 200 degrees C, 400 degrees C, 600 degrees C, 800 degrees C) under impact loading were investigated by using a 50 mm diameter split Hopkinson pressure bar (SHPB) apparatus. Scale-mass distribution rules and fractal dimension characteristics of fragments were studied based on the screening statistical method and the fractal theory. Furthermore, the relationship between the energy consumption density and the fractal dimension of fragments was established, and the effects of fiber content, temperature and impact velocity on fractal dimension and absorption energy were analyzed. The results show that the crushing severity of fragments and fractal dimension increase with the impact velocity under the same fiber content. The energy consumption density increases first and then decreases with increasing fiber content, and also decreases with increasing temperature. When the temperature and fiber content remain unchanged, the energy consumption density increases linearly with the increasing fractal dimension, and under the same impact velocity and temperature, there is no obvious linear relationship between energy consumption density and fractal dimension.

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第 36 篇

标　　题： Comparative Study Of Denitrifying-Mbbrs With Different Polyethylene Carriers For Advanced Nitrogen Removal Of Real Reverse Osmosis Concentrate

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Nitrogen (N) remains a great challenge in wastewater treatment while attempts to remove N has continuously been a research point for decades. In this study, the long-term performance of four identical-shape denitrification MBBRs (moving bed biofilm reactors) with four different configurations of cylindrical polyethylene as carriers (Phi 25 x 12, Phi 25 x 4, Phi 15 x 15, and Phi 10 x 7 mm) for advanced N removal of real reverse osmosis concentrate was investigated in great detail. The N of the real concentrate can be effectively removed by denitrification MBBRs when the pH, temperature, hydraulic retention time (HRT), C/N ratio, and filling rate are 7.50-8.10, 24 similar to 26 degrees C, 12 hours, 6.6, and 50%, respectively. The results showed that the MBBR with the Phi 15 x 15 poly-carrier had the best removal efficiency on NO3--N (78.0 +/- 15.8%), NO2--N (43.79 +/- 9.30%), NH4+-N (55.56 +/- 22.28%), and TN (68.9 +/- 12.4%). The highest biomass of 2.13 mg/g-carrier was in the Phi 15 x 15 poly-carrier was compared with the other three carriers, while the genes of the Phi 15 x 15 poly-carrier reactor were also the most abundant. Proteobacteria was the most abundant phylum in the system followed by Bacteroidetes and then Firmicutes. The entire experiment with various parameter examination supported that Phi 15 x 15 poly-carrier MBBR was a promising system for N removal in high strength concentrate. Despite the lab-scale trial, the successful treatment of high strength real reverse osmosis concentrate demonstrated the reality of the treated effluent as possible reclaimed water, thus providing a good showcase of N-rich reverse osmosis concentrate purification in practical application.

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第 37 篇

标　　题：Thermal Response Characteristics Of Intermittently Cooled Room With Tube-Embedded Cooling Slab And Optimization Of Intermittent Control

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期　　刊：ENERGIES

摘　　要：The heat storage effect of the tube-embedded slab cooling system (TESCS) makes the intermittent operation feasible, a reasonable intermittent strategy can fully realize the energy saving effect. This paper purposes to optimize the intermittent control schemes for TESCS by simulation. The response of the thermal environment intermittently cooled by TESCS is firstly studied. Then, the intermittent control schemes of TESCS are studied. On the basis of the dual-objective optimization for thermal comfort and energy efficiency, the optimal scheme is established. The results show that the tube-embedded slab has significant heat storage and release characteristics under intermittent cooling condition. Its maximum cooling capacity appears about one hour after the stop of cooling. Reducing the cooling duration can reduce the system energy consumption, but increasing the cooling duration can reduce the system peak load. Twenty-four-hour cooling can reduce the peak load by about 70%, 67%, and 41%, respectively, compared with 6-h, 8-h, and 12-h cooling. The effect of the cooling duration on the thermal comfort and energy efficiency is much greater than the cooling time distribution. Frequent starts and stops of the pump can increase the cooling capacity obtained by the room to a certain extent. Daytime cooling provides higher comfort and energy efficiency while night cooling can reduce the chiller's peak cooling requirement by about 25%.

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第 38 篇

标　　题：Seismic Performance Of Prefabricated Sheathed Cold-Formed Thin-Walled Steel Buildings: Shake Table Test And Numerical Analyses

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期　　刊：JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要：Cold formed thin-walled steel (CFS) building systems are widely used in residential construction due to their good seismic behaviour, rapid construction efficiency and high material properties. Although significant work has been conducted on CFS members and subsystems, including studs, beams, shear walls and floors, few researches exist on

the seismic performance of full-scale building systems. In order to investigate the seismic response of the CFS building system, shake table tests on a prefabricated full-scale one-story complete building were carried out. The fundamental frequency, damping ratio, displacement response and acceleration response were summarized in this paper. Then a simplified nonlinear finite element model was established with commercial software ABAQUS and validated against the test results. It was found that the developed model was suitable to accurately simulate the dynamic responses of the tested building. Hereafter, parametric studies were preformed based on the validated model to investigate the influence of key parameters on the seismic behaviour of the CFS systems, including sheathing of shear walls, diagonal brace, numbers of stories, aspect ratio as well as plan layout. Finally, based on the test data and numerical analysis results, improved seismic construction measures were proposed to provide more applicable objectives for CFS structures. (C) 2019 Elsevier Ltd. All rights reserved.

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第 39 篇

标　　题： Heat Transfer Performance Of A Deep Ground Heat Exchanger For Building Heating In Long-Term Service

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期　　刊： RENEWABLE ENERGY

摘　　要： Based on an experimental project of a deeply buried coaxial double-pipe with a burial depth of 2539 min Xi'an, Shaanxi Province, China, this study gave due consideration to the symmetry of a buried pipe structure, built a full-scale axisymmetric model for heat transfer inside and outside the coupled pipe, and verified the reliability of the model. The vertical initial temperature distribution, lithology, and thermophysical parameters of the surrounding ground of the buried pipe in the model came from the optical fiber temperature measurement of the vertical borehole wall, the interpretation of drilling data, and the experimental detection of drilling cores, respectively. This study discusses the variations in ground temperature and thermal effective radius with time in the 50-year service process of the buried pipe based upon the model, explored the heat transfer performance of the buried pipe under different constant heat transfer loads and inlet water temperatures, and analyzed the attenuation rules of its water temperature or heat transfer capacity in long-term service. (C) 2020 Elsevier Ltd. All rights reserved.

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第 40 篇

标　　题： Mechanical Properties Of Sintered Ceramsite From Iron Ore Tailings Affected By Two-Region Structure

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：As industrial waste, iron ore tailings (IOTs) can be mixed with bentonite and bauxite and subsequently sintered into ceramsite. Under sintering at 1120 degrees C, ceramsite with 60- wt% IOTs, 30- wt% bentonite, and 10- wt% bauxite showed an optimal cylinder compressive strength of 10.53 MPa, bulk density of 917.84 kg m(-3), 1-h water absorption of 9.9%, and porosity of 14.33%. Due to the different amounts of IOTs added to the ceramsite, a two-region structure is formed, which includes a red peripheral region that is rich in crystallisation and a black central region characterized by a vitreous structure. The number of vitreous components present in the structure was directly proportional to the cylinder compressive strength. Moreover, the increase in Fe2+ derived from IOTs played an important role in the formation of vitreous components. Ceramsite exhibiting a high strength can be used to prepare lightweight partition boards, which exhibit a light weight, durability, high strength, shock resistance, and good heat preservation as well as moisturizing properties.

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第 41 篇

标　　题：Effect Of Moderately Elevated Temperatures On Bond Behaviour Of Cfrp-To-Steel Bonded Joints Using Different Adhesives

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期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：The bond behaviour of CFRP-to-steel bonded joint considerably depends on the properties of adhesives, and is significantly influenced by temperature. Meanwhile, different adhesives behave differently at elevated temperatures. Therefore, an in-depth understanding of the effect of temperature on CFRP-to-steel bonded joints with different adhesives is crucial. In this study, a total of 24 single-lap shear joints with four different types of adhesives, were investigated to examine the bond behaviour of CFRP-to-steel bonded joints at a temperature of 23 degrees C, at 15 degrees C below the glass transition temperature T-g-15 degrees C, and at 15 degrees C above the glass

transition temperature T-g + 15 degrees C. The results indicate that 1) the failure mode of specimens was transformed from cohesive failure or CFRP delamination failure at room temperature to adhesive-steel interface failure with an increase in temperature, 2) the bond strength of all specimens was reduced by approximately 10% at T-g-15 degrees C, and 70% at T-g + 15 degrees C. Based on a literature review, an analytical model was proposed to predict the bond strength of the CFRP-to-steel bonded joints at elevated temperatures, 3) the bond-slip relationship of the joints with linear adhesive was changed from a trapezoidal to a triangular with an increase in temperature; However, the bond-slip relationship of the joints with a nonlinear adhesive didn't change, and 4) the stiffness of the joints decreased with temperature owning to the degradation of the elastic modulus of adhesive. (C) 2020 Elsevier Ltd. All rights reserved.

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第 42 篇

标　　题： Seismic Analysis Of Rc Tubular Columns In Air-Cooled Supporting Structure Of Tpp

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期　　刊： EARTHQUAKES AND STRUCTURES

摘　　要： This paper aims to investigate the seismic behavior and influence parameters of the large-scaled thin-walled reinforced concrete (RC) tubular columns in air-cooled supporting structures of thermal power plants (TPPs). Cyclic loading tests and finite element analysis were performed on 1/8-scaled specimens considering the influence of wall diameter ratio, axial compression ratio, longitudinal reinforcement ratio, stirrup reinforcement ratio and adding steel diagonal braces (SDBs). The research results showed that the cracks mainly occurred on the lower half part of RC tubular columns during the cyclic loading test; the specimen with the minimum wall diameter ratio presented the earlier cracking and had the most cracks; the failure mode of RC tubular columns was large bias compression failure; increasing the axial compression ratio could increase the lateral bearing capacity and energy dissipation capacity, but also weaken the ductility and aggravate the lateral stiffness deterioration; increasing the longitudinal reinforcement ratio could efficiently enhance the seismic behavior; increasing the stirrup reinforcement ratio was favorable to the ductility; RC tubular columns with SDBs had a much higher bearing capacity and lateral stiffness than those without SDBs, and with the decrease of the angle between columns and SDBs, both bearing capacity and lateral stiffness increased significantly.

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第 43 篇

标　　题：Experimental Investigation Of Strengthened Screw Connection And Application In Cfs Shear Walls

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期　　刊：JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要：The screw connections between cold-formed steel (CFS) profiles and sheathing greatly affect the structural behavior of CFS shear walls. In order to improve shear stiffness and capacity of CFS shear walls, an innovative strengthened screw connection by using additional CFS strips is presented in this paper. For this purpose, a total of 41 strengthened sheathing-screw-CFS profiles connections were tested under monotonic and cyclic loads. The thickness of CFS profiles, panel material, panel thickness, screw diameter and thickness of CFS strips were varied to investigate their impacts on shear performance of the connections. Improvement in shear stiffness and shear strength of the connections can be verified by test results. In addition, the application of this strengthened connection in CFS shear walls was also conducted. One traditional CFS shear wall and two walls with strengthened connections were tested under cyclic horizontal loads. The failure modes, load-displacement responses. deformability. and energy dissipation capacity of the walls were investigated by full-scale tests. Compared with the typical walls. the shear capacity of the strengthened walls can be improved by 1.30-153 times, the elastic stiffness is enhanced by 1.63-2.12 times. and the capacity of energy dissipation is also elevated. (C) 2019 Elsevier Ltd. All rights reserved.

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第 44 篇

标　　题：Cycle Performance Tests And Numerical Modeling Of Infilled Cfs Shear Walls

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期　　刊：JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要：The infilled CFS shear walls with FGD gypsum were developed in the paper. For lightweight design, the FGD gypsum was mixed with glazed hollow beads and air-entraining agents. Five full-scale specimens were investigated under cydic horizontal loads. The configuration of the specimens varied in compressive strength of infilled gypsum and sheathing types. The shear performance of the walls can be improved obviously due to the participation of infilled material. The failure modes are characterized by the loss of stressed skin provided by sheathings together with compressive failure of Mulled gypsum. Besides, a series of tests concerning fastener responses and material characteristics of gypsum was conducted. Furthermore, the numerical models based on OpenSEES were proposed. After calibration of parameters,

a combination of beam elements with pinned joints, zero-Length elements with Pinching-4 material and equivalent truss elements with Concrete-01 material was employed to describe the nonlinear behaviour of the infilled walls. The comparison between tests and simulations was then carried out. The results of numerical models have an agreement on test results. The developed numerical model can be used for predicting cycle performance of the infilled CFS walls and related analysis of structural systems in further studies. (C) 2020 Elsevier Ltd. All rights reserved.

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第 45 篇

标　　题： Experimental Study On Deformation Mechanism Of A Utility Tunnel In A Ground Fissure Area

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期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： This paper discusses the deformation mechanism of a utility tunnel crossing active ground fissures in Xi'an as observed in a physical model test. The purpose of this work is to confirm the precise effects of ground fissures on utility tunnels. The physical simulation experiment is carried out to measure the earth pressure and the strain relationship of the structure and the structural displacement. The structure appears to have been destroyed by torsion. The structural deformation located in the tunnel's footwall was more serious than that in the hanging wall. However, at the top of the utility tunnel structure, the earth pressure in the footwall was less than that in the hanging wall. The increased range of the hanging wall at 0.3-1.5 m (the prototype within the range of 22.5 m) and decreased range of the footwall at 0.3-0.8 m (the prototype within the range of 12 m) were basically consistent with changes in the contact pressure at the structure's bottom. This was roughly consistent with the main deformation zone of ground fissures mentioned in the specification, with the hanging wall at 0-20 m and footwall at 0-12 mm. Displacement meter data shows that the structure tends to deform to the lower right as the utility tunnel is twisted clockwise. These observations mark a notable departure from the previously published failure mode of metro tunnels under active ground fissures.

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WOS 号： 000537257000001

第 46 篇

标　　题： Experimental Investigation Of Self-Centering Steel Reinforced Concrete Coupled Wall Panels With Replaceable Energy Dissipaters

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期　　刊： ENGINEERING STRUCTURES

摘　　要： Resilience of structures is already the new issue and challenge in the field of earthquake engineering. In order to enhance the restorability of concrete wall panels and further use them in steel moment frames, a novel self-centering steel reinforced concrete coupled wall panels with replaceable energy dissipaters is presented in this paper. For this purpose, subassembly tests of the coupled walls with frame beams as boundary were carried out. Four full-scale specimens were tested under cyclic lateral loads. The initial prestress of post-tensioned (PT) steel bars and configuration of energy dissipaters were varied to investigate their impacts on lateral responses of the walls. The failure process, load-displacement relation, energy absorption capacity, residual deformation and force of PT steel bars were also investigated. Test results show that the three-stage nonlinear response is characterized by the sequential failure process of wall rocking, yielding of energy dissipater and yielding of PT steel bars. The initial prestress of PT steel bars greatly affects the initial stiffness, rocking load and residual deformation of the walls. Failure of the walls is mainly concentrated on the energy dissipaters. With the increase of energy dissipaters in quantitative terms or in type terms, the capacity of energy absorption is accordingly improved, but self-centering capacity is accordingly weakened.

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第 47 篇

标　　题： An Optimised Window Control Strategy For Naturally Ventilated Residential Buildings In Warm Climates

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期　　刊： SUSTAINABLE CITIES AND SOCIETY

摘　　要： The adopted window control strategy within an indoor environment affects ventilation performance and occupant comfort. A natural ventilation strategy with optimised window control is proposed and evaluated on a typical Australian residential building. The three main steps of window control are: 1) prediction of outdoor air temperature through rolling forecast; 2) determination of ventilation mode through the decision tree method and; 3) optimisation of window opening percentage through heuristic control. Three control strategies are investigated and compared throughout the hot season. The results suggest that introducing prediction of outdoor temperature into the natural ventilation control process minimises the negative impact of control hysteresis. By using flexible degrees of window opening, the proposed strategy shows improved performance for maintaining an indoor operative temperature compared to the original

open-closed control. The mean absolute deviations of indoor operative temperature from the neutral operative temperature are reduced by more than 30 %. In addition, the presented feedback and predictive control logic results in greater stability of indoor thermal operative temperature by avoiding over-ventilation.

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WOS 号： 000531580800007

第 48 篇

标　　题： Compressive Behavior Of Built-Up Closed Box Section Columns Consisting Of Two Cold-Formed Steel Channels

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期　　刊： THIN-WALLED STRUCTURES

摘　　要： Thirty specimens of built-up closed box sections consisting of two cold-formed steel channels of various cross sections (B92 and B143), lengths (3000, 1500, 450, and 270 mm), and thicknesses (1.2 and 1.5 mm) were tested subject to concentric and eccentric axial compression. Failure modes were analyzed and load vs. displacement curves were obtained. The test results indicate that the failure modes of long and medium columns subject to concentric axial compression are flexural buckling about the weak axis, whereas that of the short column is excessive local buckling; specimens subject to eccentric axial compression about the strong and weak axes exhibited flexural-torsional buckling and flexural buckling, respectively. Finite element (FE) models were established and verified. Detailed parameter studies were performed to evaluate the accuracy of code equations for a wide range of parameters. The FE analysis results indicate that the concentric axial compression strength of the columns decreased with an increase in the slenderness ratio of column or the web height-to-thickness ratio; increasing the flange width can significantly increase the stability and strength of the column; the eccentric axial compression strength of the column about the weak axis decreased faster than that about the strong axis. Finally, the effectiveness of the design methods, i.e., the effective ratio of width-to-thickness method in the Chinese code, effective width method, direct strength method, and load and resistance factor design in North American specifications to predict the strength of this type of built-up column is evaluated. For the B92 series columns and B143 series column with slenderness ratio of the column greater than 92, it is conservative to use design methods to calculate the concentric axial compression strength of the column. Additionally, it is conservative to use the design methods to calculate the eccentric axial compression strength of the columns.

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WOS 号： 000531095300028

第 49 篇

标　　题：Effects Of Intrinsic Anisotropy On The Dynamic Behaviour Of Undisturbed Loess

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通讯作者：Wang, R (corresponding author), Changan Univ, Sch Civil Engn, Xian, Peoples R China.

期　　刊：PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS-GEOTECHNICAL ENGINEERING

摘　　要：To investigate the effects of the relative orientation between a sample's principal axes of anisotropy and the principal stress axes on the dynamic behaviour of undisturbed loess, samples with axial inclinations 30 degrees and 90 degrees relative to the horizontal were prepared. The effects of confining pressure and depth of soil also were examined to investigate variations in the dynamic behaviour of loess. The results showed an obvious effect of intrinsic anisotropy on the dynamic behaviour of loess. With all other conditions constant, the higher the confining pressure, the greater the dynamic stress to generate the same dynamic strain. The dynamic stresses of the 90 degrees samples were always greater than those of the 30 degrees samples. The effect of intrinsic anisotropy on the backbone curves was more obvious for the 2 m depth samples than for the 6 m depth samples. The damping ratio was within a certain range and initially increased as the dynamic strain increased and then gradually levelled off. The 2 m samples exhibited higher damping ratios than the 6 m samples. Finally it was found that the intrinsic anisotropy of loess might weaken the sample during the loading process and a confining pressure of 300 kPa was sufficient to nearly eliminate the effects of intrinsic anisotropy.

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WOS 号：000532801900003

第 50 篇

标　　题：Design Method For Cold-Formed Steel U-Section Short Columns

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期　　刊：ADVANCED STEEL CONSTRUCTION

摘　　要：The axial bearing properties of cold-formed steel U-section short columns are investigated in this paper, including 12 columns with four types of lengths i.e.300 mm, 360 mm, 420 mm, and 450 mm. Then finite element models (FEM) were developed to simulate the experimental specimens and compared with the test results to guarantee the rationality of FEM. Moreover, the width-to-thickness and the height-to-thickness of CFS U-section short columns were examined by FEM. An approach to accurately predict the ultimate capacity of CFS U-section short columns was proposed and certified by a large number of experimental and numerical simulation data, in order to remedy the deficiency that the direct strength method (DSM) has a large error in calculating the ultimate capacity of CFS U-section short columns. Specifically, this paper not only clarified the proposed method depending on the DSM for calculating the

ultimate capacity of the CFS U-section columns but also provides reference for practical engineering design and application. Copyright (C) 2020 by The Hong Kong Institute of Steel Construction. All rights reserved.

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WOS 号： 000536808800006

第 51 篇

标　　题： Numerical Study On The Heat Transfer, Extraction, And Storage In A Deep-Buried Pipe

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期　　刊： RENEWABLE ENERGY

摘　　要： Aiming at the thermal attenuation problem of ground temperature field in unidirectional heat extraction and supply in buildings of deep-buried geothermal energy, we propose supplementing heat to the ground using some heat source such as solar energy that is stored during the non-heating period, thus enabling long-term operation of a buried pipe system. With the study conducted on a buried U-bend pipe project with a depth of 2505 m, a three-dimensional (3D) full-scale model was established based on the numerical modeling method which obtained by the author's research team in the early stage. The heat extracted from the buried pipe or the heat storage capacity of ground for a constant inlet water temperature and given initial ground temperature field was analyzed and predicted. Meanwhile, the heat storage capacity after heat was taken from the buried pipe was calculated and analyzed. Finally, heat flux through the wall of the buried pipe was analyzed, and heat transfer to ground at different buried depths during the heat storage period was discussed. (c) 2020 Elsevier Ltd. All rights reserved.

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第 52 篇

标　　题： A New Composite Slab Using Crushed Waste Tires As Fine Aggregate In Self-Compacting Lightweight Aggregate Concrete

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期　　刊： MATERIALS

摘　　要： A composite slab comprised of self-compacting rubber lightweight aggregate concrete (SCRLC) and profiled steel sheeting is a new type of structural element with a series of superior properties. This paper presents an experimental research and finite element analysis (FEA) of the flexural behavior of composite slabs consisting of SCRLC to develop a new floor system. Four composite slabs specimens with different shear spans (450 mm and 800 mm) and SCRLC (0% and 30% in rubber particles substitution ratio)

are prepared, and the flexural properties including failure modes, deflection at mid-span, profiled steel sheeting, and concrete surface stain at mid-span and end slippage are investigated by four-point bending tests. The experimental results indicate that applying SCRLC30 in composites slabs will improve the anti-cracking ability under the loading of composite slabs compared with composite slabs consisting of self-compacting lightweight aggregate concrete (SCLC). FEM on the flexural properties of SCRLC composites slabs show that the yield load, ultimate load, and deflection corresponding to the yield load and the ultimate load of composite slabs drop as the rubber particles content increases in SCRLC. The variation of SCRLC strength has less impact on the flexural bearing capacity of corresponding composite slabs. Based on the traditional calculated method of the ultimate bending moment of normal concrete (NC) composite slabs, a modified calculated method for the ultimate bending moment of SCRLC composite slabs is proposed.

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WOS 号： 000551495800127

第 53 篇

标　　题： Probabilistic Models Of The Strut Efficiency Factor For Rc Deep Beams With Mcmc Method

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期　　刊： STRUCTURAL CONCRETE

摘　　要： The probabilistic model using Markov Chain Monte Carlo (MCMC) sampling procedure was proposed for estimating the value of strut efficiency factor in the strut-and-tie model (STM). The STMs according to various proposals from different researchers were compared with the database containing 691 tests on the shear strength of RC deep beams. Strut efficiency factor models were collected and compared against the experimental results in the database. Considering prior information, established database, and existing models, the probabilistic model was improved by considering the shear span-to-depth ratio, web reinforcement ratio, longitudinal reinforcement ratio, and dimension of specimen. The proposed model was evaluated by the results in the database, which shows better accuracy and discreteness with mean and CoV of 1.047 and 0.248, respectively.

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WOS 号： 000577114900006

第 54 篇

标　　题： Experimental And Theoretical Study On The Deformation Constitution Of Reinforced Concrete Beam-Column Sub-Assemblages

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China.

期　　刊：JOURNAL OF EARTHQUAKE ENGINEERING

摘　　要：The deformation behavior of beam-column sub-assemblages has a significant impact on the lateral displacement of frame structures. Understanding and realistically predicting the deformation constitution of beam-column sub-assemblages are important aims in the control of frame structural lateral displacement. In this study, experimental tests on three reinforced concrete frame structures were carried out to investigate the deformation constitution of beam-column sub-assemblages. The specimens are different for the axial compression ratio and beam-to-column stiffness ratio. A numerical model was developed to further study the effects of axial compression ratio, reinforcement ratio of column, and shear-to-span ratio of beam on the deformation constitution. In addition, a method to calculate the deformation constitution was proposed.

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WOS 号：000543697700001

第 55 篇

标　　题：Simplified Calculation Method For Flexural Moment Capacity Of Cold-Formed Steel Built-Up Section Beams

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期　　刊：ADVANCES IN STRUCTURAL ENGINEERING

摘　　要：Cold-formed steel built-up section beams are commonly employed in cold-formed steel framing owing to their excellent mechanical performance. In order to develop a simplified approach for obtaining the flexural moment capacity of built-up section beams, both experimental study and numerical analysis on the flexural behavior of cold-formed steel built-up I-section and box section beams under flexural load were carried out in this study. The I-section beams are assembled from two back-to-back cold-formed steel lipped channels, and the box section beams consist of a cold-formed steel plain channel overlapping a lipped channel. First, four-point bending tests were performed on 30 simply supported specimens having 10 different configurations, and the moment capacities and failure modes of built-up section beams at ultimate loads were investigated. The failure characteristics observed were the interaction of local and distortional buckling of the web and top flange for I-section beams and local buckling of the web and top flange in pure bending for box section beams. Then, finite element models were developed to simulate the tested specimens and validated against the experimental results in terms of the moment capacities and failure characteristics. Moreover, extensive parametric studies, including section height-to-width ratio and flange width-to-thickness ratio, were conducted with the validated numerical models to identify the key factors influencing built-up section beams. Finally, a simplified

calculation method considering the reduction factor of the gross section modulus of the built-up section to predict the flexural moment capacities of cold-formed steel built-up I-section and box section beams was proposed.

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WOS 号： 000542289700001

第 56 篇

标　　题： Sample Preparation Methods Affect Engineering Characteristic Tests Of Municipal Solid Waste

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The output of municipal solid waste (MSW) has sharply increased over the recent years, which induces many severe problems (environmental pollution, deteriorating human health, and increased land occupation). Engineering parameters form the research basis for MSW treatment, which can be greatly influenced by the applied sample preparation methods. Currently, the preparation method of MSW samples mostly refers to the geotechnical test standard. The suitability and accuracy of this method for MSW are less studied, especially when considering biodegradation, so further research is needed. Depending on whether the material is dried or remains wet during preparation, the samples made by traditional geotechnical test standards are referred to as dry method samples or wet method samples, respectively. To study the influence of the sample preparation methods on the MSW engineering properties of MSW, the compression tests, direct shear tests, and biodegradation compression tests were conducted for both types of samples (dry and wet). The results show that the data dispersion of the wet method samples is stronger. The average test data variance of wet samples was 1.43-8.85 times higher than that of dry samples. In both the direct shear test and the compression test, the differences in engineering parameters caused by the sample preparation method were less than 12.3% and 8.9%, respectively. In biodegradation compression tests, the difference in engineering parameters reached up to 33.7%. In general, the dry method is preferred for tests that do not consider biodegradation, while the wet method is more suitable for tests that consider biodegradation. The research can be used as a reference toward improving the simplicity and accuracy of MSW tests.

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第 57 篇

标　　题： Enhancing Flexural Capacity Of Rc Columns Through Near Surface Mounted Sma And Cfrp Bars

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期　　刊： JOURNAL OF COMPOSITE MATERIALS

摘　　要： This study explores the flexural behavior of reinforced concrete (RC) columns strengthened with near surface mounted (NSM) shape memory alloy (SMA) bars or carbon fiber reinforced polymer (CFRP) bars. Seven RC column specimens were designed and fabricated to study the influence of different variables on the flexural response of the strengthened columns. These parameters include type of NSM reinforcement (SMA bars or CFRP bars), ratio of NSM reinforcement, and effect of CFRP jacketing. The columns were tested under cyclic lateral loading with constant axial force. The flexural behavior of each specimen was examined in terms of peak load, failure load, drift ratios, displacement ductility, stiffness degradation, energy dissipation, and seismic damage index. The experimental results indicate that strengthening of RC columns with NSM SMA or CFRP bars improves the flexural behavior of the columns through increasing the lateral load capacity, reducing the stiffness degradation and increasing the cumulative energy absorption up to failure. Further enhancement in the lateral response of RC columns was obtained by combining NSM bars and CFRP jacketing as the later provides an additional confinement to the critical sections of the test specimens.

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WOS 号： 000544023300001

第 58 篇

标　　题： Study On Restoration Materials For Historical Silty Earthen Sites Based On Lime And Starch Ether

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通讯作者： Kong, DQ (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要： The relics built with soil are called earthen archaeological sites. Many silt earthen sites exposed to natural environment get seriously damaged and thus require urgent restoration with suitable materials. Previously, lime and glutinous rice slurry were used in the construction of earthen sites. However, lime is usually used in clay, and glutinous rice pulp is difficult to prepare and use on a large scale. Therefore, in this study, starch ether was selected to replace glutinous rice pulp. Lime and starch ether were added to silt as single or double additives, respectively, to prepare the corresponding single-mixed and multiple-mixed modified soil samples. Furthermore, the direct shear test and compression test were carried out and the optimum content was determined. The strength and durability of optimum modified materials were compared with those

of the original site soil. When the lime content was 9% or the concentration of starch ether solution was 5%, the shear strength and compression resistance ability of single-mixed modified soil were improved significantly. When lime content was 6% and starch ether solution was 5%, the strength of multiple-mixed modified soil was the best, and the maximum cohesion and internal friction angle were 51.1 and 3.37% higher than those of single-mixed soil, respectively. The strength and durability of the optimum modified soil were similar to or higher than those of the site soil. Thus, it is feasible and effective to use lime together with starch ether as restoration material for silty earthen sites.

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WOS 号： 000552805300002

第 59 篇

标　　题： Crack Behavior Of Concrete Beam In Flexure Strengthened With Nsm Prestressing Screw-Thread Steel Bars

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期　　刊： MATERIALS AND STRUCTURES

摘　　要： The cracking of concrete plays a vital important role for the serviceability and durability of reinforced concrete (RC) structures in terms of the structural behavior. To investigate the crack behavior of concrete structure with additional strengthening, monotonic four-point bending test was carried out for RC beams which strengthened with near surface mounted (NSM) prestressing screw-thread steel bars (PSB). Detailed description of the strengthened beams was presented, particularly on the crack initiation and propagation, the distribution, even the crack width and length, based on the deformation fields obtained from the non-contact digital image correlation (DIC) method. In addition, the relationship between the crack width and the damage level was discussed, and based on the results a crack-based damage assessment method for NSM strengthened members was proposed. The results reveal that the beam strengthened with NSM PSB steel bars demonstrated higher load carrying capacity than the reference beam. The prestressing application could significantly increase the cracking load thus delaying the initiation of cracks. The beams NSM strengthened with prestressed bars exhibited more flexural cracks in the constant moment region with a smaller crack width and spacing compared to the specimen without prestress. Furthermore, the crack-based damage assessment method proposed in this paper was demonstrated to be feasible to NSM strengthened beam for determining the damage status and repairability with simple operation.

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WOS 号： 000550018900003

第 60 篇

标　　题： Effect Of The Dosage Ofmwcntson Deterioration Resistant Of Concrete Subjected To

Combined Freeze-Thaw Cycles And Sulfate Attack

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期　　刊：STRUCTURAL CONCRETE

摘　　要：In this study, the deterioration resistant of concrete with and without multi-walled carbon nanotubes (MWCNTs) against combined freeze-thaw cycles and sulfate attack was studied, and concretes incorporating MWCNTs (i.e., 0.05, 0.10, and 0.15 wt%) as partial replacement of Portland cement were exposed to 5% sodium sulfate solution under freeze-thaw cycles. The performance, including compressive strength, relative dynamic elastic modulus, mass loss, microstructure, deterioration resistant coefficient of concretes were evaluated. Results show that when exposed to 5% sodium sulfate solution, MWCNTs could enhance the mechanical and durability properties of concrete subjected to combined freeze-thaw cycles and sulfate attack, regardless of the dosage of MWCNTs. The deterioration resistant of MWCNTs concrete was not increase with the increase dosage of MWCNTs. And the best resistance performance was obtained in concrete containing lower dosage of MWCNTs. In addition, MWCNTs could promote formation of hydration and corrosion products, and delay deterioration of concrete was demonstrated by SEM and thermogravimetric analysis.

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第 61 篇

标　　题：Woodchips As Sustained-Release Carbon Source To Enhance The Nitrogen Transformation Of Low C/N Wastewater In A Baffle Subsurface Flow Constructed Wetland

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期　　刊：CHEMICAL ENGINEERING JOURNAL

摘　　要：The lack of carbon source in the denitrification process with low C/N wastewater is the main factor limiting the denitrification efficiency in constructed wetlands (CWs). However, the traditional method of adding liquid carbon source is often costly and facing the risk of secondary pollution. This study attempted to solve this problem by adding woodchips sustained-release carbon sources as part of the substrate, together with the dewatered alum sludge as the main wetland substrate to the baffle subsurface flow constructed wetland (BSFCW). The effects of woodchips on denitrification capacity, effluent COD and nitrogen transfer and transformation were studied. Results showed that the removal rates of ammonia nitrogen (NHS4(+) -N), nitrate nitrogen (NO3- -N), total nitrogen (TN) and total phosphorus (TP) were 19.0%-75.3%,

63.6%-96.1%, 61.94%-74.4%, 75.0%-98.8%, respectively, when the C/N ratio varies between 0.93 and 1.87. The two-dimensional contour simulation of pollutants concentration in the system indicated that: i) the release rate of COD by woodchips decreased with the time; ii) woodchips reduced the oxidation reduction potential (ORP) of CW system, creating favorable conditions for the denitrification; iii) the closer the woodchips filling position to the inlet, the higher the denitrification efficiency of the system. The combination of dewatered alum sludge and woodchips substrates realized the simultaneous denitrification and dephosphorization of the BSFCW system. This study is of great significance for the treatment of low C/N wastewater containing considerable even high strength P.

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第 62 篇

标　　题： Compressive Stress-Strain Behavior Of Cfrp-Confined Lightweight Aggregate Concrete Reinforced With Hybrid Fibers

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通讯作者： Wu, T (corresponding author), Changan Univ, Sch Civil Engn, Xian, Peoples R China.

期　　刊： COMPOSITE STRUCTURES

摘　　要： The axial compressive stress-strain behavior of CFRP-confined lightweight aggregate concrete (LWAC) with short carbon fiber and/or polypropylene fiber was investigated. Thirty cylinders with different concrete types (normal weight concrete and LWAC), fiber types (carbon fiber, polypropylene fiber, and mixture of these two fibers), volume faction of fibers (from 0% to 0.4% for each fiber type in single and hybrid form), and spacing between CFPR straps (0 mm, 30 mm, and 50 mm) were experimentally studied. The compressive strengths of CFRP-confined LWAC were improved to 1.01-1.51 times the unconfined strength, and LWAC showed less enhancement in compressive strength provided by confining pressure compared with normal weight concrete. The increase in spacing between CFRP straps declined the confining effect. Addition of carbon fiber in both single and hybrid form positively affected the toughness of CFRP-confined LWAC, while the polypropylene fiber showed few influences on properties of LWAC. Models for the peak stress and corresponding strain were established by collected and present test data. Then theoretical stress-strain model was developed by combining iterative calculation of ascending portion and close-form formula of descending branch. The proposed model showed good match to the test results.

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WOS 号： 000533557300003

第 63 篇

标　　题： Bond Properties Between Gfrp Bars And Hybrid Fiber-Reinforced Concrete Containing Three Types Of Artificial Fibers

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： This study investigated the bond properties and stress-slip relations between glass-fiber-reinforced plastic (GFRP) bars and hybrid fiber-reinforced concrete (HFRC) containing carbon, aramid and polypropylene fibers, and explored the effects of fibers-volume fraction, bar diameter, anchorage length and surface configuration. A total of 48 samples, including 36 HFRC samples with embedded GFRP bars and 12 ordinary concrete (OC) samples with embedded GFRP bars, were manufactured and subjected to pullout tests. The test results indicated that the bond behavior between the GFRP bars and HFRC was significantly improved by the cooperative effects of the carbon, polypropylene and aramid fiber. A bond-slip constitutive model for the GFRP bars embedded in both HFRC and OC was established and had a good agreement with the testing results. (C) 2020 Elsevier Ltd. All rights reserved.

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第 64 篇

标　　题： Experimental Investigation On Rehabilitation Of Corroded Rc Columns With Bsp And Hpfl Under Combined Loadings

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期　　刊： JOURNAL OF STRUCTURAL ENGINEERING

摘　　要： This research focuses on evaluating the seismic properties of corrosion-damaged RC columns strengthened by bonded steel plate (BSP) and high-performance ferrocement laminate (HPFL). The mechanical properties are experimentally investigated based on various combined loading cases. A total of nine square RC columns with identical structural properties are produced, and five of them are corroded and poststrengthened with BSP and HPFL. The effects of the combined loadings, bearing capacity, failure mode, skeleton curves, hysteretic curves, ductility, stiffness degradation, energy dissipation, and plastic hinge characteristics are analyzed. In particular, a new method for calculating the skeleton curves under different failures modes is proposed and agrees well with the experimental results by comparison. (c) 2020 American Society of Civil Engineers.

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WOS 号： 000546983600003

第 65 篇

标　　题： Effect Of Carbon Nanotubes' Diameter On Freeze-Thaw Resistance Of Cement Paste

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期　　刊： JOURNAL OF MECHANICS

摘　　要： This paper aims to investigate the freeze-thaw resistance of cement-paste containing with different diameter and content of multiwalled carbon nanotubes (MWCNTs) in terms of mechanical properties and microstructure. Three groups of cement-paste with MWCNTs diameter of 10-20 nm, 20-40 nm and 40-60 nm were prepared by incorporating 0.1 wt%, 0.2 wt%, 0.3 wt%, 0.4 wt%, 0.5 wt% MWCNTs by cement weight. Experimental results showed that the addition of 0.1 wt% MWCNTs with diameters of 10-20 nm effectively improved the freeze-thaw resistance of cement-paste. In addition, microstructural analysis of these cement-paste specimens showed that MWCNTs addition increased the materials' initial porosity, but a proper amount of MWCNTs decreased the porosity of cement-paste after freeze-thaw cycles and effectively improved the pore size distribution. MWCNTs 10-20 nm in diameter were found to be the optimal size for improving the microstructure of these MWCNTs cement-paste

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WOS 号： 000554990200003

第 66 篇

标　　题： Analysis Of Wind-Induced Vibration Of A Spoke-Wise Cable-Membrane Structure

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期　　刊： JOURNAL OF MARINE SCIENCE AND ENGINEERING

摘　　要： Lightweight cable-membrane structures can span large distances and undertake aesthetically pleasing shapes. They are widely used for roofs and modern structural canopies and in the aerospace industry for large on-board antenna reflectors that are to be deployed in space. This paper studies a wind-induced vibration under different cable stress relaxation conditions based on the wind load time-history to obtain the dynamic behavior of such a structure. Particularly, the focus is put upon its wind resistance in the event of stress relaxation. This research can provide an important reference for the design of wind resistance, damage assessment, and emergency maintenance for the spoke-wise cable-membrane structure (SCMS).

DOI： 10.3390/jmse8080603

WOS 号： 000567287500001

第 67 篇

标　　题： Effects Of Static Magnetic Field On The Performances Of Anoxic/Oxic Sequencing Batch Reactor

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期　　刊： BIORESOURCE TECHNOLOGY

摘　　要： Two anoxic/oxic (A/O) sequencing batch reactor (SBR) processes were utilized to study the effects of static magnetic field (SMF) on biological wastewater treatment process. Except for conventional indices, the reduced nicotinamide adenine dinucleotide (NADH)/oxidized nicotinamide adenine dinucleotide (NAD(+)) ratio and electron transport system activity (ETSA), as well as poly-beta-hydroxybutyrate (PHB) and extracellular polymetric substance (EPS) contents in two reactors which were with and without SMF under two cyclic times (12 h and 8 h) were monitored. When the process was enhanced by SMF, the total nitrogen removal efficiency can be improved (> 80%), and the NADN/NAD(+) ratio, ESTA, the maximum EPS content and the maximum PHB content in the reactor with SMF were higher. Besides, SMF can reduce the microorganism community diversity and make species distribute more even and abundant. SMF can promote the performance of A/O SBR process via improving electron transport and microbial community.

DOI： 10.1016/j.biortech.2020.123299

WOS 号： 000569075100007

第 68 篇

标　　题： Experimental Study Of Predamaged Columns Strengthened By Hpfl And Bsp Under Combined Load Cases

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通讯作者： Zhang, W (corresponding author), Fujian Univ Technol, Sch Civil Engn, Fuzhou 350118, Peoples R China.

期　　刊： STRUCTURE AND INFRASTRUCTURE ENGINEERING

摘　　要： After the ground motion, a large number of columns remain intact and can be retrofitted and reused. In this paper, to explore the effects of the loading scenario, predamage level and strengthening measures on the seismic performance of reinforced concrete (RC)

columns, seven predamaged specimens strengthened with high-performance ferrocement laminate (HPFL) and bond steel plate (BSP) were tested. The results show that the bearing capacity, ductility, single-cycle energy dissipation and stiffness of all the predamaged specimens can be effectively restored and improved by this strengthening method for different loading cases. This strengthening method also significantly improves the shear capacity and changes the failure modes of the predamaged strengthened specimens from those of the corresponding predamaged unstrengthened specimens. The vertical eccentricity only slightly affects the seismic behavior of the specimens, while the horizontal eccentricity significantly increases the length of the failure region and reduces the seismic behavior of the specimens, considering the bearing capacity, energy dissipation capacity, and stiffness. The effects of different predamage levels are unique.

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WOS 号： 000555215900001

第 69 篇

标　　题： Theoretical Analysis Of Annular Elliptic Finned Tube Evaporative Condenser Based On Field Measurement

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期　　刊： JOURNAL OF THERMAL SCIENCE

摘　　要： In this article, a new evaporative condenser with an annular elliptic finned tube heat exchanger that includes a round inner tube and elliptic outer finned tube was designed and analyzed. The refrigerant flows between the round inner tube and the elliptic outer tube, and it simultaneously exchanges heat with the cooling water in the inner tube, the spray water, and the cooling air flowing past the outer tube. Using field measurement for the traditional round finned tube evaporative condenser in the Futong Metro Station of Line 14 in Beijing, China, the theoretical heat transfer performance of the annular elliptic finned tube evaporative condenser was analyzed and simulated. Compared with a round finned tube heat exchanger, the heat exchange capacity of the annular elliptic finned tube increased by 2.34% to 9.28%; the total heat transfer coefficient increased by 47.42%, and the power consumption of the fan in the air-conditioning system with an annular elliptic finned tube heat exchanger decreased by 11.18% to 14.65%. Therefore, the energy-saving performance and the heat transfer performance of the new annular elliptic finned tube heat exchanger were enhanced compared to the round finned tube heat exchanger.

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WOS 号： 000557117400002

第 70 篇
标　　题： Hydrodynamic Pressure Distribution In Saturated Void Beneath Cement Concrete Pavement Slab
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期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING
摘　　要： The void beneath cement concrete pavement slab (CCPS) is one of the common defects, which can cause the pavement cracking when heavy vehicle load is exerted on the pavement. The void expands when the water trapped inside erodes the inner surfaces of void circularly, bringing more cracks easily. Due to the close relationship with the erosion of the void, the hydrodynamic pressure distribution in saturated void beneath CCPS is investigated in this paper. Firstly, a theoretical expression of the hydrodynamic pressure in saturated void is proposed taking in account the law of mass conservation and the theorem of momentum. Secondly, the deformation patterns of the CCPS and the fluid-structure interaction (FSI) are discussed based on the proposed method. The results show that the hydrodynamic pressure and the water flow velocity in the void are overvalued while the rigid deformation pattern of CCPS is employed and the FSI is ignored. Finally, some influence factors are discussed. It is obtained that, both the maximum hydrodynamic pressure and the average velocity of water increase with the increase of the load amplitude, the vehicle speed and the void dimension. The conclusions are helpful for the prevention and maintenance of void beneath the CCPS.
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WOS 号： 000560220400001

第 71 篇
标　　题： Modulation Of Coordinative Unsaturation Degree And Valence State For Cerium -Based Adsorbent To Boost Phosphate Adsorption
作　　者： [He, Jiaojie; Xu, Yuhong; Yang, Liwei; Sun, Yan; Yang, Yue] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China; [Shao, Penghui] Nanchang Hangkong Univ, Key Lab Jiangxi Prov Persistent Pollutants Contro, Nanchang 330063, Jiangxi, Peoples R China; [Cui, Fuyi] Chongqing Univ, Coll Urban Construct & Environm Engn, Chongqing 400000, Peoples R China; [Wang, Wei] Harbin Inst Technol, Sch Environm, State Key Lab Urban Water Resource & Environm, Harbin 150090, Peoples R China
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期　　刊：CHEMICAL ENGINEERING JOURNAL

摘　　要：The electronic structure and associated chemical characteristics of metal-based adsorbent are directly relevant to the selectivity and efficiency of phosphate uptake. However, few studies focus on the nature of metal centers' electronic orbit (i.e., the coordination number and valence state). Herein, we report a coordinatively unsaturated Ce(III)-based materials, which exhibits excellent potential in effective phosphate removal. Via controlled partial thermolysis and the following reduction process, the valence state and coordination number of original Ce(III)-MOF (denoted as CM) can be tuned and optimized. The manufacture of more coordination vacancy was fulfilled through total release of solvent molecules under annealing at 300 °C in air. Meanwhile, the reduction procedure could precisely tuned the ratio of Ce(III)/Ce(IV). The result shows that samples only annealed induce a sharp decrease of the phosphate capacity due to the high amount of Ce(IV) state. After the reduction process, the XPS spectra reveal the growth of oxygen vacancy content calculated as 11.6% and the increase of Ce(III)/Ce(IV) values from 0.79:1 to 1.36:1. Based on those great improvement of the unsaturated coordination numbers and the recovery of Ce(III) content for metal centers, the maximum capacity of CM-300(R) to adsorb phosphate is up to 273 mg/g, 2.6 times larger than that of pristine CM. Those new insights provide a novel strategy for synthesizing a highly active adsorbent by controlling the electronic structure of metal centers for efficient phosphate removal.

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WOS 号：000540709600006

第 72 篇

标　　题：Study On The Global Bidirectional Seismic Behavior Of Monolithic Prefabricate Concrete Shear Wall Structure

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通讯作者：Wang, B (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊：SOIL DYNAMICS AND EARTHQUAKE ENGINEERING

摘　　要：The seismic responses of precast concrete structure are studied under the earthquake excitations, by applying the shaking table test on the 12-storey, two-bay, 1/5 scale monolithic prefabricate concrete shear wall structure (MPCSWS), which is designed with the Chinese codes and assembled by the precast elements and cast-in-place boundary elements in the laboratory. The model MPCSWS is subjected to a series of dynamic tests with increasing intensities. The phenomena of the MPCSWS are observed from the shaking table test, including the dynamic characteristics, accelerations, displacements, global hysteresis responses, torsion responses and failure mechanism. Test results indicate that the MPCSWS shows the equivalent connections with no visible cracks under the frequent and basic ground motions, and then the weak connections appear cracks to consume the earthquake energy. Meanwhile, the

bidirectional accelerations, displacements, energy dissipations and torsion responses increase with the increasing of seismic excitations, whereas, the effective stiffness decrease. Furthermore, the connections mainly affect the initial frequency and plastic behavior of global structure, especially, the distribution of seismic responses under the strong earthquakes. It is recommended that the cast-in-place boundary elements effectively constraint the precast elements in the elastic stage in MPCSWS. And the theoretical model of connections under the shear-compression loading should be further studied to conduct the finite element analysis of structure to understand the collapse mechanism.

DOI： 10.1016/j.soildyn.2020.106194

WOS 号： 000551483900037

第 73 篇

标　　题： Seismic Behaviour And Strength Prediction Of Corroded Rc Columns Subjected To Cyclic Loading

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通讯作者： Xing, GH (corresponding author), Changan Univ, Sch Civil Engn, Xian, Shaanxi, Peoples R China.

期　　刊： MAGAZINE OF CONCRETE RESEARCH

摘　　要： In this paper, the performance degradation of reinforced-concrete (RC) columns with corroded longitudinal steel bars was experimentally investigated. Ten large-scale RC column specimens were constructed, and the longitudinal steel bars were corroded, to simulate the real severe environmental condition that concrete structures may encounter during their long-term service life, using a hybrid method. All specimens were tested under lateral cyclic loadings up to failure with the aim of revealing the effects of rebar corrosion level and axial compression ratio on the seismic behaviour of corroded RC columns. Test results indicate that an increase in the rebar corrosion level and axial compression ratio causes a marked degradation in the seismic performance of corroded RC columns, especially a reduction in the strength, ductility and energy dissipation capacity. To study the effect of the rebar corrosion level, the seismic damage indices of the corroded RC columns were also assessed using the damage model proposed by Park-Ang. In addition, a strength prediction method for corroded RC columns was proposed based on the modified compression field theory coupled with the conventional sectional analysis method. The proposed prediction method was then verified with the experimental results.

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WOS 号： 000558598500003

第 74 篇

标　　题： Experimental Study On Lining Cracking Of Shallow Buried Loess Tunnel Under The Simulation Of Effect Of Slide Surface Immersion

作　　者： [Liu, Yuyang] Changan Univ, Sch Civil Engn, Xian 710064, Peoples R China; [Lai, Hongpeng] Changan Univ, Sch Highway, Xian 710064, Peoples R China

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Featured Application The findings of this study can provide a useful reference for the reinforcement design of cracked lining of the operating tunnel, and help to evaluate the long-term safety of tunnel structures. The water immersion of surrounding rock slide surface causes lining cracking of the shallow buried loess tunnel, and different types of slide surface and different immersion degrees have different effects on secondary lining. In this paper, four types of slide surfaces for shallow buried loess tunnel are proposed. In order to find out the characteristics and laws of lining cracking under the effect of slide surface immersion, a loading model test with a large geometric similarity ratio of 1:10 was carried out. The test results show that the immersion of the slide surface has the most significant influence on the deformation of the lining vault and the arch waist, and the value and speed of the vault deformation are always the largest. When the unilateral slide surface is immersed in water, the lining cracking is concentrated on the flooded side of the slide surface, and the appearance of compressive cracks can be regarded as a precursor of lining instability. In the direction of lining thickness, the cracks always begin to develop from I-type, then gradually develop into L-type, and finally develop to Y-type, among which the number of L-type cracks is the most. Furthermore, the residual bearing capacity of cracked lining is also discussed.

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WOS 号： 000570371300001

第 75 篇

标　　题： Experimental Study And Finite Element Analysis On Fracture Performance Of Er55-G Welds

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通讯作者： Liao, FF (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH

摘　　要： In order to study the fracture performance of the ER55-G welds used together with Chinese Q460D low-alloy high-strength steel under multiaxial stress state, the uniaxial tensile fracture tests and finite element analyses (FEA) using ABAQUS were carried out on notched round bar specimens, flat grooved plate specimens, pure shear and tensile-shear flat plate specimens of the ER55-G welds respectively. Subsequently, the fracture surfaces were observed and analyzed, and the exponential ductile fracture criterion proposed by Rice and Tracey was calibrated with the test data. The results show that the stress state has an obvious influence on the fracture performance of the ER55-G welds. The FEA results are consistent with the test results. The notch radius, stress triaxiality and Lode angle parameter all affect the bearing capacity and ductility of the ER55-G welds.

DOI： 10.1016/j.jcsr.2020.106129

WOS 号： 000571392100002

第 76 篇

标　　题： Ultimate Bearing Capacity Of Strip Foundations In Unsaturated Soils Considering The Intermediate Principal Stress Effect

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： The reasonable determination of ultimate bearing capacity is crucial to an optimal design of shallow foundations. Soils surrounding shallow foundations are commonly located above the water table and are thus in an unsaturated state. The intermediate principal stress has an improving effect on the unsaturated soil strength. In this study, the ultimate bearing capacity formulation of strip foundations in unsaturated soils is presented by using Terzaghi's theory. The unified shear strength equation of unsaturated soils under a plane strain condition is utilized to capture the intermediate principal stress effect. Furthermore, two profiles of matric suction are considered and a hyperbolic function of the friction angle related to matric suction (phi(b)) is adopted to describe strength nonlinearity. The validity of this study is demonstrated by comparing it with model tests and a theoretical solution reported in the literature. Finally, parameter studies are conducted to investigate the effects of intermediate principal stress, matric suction, and base roughness on the ultimate bearing capacity of strip foundations. Besides, the effect of strength nonlinearity is discussed with two methods representing the angle phi(b).

DOI： 10.1155/2020/8854552

WOS 号： 000572081400007

第 77 篇

标　　题： Design And Structural Analysis Of A 70-M Metal Space-Frame Radome

作　　者： [Liu, Yan] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China

通讯作者： Liu, Y (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： STRUCTURAL DESIGN OF TALL AND SPECIAL BUILDINGS

摘　　要： The electrical performance of an antenna is usually affected by the stiffness, intensity, and stability of the radome structure. Thus, radome structural analysis is of great concern to designers. Taking a 70-m radome structure to be built in the future with a 50-m aperture antenna structure as the study platform, its mechanical behavior and electrical properties are analyzed and discussed. First, a detailed introduction regarding the method and principle of radome partitioning is presented. Based these methods, random divisions on radome plates are conducted using a specially developed program, and thereby, a whole spherical-segment model is established. In addition, focusing on the finite element model of a steel radome structure, static mechanical, seismic

response, modality, and stability analyses are performed, such that the member sections of the radome structure, adopting two kinds of materials, are determined. The results show that the mechanical properties of the structure are superior and that all indices meet the requirements in the safety evaluation. Just as noteworthy, the influencing mechanism of structural deformation of the radome on electrical performance is examined, and in particular, the reason why large deformation does not greatly degrade electrical performance is presented. Subsequently, a novel method for describing deformation is put forth to accurately estimate the effects of structural deformation on electrical performance. These achievements provide references for structural design and construction as well as maintenance of similar common metal space-truss radomes.

DOI： 10.1002/tal.1806

WOS 号： 000566669500001

第 78 篇

标　　题： Numerical Evaluation Of Reinforced Concrete Columns Retrofitted With Frp For Blast Mitigation

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Fiber reinforced polymer (FRP) material is commonly applied in retrofitting structures due to the advantages of high strength and well corrosion resistance. Previous studies indicated that retrofitting with FRP sheet was an effective way for protecting the existing structures to resist the blast loads, but little research made comprehensive comparison study on the blast response of RC columns with different retrofitting strategies. This paper proposed a series of FRP retrofitting strategies and evaluated their effect on blast mitigation using numerical analysis approach. Comparison studies were conducted on the effect of FRP type, FRP thickness, and retrofitting mode on blast mitigation. A finite element model of RC columns retrofitted with FRP under blast loading was developed. The model considered the strain rate effect of steel and concrete and the orthotropic property of FRP composites. The reliability of the proposed model was validated against the data from a field blast test. Based on the verified model, the blast responses of RC columns with different retrofitting strategies were numerically investigated. According to the result analysis, appropriate FRP type, FRP thickness, retrofitting mode, and retrofitting length were recommended.

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WOS 号： 000576074500004

第 79 篇

标　　题： Evaluation Of Cracking And Serviceability Performance Of Lightweight Aggregate Concrete Deep Beams

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通讯作者： Wu, T (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： KSCE JOURNAL OF CIVIL ENGINEERING

摘　　要： This paper investigated the diagonal crack propagation and serviceability performance of fifteen deep beams fabricated using lightweight aggregate concrete (LWAC). Experimental variables included the shear span-depth ratio, beam section depth, and bearing plate width. The test results were reported in terms of crack propagation, diagonal crack width, diagonal cracking load, and size effect on the serviceability of deep beams; they were also employed to establish a relationship between residual shear bearing capacity and maximum diagonal crack width for such components. In addition, the crack width limits in current code provisions were utilized to further evaluate the serviceability of LWAC deep beams. The test results revealed that the diagonal crack propagation is almost independent of the variation of beam depth, while the diagonal crack width exhibited an obvious increasing trend as shear span-depth ratio or bearing plate width increased. At service load level, the crack width limit of 0.4 mm stipulated in ACI 224-R-01 can be satisfied by LWAC deep beams with horizontal and vertical shear reinforcement ratios more than 0.3%.

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WOS 号： 000569048900003

第 80 篇

标　　题： Bond-Slip Properties Between Lightweight Aggregate Concrete And Rebar

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通讯作者： Wu, T (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The bond-slip behavior of reinforcing bars in lightweight aggregate concrete (LWAC) was investigated. Effects of different concrete strengths (39.4, 48.7, 62.7 and 83.2 MPa), diameters of reinforcing bars (12, 16 and 20 mm) and embedded lengths (50 and 80 mm) on the bond-slip properties of rebar in LWAC were experimentally studied. The thick-walled model was adopted to provide the analytical bond strength solution of LWAC. Three-dimensional finite element (FE) model considering the effect of radial stress around the rebar was established to conduct simulations. The proposed bond stress-slip model showed good precision to test curves, and the established FE model was able to reflect the crack propagation at the inner of concrete. The splitting bond strength of LWAC was found to be better than that of normal weight concrete according to FE analysis. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000539386100044

第 81 篇

标　　题： Behavior Of Plastic-Steel Fiber Reinforced Lightweight Aggregate Concrete Columns Subjected To Concentric Axial Loading

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期　　刊：INTERNATIONAL JOURNAL OF CIVIL ENGINEERING

摘　　要：This paper presents the findings of an experimental study on the behavior of plastic-steel fiber (PSF) reinforced lightweight aggregate concrete (LWC) columns under axial compression loading. The experimental variables were concrete compressive strength, main reinforcement percentage, and PSF volumetric ratio. The behavior of the PSF reinforced LWC columns was evaluated in terms of the failure mode, load-bearing capacity, steel reinforcement strain, and ductility. The results showed that the addition of PSFs not only prevented premature spalling of the concrete cover but also strengthened the bond between the LWC and the steel bar. Compared with that of the control specimen, the ductility of the fiber-reinforced columns improved significantly. In addition to the experimental program, a numerical investigation based on nonlinear finite element (FE) analysis was performed using ANSYS 10.0. The experimental and numerical results were compared and found to be in satisfactory agreement. Furthermore, an analytical model developed in a previous study was used to predict the load-bearing capacities of the PSF reinforced LWC columns. The compressive strength of concrete, the spacing, and yield strength of transverse reinforcement were considered in the analytical models, and the analytical predictions were in agreement with the experimental results.

DOI：10.1007/s40999-020-00564-x

WOS 号：000572624100001

第 82 篇

标　　题：Investigation Of Stress-Strain Relationship For Confined Lightweight Aggregate Concrete

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通讯作者：Wu, T (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.

期　　刊：CONSTRUCTION AND BUILDING MATERIALS

摘　　要：Lightweight aggregate concrete (LWAC) is prone to undergo the aggregate fracture, which causes its failure mechanism are significantly different from that of normal weight concrete. The provision of sufficient lateral reinforcement can effectively improve the synergistic effect between the lightweight aggregates and cement matrix, thus enhancing the strength and ductility of LWAC and expanding its engineering applications. This paper presents an experimental investigation on the uniaxial behavior of twelve LWAC columns designed with different amount and configuration of lateral reinforcement. The equations of the feature points needed for the stress-strain model are established by considering the confinement efficiency of the lateral reinforcement and

the actual lateral reinforcement stress at the peak point, and are calibrated using the extensive results of the confined LWAC test database. Test results reveal the working mechanism of confined LWAC and further verify the accuracy and applicability of the proposed model. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000540841400040

第 83 篇

标　　题： The Enhanced Removal Of Phosphate By Structural Defects And Competitive Fluoride Adsorption On Cerium-Based Adsorbent

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期　　刊： CHEMOSPHERE

摘　　要： Trivalent cerium (Ce(III)) was demonstrated to have great potential for phosphate (P) removal. Besides the valence states, the relationship of nano -structure and adsorption capacity needs further study to explore more efficient adsorbents. Herein, a series of Ce(III)-terephthalate (BDC) metal-organic framework (MOF) with linker deficiencies are fabricated to achieve excellent P capture. The defective density can be increased by decreasing the reaction time and the ratio of organic linkers/metal. TGA reveals CeBDC-48 synthesized with BDC:Ce ratio of 1:1 for 48 h possessed 2.5 missing linkers per inorganic node. And the P uptake of Ce-BDC-48 was 35% higher than that of Ce-BDC-72 without defects. The maximum adsorption capacity of Ce-BDC-48 was 278.8 mg/g for P and 128.0 mg/g for fluoride (F), respectively. The adsorption mechanism illustrates that both P and F mainly focus on the Ce(III) active sites to achieve ligand exchange. The competing adsorption of P and F at the lower concentration of F (50 mg/L) indicates that the interference of F for P removal is insignificant on account of the selective preferential order of P. However, with the increment of F concentration (100 mg/L), amount of F with small sizes gathering around the adsorbent surface enlarge the steric hindrance to hinder the access of P, leading to the sharp decline of P uptake. This study not only provides promising candidate by the design of structural defects for the P removal in practical application but also give a deep analysis on the adsorption mechanism of P with competing F surrounded. (C) 2020 Elsevier Ltd. All rights reserved.

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第 84 篇

标　　题： Formulation Of Ultimate Bearing Capacity For Strip Foundations Based On The

Meyerhof Theory And Unsaturated Soil Mechanics

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期　　刊：COMPUTERS AND GEOTECHNICS

摘　　要：This study presents an ultimate bearing capacity formulation of strip foundations in unsaturated soils within the framework of the Meyerhof theory. The flowchart of calculation steps for this formulation is provided with a trial method according to suction distributions. The validity of the formulation obtained is demonstrated by two available theoretical solutions and experimental data. Comparisons are also performed between the results from the Meyerhof and the Terzaghi theories. It is found that the effects of matric suction and its distribution are significant; strength nonlinearity generates three types of the ultimate bearing capacity variation with respect to matric suction.

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第 85 篇

标　　题：Experimental Investigation On Shear Behavior Of Rc Beams Strengthened By Cfrp Grids And Pcm

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期　　刊：STRUCTURES

摘　　要：This paper presents the experimental results of four-point bending tests for reinforced concrete (RC) beams strengthened by carbon fiber reinforced polymer (CFRP) grids and sprayed polymer-cement-mortar (PCM). The reinforced arrangements of CFRP grids, stirrups and longitudinal steel rebars were selected as changing para-meters. The maximum loads, mid-span deflections and strains for the PCM, longitudinal steel rebars, stirrups and CFRP grids were obtained. The mechanical behavior of CFRP grids and the cooperation work performance between CFRP grids and steel rebars were investigated emphatically. The research results indicated that the shear strengthening effect of the CFRP grid-PCM reinforcing layers bonded along both sides of RC beams was sufficient. The shear contribution of the vertical CFRP grid was similar to that of the stirrup, but the stress distribution of vertical CFRP grid was not uniform due to the resistant action of grid points. Moreover, the vertical CFRP grids bore the lateral extruding action with opposite directions in tension and compression zones due to the

compressive and tensile behavior of horizontal CFRP grids, resulting in the complex stress state of the vertical grid which differs from the stirrup. There exists the cooperation work between CFRP grids and steel rebars in shear strengthening RC beams. So as to clarify the shear mechanism of RC beams strengthened by CFRP grids and PCM, the complex stress state of vertical CFRP grid, influence of the horizontal CFRP grid and the preconditions for the normal work of CFRP grid should be taken into account. The proposed shear capacity calculation formula based on truss-arch model could satisfy the design requirements.

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WOS 号： 000569323600003

第 86 篇

标　　题： Enhanced Hindrance From Phenyl Outer Side Chains On Nonfullerene Acceptor Enables Unprecedented Simultaneous Enhancement In Organic Solar Cell Performances With 16.7% Efficiency

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期　　刊： NANO ENERGY

摘　　要： Inner side-chain engineering on Y6 has been proven successful in improving short-circuit current density (J(SC)) through fine-tuning aggregated structures of acceptors. However, it fails in tuning the lowest unoccupied molecular orbital level (LUMO) and open-circuit voltage (V-OC). In this paper, we turn to focus on engineering the outer side chains on the flanking thienothiophene units with 4-hexylphenyl (PhC6) and 6-phenylhexyl (C6Ph) chains. Use of PhC6 enhances the

steric effect between the attached phenyl and the ending group, which in combination with the additional conjugation effect provided by the linking phenyl leads to upshifted energy levels and increased V-OC as a result. Again, substitution with the bulkier PhC6 unprecedentedly improves film-morphology with reduced paracrystalline disorder and long period and increased root-mean-square composition variations as well, leading to increased electron and hole mobilities and suppressed monomolecular recombination with J(SC) and fill-factor (FF) simultaneously enhanced. The PM6:BTP-PhC6-based devices yield a higher efficiency value of 16.7% than the PM6:BTP-C6Ph-based one (15.5%). Therefore, this study shows a conceptual advance in materials design towards reducing the conflict between V-OC and J(SC) in binary blended organic solar cells, which can be achieved by introducing bulkier chains to twist the backbone and simultaneously enhance the packing order.

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WOS 号： 000571080400002

第 87 篇

标　　题： Compressive Behavior Of Built-Up Double-Box Columns Consisting Of Four Cold-Formed Steel Channels

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期　　刊： ENGINEERING STRUCTURES

摘　　要： Thirty specimens of built-up double-box columns consisting of four cold-formed steel channels were experimentally tested under concentric and eccentric axial compression. The test specimens had varied cross-sectional dimensions (outside dimensions equal to 89 mm x 147 mm or 86 mm x 96 mm), different effective lengths (3200 mm, 1700 mm, 210 mm, or 135 mm), and different thicknesses (1.2 mm or 1.5 mm). The load vs. displacement curves and the measured compression strength of specimens were obtained and the failure modes were analyzed. The WA results showed that the failure mode of the long specimens (L/r between 103 and 108, where L is the calculated length of the column, r is the minimum radius of gyration) was flexural buckling about the weak axis. The typical failure modes of medium length specimens (L/r between 53 and 57) and short specimens (L/r between 4 and 8) subjected to concentric axial compression were deformation concentration caused by large local buckling. The failure mode of the medium length specimens under eccentric axial compression was flexural buckling, except for the specimens whose web height was 147 mm and the eccentricity direction was along the minor axis, for which the failure mode was deformation concentration. Then, finite element (FE) models considering geometric, material, and contact nonlinearity were developed, compared to experimental results, and used to explore a wider design space. The FE analysis results showed that the slenderness ratio of the column and the web height-to-thickness ratio have an important

influence on the strength of these columns. Finally, the applicability and effectiveness of calculating compression strength for this type of built-up column using methods such as Effective Ratio of Width-to-Thickness Method in Chinese code, Effective Width Method in AISI and Direct Strength Method in AISI, were evaluated by comparison with the WA and FE results. For all the columns analyzed with slenderness ratio greater than 105, it is reasonable to use these methods to calculate the concentric axial compression strength of columns. The methods in China and AISI S100-16 were found to be conservative for calculating the eccentric axial compression strengths of these built-up double box columns.

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WOS 号： 000571199000010

第 88 篇

标　　题： Research On Dynamic Mechanical Properties And Constitutive Model Of Basalt Fiber Reinforced Concrete After Exposure To Elevated Temperatures Under Impact Loading

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： The dynamic mechanical properties of basalt fiber reinforced concrete (BFRC) with different fiber contents (0.0%, 0.1%, 0.2%, 0.3%, 0.4%), confining pressures (0 MPa, 5 MPa, 10 MPa, 15 MPa) and exposed to different temperatures (20 degrees C, 200 degrees C, 400 degrees C, 600 degrees C, 800 degrees C) were investigated by using a 50 mm split Hopkinson pressure bar (SHPB) apparatus, and the factors such as fiber content, temperature and confining pressure effect on the dynamic mechanical properties were analyzed. The results show that the dynamic peak stress increases first and then decreases with the increase of fiber content. At different temperatures, the peak stress and its corresponding strain correspond to different fiber content, and the optimal fiber content is between 0.1% and 0.3%. When the temperature was from 20 degrees C to 400 degrees C, the dynamic peak stress decreased less, while when the temperature reached 600 degrees C and 800 degrees C, the dynamic peak stress decreased greatly. The confining pressure can significantly increase the dynamic peak stress and change the crushing morphology of specimens. The damage variable was built based on the Weibull distribution. A dynamic damage constitutive model combining statistical damage and viscoelastic model was established based on component combination model. The fitting curve of this model fitted well with test curve by identifying fewer undetermined parameters compared with Zhu-Wang-Tang (ZWT) model; therefore, this model can well describe the dynamic properties of BFRC under impact load.

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WOS 号： 000588891000001

第 89 篇

标　　题：Dynamic Response Analysis Of Blocks-Combined Dam Under Impact Load

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期　　刊：JOURNAL OF MOUNTAIN SCIENCE

摘　　要：In order to reduce the damage of ordinary gravity dam impacted by boulders in debris flow, a blocks-combined dam based practical project is proposed. The dynamic response of the proposed dam under impact load is investigated by using ABAQUS finite element software. Considering the impact velocity and impact height, the anti-impact performance of blocks-combined dam is discussed in terms of deformation, displacement, impact force, acceleration, and energy, and is compared with that of ordinary dam. Results show that the displacement, impact force and acceleration of dam increase with the increase of impact velocity and height. The impact energy of blocks-combined dam is mainly absorbed and consumed by the friction between the component interfaces, which is related to the location of impact point. Compared with the ordinary gravity dam, the blocks-combined dam has better impact resistance to boulders in debris flow.

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第 90 篇

标　　题：Preparation Of Rod-Shaped Bi5O7I As Bifunctional Material For Supercapacitors And Photcatalysts

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期　　刊：INTERNATIONAL JOURNAL OF ELECTROCHEMICAL SCIENCE

摘　　要：The preparation of new functional materials is one of the most effective, yet difficult methods for solving both energy shortage and environmental pollution problems. Bismuth iodide series oxides have been increasingly studied and favored in the field of supercapacitors and photocatalysts due to their unique morphological characteristics and excellent electrochemical performance. In this study, 3D rod-shaped Bi5O7I rich in

bismuth and oxygen was synthesized from BiOI by adjusting the pH. A variety of advanced characterization techniques were used to systematically study the chemical composition, structural characteristics, surface properties, morphological characteristics and electrochemical and photocatalytic performance. Results showed that flaky BiOI and 3D rod-shaped Bi5O7I were successfully prepared with good crystal structure and high phase purity. The electrochemical impedance spectroscopy (EIS) of rod-shaped Bi5O7I were lower than BiOI because Bi3+ could easily migrate in Bi5O7I to reach a higher specific capacitance value (363 F/g). The high capacitance retention rate (72.9%) of rod-shaped Bi5O7I electrode indicated its high-rate capability. In addition, because of the large forbidden band width and suitable conduction and valence band positions of Bi5O7I, an increased number of holes could be generated under visible light radiation while the recombination of electrons and holes could be effectively hindered, thereby improving the photocatalytic performance. Carbamazepine (CBZ) anticonvulsant wastewater was degraded efficiently with a degradation rate of 97.1%, and K (degradation rate constant) of 0.021/min. In addition, recycling performance was also satisfactory, and the degradation efficiency of CBZ still remained above 85% after 6 cycles. This study provides a new way to develop new efficient supercapacitor electrodes for degrading organic pollutants in the environment.

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WOS 号： 000591930300052

第 91 篇

标　　题： Effect Of Gradation On The Thermal Conductivities Of Backfill Materials Of Ground Source Heat Pump Based On Loess And Iron Tailings

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期　　刊： APPLIED THERMAL ENGINEERING

摘　　要： The addition of iron tailings to backfill soil of ground source heat pump (GSHP) systems can efficiently improve backfill thermal conductivity. The engineering properties of iron tailings and soil are significantly affected by particle gradation. Therefore, the effect of gradation on the thermal conductivity of backfill material composed of iron tailing and loess was investigated. The thermal conductivities of natural (bad) gradation and manmade (good) gradation materials with different iron tailings content, water content, and dry density were tested and analyzed. Results showed that the thermal conductivity of manmade gradation materials was usually higher than that of natural gradation materials. For the same water content and dry density, the influence of gradation on thermal conductivity decreased with increasing water content. For saturated material, the maximum difference in thermal conductivity caused by gradation ranged from 39.1% to 8.6% compared to dry material. The

maximum increases in thermal conductivity caused by gradation were approximately 0.12-0.24 WArrrK). The maximum increase percentage of thermal conductivity increases with decreasing water content, and the value range is 28.4-60.5%. The empirical formula for thermal conductivity was established based on the water saturation. The influence of gradation on formula parameters is analyzed. Finally, suggestions for gradation selection in practical applications of GSHP backfill materials are given.

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WOS 号： 000569818200055

第 92 篇

标　　题： Effect Of Diameter Of Multi-Walled Carbon Nanotubes On Mechanical Properties And Microstructure Of The Cement-Based Materials

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： This paper is intended to investigate the effects of multi-walled carbon nanotubes (MWCNTs) with different inner diameters on the mechanical properties (flexural strength and compressive strength) and microstructures of cement-based materials. Three kinds of multi-walled carbon nanotubes (MWCNTs) with diameter of 10-20 nm, 20-40 nm and 40-60 nm were ready to reinforce cement-based materials. And each batch incorporated 0.1 wt%, 0.2 wt%, 0.3 wt%, 0.4 wt%, 0.5 wt% MWCNTs by cement weight. To obtain a uniform distribution of MWCNTs in the cement-based materials, the effects of ultrasonic dispersion time and intensity on the properties of MWCNTs cement-based materials were studied. In addition, the relationships between mechanical properties, porosity and diameter of MWCNTs were investigated. Experimental results showed that the improvements of flexural strength and compressive strength of cement-based materials were altered by increasing the diameter of MWCNTs. Microstructure analysis by SEM and MIP tests indicated that MWCNTs with diameter of 10-20 nm have the best effect on optimizing pore structure. The results of this study were useful to determine the diameter and content of MWCNTs required for optimum pore structure and maximum strength enhancement of cement-based materials.

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第 93 篇

标　　题： Elastoplastic Analysis Of Ultimate Bearing Capacity For Multilayered Thick-Walled Cylinders Under Internal Pressure

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通讯作者： Zhu, Q (corresponding author), Changan Univ, Sch Civil Engn, Xian, Peoples R China.
期　　刊： STRENGTH OF MATERIALS
摘　　要： The elastoplastic analysis based on the unified strength theory was performed to evaluate the ultimate bearing capacity of double- and multilayered thick-walled cylinders. The theory provides a new concept and method for the analysis of thick-walled cylinders. The solutions derived herein are widely applicable and can quantitatively account for different tension-compression strength values and mean principal stress. The fundamental solutions for single radii, assemblage pressure, and shrink range are derived with the yield condition of the theory. The traditional existing elastoplastic results by the Tresca or von Mises yield criteria can be seen as a particular case of the new solutions that can overcome shortcomings. The strength parameter, tension-compression strength ratio, radii ratio, and combined cylinder layers were taken as major theory variables for the unified solutions. The new solutions are versatile and can be adapted to the existing formulas, to more accurately calculate the structural stress conditions. The strength theory effect due to adopting different yield criteria is quite significant, which cannot be underestimated.
DOI： 10.1007/s11223-020-00203-9
WOS 号： 000588275100002

第 94 篇
标　　题： La(Oh)(3) Nano-Rods/Polyacrylonitrile Nanofibers: Fabrication, Characterization And Application For Phosphate Removal
作　　者： [He, Jiaojie; Yang, Yue; Xu, Yuhong; Wang, Zichuan; Xu, Bing; Huang, Yuheng; Yang, Liwei] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China
通讯作者： Yang, LW (corresponding author), Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China.
期　　刊： WATER SCIENCE AND TECHNOLOGY
摘　　要： In this study, an excellent phosphate adsorbent was prepared for removing phosphate to an extremely low concentration. The La(OH)(3) nano-rods stabilizing in polyacrylonitrile (PAN) nanofibers (PLNFs) were prepared by electrospinning and a subsequent in situ precipitation. PAN nanofibers were employed as the matrix of the composite nanofibers, where the well-dispersed La(OH)(3) nano-rods were encapsulated as the active species for highly efficient phosphate capture owing to the strong binding between phosphate and lanthanum. On account of the nano-structure, the maximum phosphate adsorption capacity was 151.98 mg P/g (La), much higher than the result of La(OH)(3) nano-crystal, produced by precipitation without PAN or any organic surfactants. Moreover, the PLNFs could remove phosphate (2 mg P/L) to an extremely low concentration within 20 min, which could lead to a nutrient deficient condition to protect water quality and ecosystem. The optimization of PLNFs design was implemented through parameter adjustment of electrospinning. Lanthanum salt content, humidity, concentration of solution and applied voltage were chosen to analyze the influences on the composition, diameter and morphology of the nanofibers, giving the result that the most effective adsorbent was the PLNFs with spider-web-like nano-structures.

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WOS 号： 000596173700012

第 95 篇
标　　题： Multi-Disciplinary Co-Simulation Of Floating Process Induced By Pneumatic Inflatable Collar For Underwater Vehicle Recovery
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期　　刊： OCEAN ENGINEERING
摘　　要： The recovery of underwater vehicles using a pneumatic inflatable collar provides an economical approach to the re-use of the vehicles and/or collar. However, limited high-fidelity numerical studies have been conducted to examine this approach. Accordingly, in this study, a multi-disciplinary co-simulation is conducted. The results show helical floating processes exhibiting random rolling and yawing motions, with the mechanisms stated as follows: a) a symmetric flow around the vehicle/collar conjunction body is generated owing to a small incidence angle; b) symmetric vortex pairs are generated on the leeside of the conjunction body owing to the inflation of the collar acting as a 'source', c) an accelerated pitching angular rotation suppresses the detached vortices on the leeside of the airbag to be attached pairs, and asymmetric vortices are shed from the tail fins; d) the deceleration of the pitching motion induced by the damping of water results in the formation of a detached horse-shoe vortex, and the horse-shoe vortex forms two detached vortices, which flow downstream and interact with the asymmetric tail fin vortices; and e) the rolling and yawing motions of the conjunction body intensify the asymmetric characteristics of the collar and tail fin vortices, augmenting the pitching and rolling motions and inducing the helical floating process. In general, the pitching angular velocity induced by the collar inflation governs the mechanisms for the evolutionary processes of flow patterns and determines the floating process.
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WOS 号： 000596863000054

第 96 篇
标　　题： The Effect Of Intersection Angle On The Failure Mechanism Of Utility Tunnel
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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Planning utility tunnel network in the area with geological disasters poses serious concerns, especial for the utility tunnel built in the ground fissures developed cities. Many prevention and control measures have been taken when the utility tunnel crossed the ground fissures, such as finding the right intersection angle when planning the utility tunnel. In order to study the effect of intersection angle for utility tunnel when crossing ground fissures, this paper compares outcomes when the utility tunnel crosses ground fissures with different intersection angle through numerical simulation method. Because actually the intersection angle of utility tunnel and ground fissures is varied, in order to make stress-strain relationship of the model more realistic, a trilinear mode of reinforcing bar stress-strain relationship was established, and the material property of utility tunnel and soil were assigned to concrete damaged plasticity and Mohr-Coulomb plasticity, respectively. The simulation result shows that the axial tension stress and vertical shear stress of utility tunnel are increased with the increasing of intersection angle, but displacement and shear stress of utility tunnel in horizontal direction are increased with the decreasing of intersection angle. The variation of intersection angle of utility tunnel and ground fissures cannot significantly reduce the damage of utility tunnel. The vertical displacement of utility tunnel does not vary with intersection angle. Finally, this paper suggests that the strengthening length of utility tunnel should not be less than 50 meters (10 times the height of utility tunnel) on both sides of the ground fissures no matter the variation of intersection angle.

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第 97 篇

标　　题：Flexural Cracks In Steel Fiber-Reinforced Lightweight Aggregate Concrete Beams Reinforced With Frp Bars

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期　　刊：COMPOSITE STRUCTURES

摘　　要：Fourteen plain and steel fiber-reinforced lightweight aggregate concrete (LWC) beams with two types of fiber reinforced polymer (FRP) reinforcing bars were tested under a four-point bending load with different reinforcement ratios, bar diameters and clear span lengths to evaluate their cracking behavior. The test results showed that using steel fiber-reinforced lightweight aggregate concrete (SFLWC) and increasing the clear span length mitigated the maximum crack width at low load levels, while increasing the reinforcement ratio tended to decrease the maximum crack width during the entire loading period. At service load, all CFRP-reinforced beams satisfied the crack width criteria of 0.7 mm, while more than half of the GFRP-reinforced specimens exhibited unconservative crack widths. Crack width prediction equations in the current design codes in the US, China, and Canada were compared based on the experimental results. The original average crack spacing equation recommended by GB 50608 was modified

considering the effect of bar position. Furthermore, using the method of probability and statistics, the relationships between the maximum crack width and the average crack width for the tested beams were investigated. Accordingly, a rational alternative crack width model was proposed for CFRPand GFRP-reinforced beams incorporating the effects of lightweight aggregates and steel fibers.

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WOS 号： 000576112800004

第 98 篇

标　　题： Experimental Verification Of A Novel Anchorage Method Of Cfrp Grid In Mortar

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期　　刊： STRUCTURES

摘　　要： A novel anchorage method of CFRP grid in mortar named intersect-type anchorage method was proposed in this paper. In order to verify the application feasibility of this novel anchorage method in practical engineering, two phases of pull-out tests including single-direction pull-out tests and bidirectional pull-out tests were carried out. The number of grid points and anchorage conditions were selected as changing parameters. The maximum tensile loads, failure patterns, load-displacement curves of test specimens and load-strain curves of CFRP grids were obtained. The ultimate resistant actions, tensile bearing modes of grid points, tensile stress transfer process, coupling effect between the bond action of vertical grid and the resistant action of grid points and the failure mechanism were discussed. The research results showed that the intersect-type anchorage method is a favorable anchorage method for CFRP grid in mortar and the bond action of vertical grid play a dominant role for the anchorage action of CFRP grid in mortar rather than the resistant action of horizontal grid. In order to make full use of the tensile strength of CFRP grid, the number of grid points in intersecting part was not less than two.

DOI： 10.1016/j.istruc.2020.09.044

WOS 号： 000595305400001

第 99 篇

标　　题： A Multiscale Method For Predicting The Long-Term Emission Behaviors Of Semivolatile Organic Compounds

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期　　刊：BUILDING AND ENVIRONMENT

摘　　要：Characterizing the emission behaviors of the gaseous, particulate, and adsorbed semivolatile organic compounds (SVOCs) in indoor environments is critical for exposure assessments and control strategies. A long-term multiscale model was developed to predict the emission profiles of the SVOC concentrations in different phases with the macroscale model, and the dynamic gas/particle partitioning process via the mesoscale model. The mesoscopic method can fully consider the detailed microstructures of the indoor airborne particles, and the macroscale model considers their residence time. The dynamic SVOC concentration in a particle predicted with the mesoscale model was upscaled to the macroscale model. Results show that the difference of the critical equilibrium times predicted with the simulated and the existing dynamic partitioning model is attributed to the surface area per unit volume of the particle. The critical equilibrium time increases with the partition coefficient, while decreases with the mass transfer coefficient at gas/particle surfaces. If the residence time is far lower than the critical equilibrium time, the difference of the gaseous, particulate and adsorbed SVOC concentrations of low volatility obtained with the present model and the existing models becomes more significant. Parameter sensitivity analyses of the relative deviations of different SVOC phases predicted with the present model and the existing models on several critical model parameters such as the ventilation rate, the residence time, the total suspended mass concentration particles and the partition coefficient, demonstrate the possible large errors that may be introduced.

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WOS 号：000600276800002

第 100 篇

标　　题：Local Buckling Of Concrete Filled Rectangular Steel Tube With Longitudinal Stiffener Under Axial Compression

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通讯作者：Liu, HP (corresponding author), Changan Univ, Changan Univ Co LTD, Civil Engn Design Acad, Xian 710064, Shaanxi, Peoples R China.

期　　刊：TEHNICKI VJESNIK-TECHNICAL GAZETTE

摘　　要：Width-thickness ratio was an important parameter for designing Concrete Filled Rectangular Steel Tube (CFRST). Welding longitudinal stiffener on the internal wall of steel pipe could delay the local buckling, which increased the limit of width-thickness ratio. If there was not enough stiffener and its sectional dimension was too small, the local buckling of steel pipe would occur, inducing its bearing capacity seriously. If the stiffener sectional dimension was too large, concrete filled in steel tube would be broken up, which reduces its bearing capacity. To solve that problem, this paper studied local buckling of CFRST with longitudinal stiffener under axial compression and design of longitudinal stiffener. It established buckling analysis model, simplified local

buckling analysis as calculating buckling load of thin plate clamped on loading side and unloading side under axial force. It deduced buckling load and buckling coefficient based on the principle of energy. The results showed that buckling mode depended on stiffening rigidity. Therefore, it put forward minimum stiffening rigidity ratio that controlled the stiffener design. This paper also came up with a formula to calculate minimum stiffening rigidity ratio. It provided guidance on designing number, sectional dimension and material performance.

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WOS 号： 000600425200024

第 101 篇

标　　题： Calculation Of The Vertical Strata Load Of Utility Tunnel Crossing Ground Fissure Zone

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期　　刊： SHOCK AND VIBRATION

摘　　要： A ground fissure is a geological disaster in which the vertical dislocation of strata causes surface rupture. Ground fissures can cause extreme harm to the surface and underground buildings. Ground fissure activity can result in different settlement on the two sides of the strata, which will generate additional stress (pressure) that differs from the stress of the general stratum on underground structures across the ground fissure zone. It is essential to assess the effective stress of strata in the design of underground engineering structures across a ground fissure zone. The Xi'an ground fissure through a utility tunnel was focus of the research, and a physical model and data for oblique crossing of the 45 degrees ground fissure were analyzed. A model of the utility tunnel structure was established, including the surrounding soil load as an active ground fissure environment. This model was used to calculate the vertical formation pressure of the overlying soil on the utility tunnel. A method to calculate the overlying load on the utility tunnel caused by ground fissure activity was proposed and compared with the calculation based on the A. Marston principle. The results showed that the ground fissure load calculation method based on the strata-holding effect can effectively calculate the earth pressure of the surrounding soil layer of the utility tunnel in the cross-ground fissure section. The results of this work provide guidance and reference value for the design of a utility tunnel in an area with the potential for a ground fissure.

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第 102 篇

标　　题： Optimization Analysis Of Smart Steel-Plastic Geogrid Support For Tunnel

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： With the concept of smart geogrid coming out, many scholars have built optical fiber into the geogrid to form a kind of smart geogrid material with self-sensing function of structural deformation. It can not only reinforce the parts with potential safety hazards, but also have the functions of safety monitoring, intelligent prevention, and control of engineering disasters, which is of great significance for ensuring the safety of tunnel construction and improving the tunnel monitoring methods. Based on predecessors' research on smart geogrid tensile calibration experiment and sensor method simulation and experimental verification, this paper analyzes the smart geogrid and the tunnel surrounding rock as a whole, to study the deformation coordination mechanism between the geogrid material and the tunnel surrounding rock. Referring to the relevant engineering practice case, through finite element numerical simulation, the optimal layout of smart geogrid material was explored, and the principle of discrete curvature reconstruction curve sensing of smart geogrid was optimized by simulating the working conditions of different construction methods and supporting conditions, in order to provide a theoretical basis for the application of smart geogrid material in practical tunnel engineering.

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WOS 号： 000609498900002

第 103 篇

标　　题： Study On Two-Dimensional Capillary Water Rise In Cracked And Uncracked Cement Based Materials

作　　者： [Liang, Kun; Li, Xiaoguang; Tian, Wei; Liu, Yunxiao; Qu, Yaan] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China; [You, Chuang] China State Construct Southwest Geotech Invest &, Xian Branch, Xian 710000, Peoples R China; [Luo, Gang] Changan Univ, Sch Highway, Xian 710064, Peoples R China

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to explore the influence of cracks on capillary rise in cement based materials (CBMs), theoretical analysis of cracked and uncracked specimens is conducted in this paper. Firstly, based on the one-dimensional Terzaghi model, a two-dimensional capillary rise model for uncracked specimens is established by considering different areas exposed to water. Then, the model is verified by experiment data. Secondly, a specimen with an ideal artificial crack is considered and a theoretical model for cracked specimens is established based on the two-dimensional capillary rise model for uncracked specimens. Finally, these theoretical models are used to analyze the influence factors during the capillary rise in cracked and uncracked specimens of CBMs. The

main results show that (1) the proposed analytical method and the established models fit the experimental data well and can be used to describe the two-dimensional capillary rise as well as analyze the influence factors. (2) With the increase of area exposed to water, the rising rate of wetting front increases and the water absorption rate per area decrease. (3) The presence of cracks promotes the capillary rise for the increase of exposed area to water. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000591202600009

汽车学院

第 1 篇

标　　题： An Experimental And Numerical Study Of Polyoxymethylene Dimethyl Ethers On A Homogeneous Charge Compression Ignition Engine

作　　者： [Jing, Zheng; Zhang, Chunhua; Cai, Panpan; Li, Yangyang; Yin, Peng; Wang, Jibai] Changan Univ, Key Lab Shaanxi Prov Dev & Applicat New Transport, Xian, Peoples R China

通讯作者： Zhang, CH (corresponding author), Changan Univ, Sch Automobile, 33 Changan Middle Rd, Xian 710064, Peoples R China.

期　　刊： ENERGY SOURCES PART A-RECOVERY UTILIZATION AND ENVIRONMENTAL EFFECTS

摘　　要： Polyoxymethylene Dimethyl Ethers (PODEn) are a kind of high-activity and promising soot-reduction additive fuel. The effects of enhanced intake charge temperature (T-in) and low fuel-air equivalence ratio (phi) on the combustion and emission characteristics of PODE(2-8)were captured on a homogeneous charge compression ignition (HCCI) engine. Meanwhile, a numerical study using Chemkin was conducted to investigate the effects ofT(in)on the combustion characteristics of PODE3. The results indicate that with the increase ofT(in), rate of production (ROP) of CH2O and OH radicals and rate of exothermic reactions related to H- and O- species are greatly promoted, which result in a highly reactive atmosphere, advanced ignition timing (IT) and increased heat release rate (HRR). Typical two-stage auto-ignition behavior is also observed in lean PODE2-8HCCI at highT(in). The enhancedT(in)can promote the rate of CO-to-CO(2)and decrease combustion duration (CD), which eliminates the thirdHRRoxidation peak. At phi = 0.143, the peak in-cylinder pressure has increased by about 40% and the combustion duration (CD) has decreased by nearly 25% whenT(in)is from 80 degrees C to 140 degrees C. Moreover, for all test cases, NOx, HC, and CO emissions are lower than 15 ppm, 100 ppm, and 1%, respectively.phi has a slight effect on the ignition timing of low temperature (ITL) but an obvious effect on the ignition timing of high temperature (ITH). With an increase of phi, CO emissions decrease, HC emissions decrease first and then increase, and NOx emissions slightly increase. This research reveals that the combustion and emission characteristics of PODEn are sensitive toT(in), PODEn with enhancedT(in)can form a chemical atmosphere with high-activity radicals.

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WOS 号： 000573117100001

第 2 篇
标　　题： A Reduced Chemical Kinetic Mechanism For Toluene Reference Fuels Based On Drgep And Qssa Methods
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通讯作者： Zhang, CH (corresponding author), Changan Univ, Key Lab Shaanxi Prov Dev & Applicat New Transport, Xian 710064, Peoples R China.
期　　刊： TEHNICKI VJESNIK-TECHNICAL GAZETTE
摘　　要： As a gasoline surrogate fuel, the physical and chemical properties of toluene reference fuel (TRF) are relatively simple and stable, and the TRF chemical kinetic mechanism may be used in simulating combustion processes of gasoline. However, simulations using detailed or semi-detailed mechanisms have been limited due to the computational complexity and long computational time. For the construction of the reduced mechanism, the directed relation graph with error propagation (DRGEP) method is used to wipe out insignificant components efficiently, followed by the use of the quasi-steady state assumption (QSSA) method to separate quasi-steady-state (QSS) species from the kinetic ODEs. In addition, some elementary reactions involving the formation and destruction of H and phenyl methyl radicals are subjected to sensitivity analysis and some kinetic parameters of the relevant elementary reactions are revised. As a result, a reduced mechanism involving 234 reactions and 60 species is developed. Comparing the experimental records with the analog data by utilizing the reduced mechanism, good agreement can be obtained when ignition delay time (T), laminar flame speed (S-L) and molar fraction of vital species are measured. Moreover, the mechanism may predict S-L more accurately under lean mixture (equivalence ratio phi < 1.0) conditions. The reduced mechanism is small and reliable in performance, which can commendably reproduce the combustion characteristics of gasoline surrogate.
DOI： 10.17559/TV-20190913062824
WOS 号： 000581774100028

第 3 篇
标　　题： Quantitative Evaluation Of The Discomfort Glare Of A Tunnel Pergola
作　　者： [Xu, Yu; Hu, Yueqi; Liu, Haoxue] Changan Univ, Sch Automobile, Xian, Shaanxi, Peoples R China; [Zheng, Xuan; Li, Xue] Changan Univ, Sch Elect & Control Engn, Xian, Shaanxi, Peoples R China; [Liu, Haoxue] Changan Univ, Key Lab Automot Transportat Safety Enhancement Te, Minist Commun, Xian, Shaanxi, Peoples R China
通讯作者： Zheng, X (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian, Shaanxi, Peoples R China.
期　　刊： TUNNELLING AND UNDERGROUND SPACE TECHNOLOGY
摘　　要： The light spot on the ground at the portal of a tunnel, which is caused by the sun shining on a pergola, consists of bright areas and dark areas, and it can cause a discomfort glare for drivers. In this study, in order to evaluate the level of discomfort glare, the bright

areas were compared to lamps and the dark areas were compared to the backgrounds. Using Unified Glare Rating (UGR), which is used to evaluate the glare degree in lighting places, we established a quantitative evaluation method of the discomfort glare and derived the formulas that could calculate the UGR of the pergola with equal beam spacing and unequal beam spacing. In accordance with the formulas, the UGR of the two kinds of pergolas was calculated. The results showed that the UGR of the pergola with equal beam spacing was smaller than the UGR of the pergola with unequal beam spacing, demonstrating a less level of the discomfort glare. Furthermore, the relationship between the variations of the parameters of the pergola and the UGR was analyzed, which could provide references for the design of the pergola and the improvement of driving comfort.

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WOS 号： 000501654300026

第 4 篇

标　　题： Front Vehicle Detection Based On Multi-Sensor Fusion For Autonomous Vehicle

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通讯作者： Zhao, X (corresponding author), Changan Univ, Sch Automobile, Xian, Peoples R China.

期　　刊： JOURNAL OF INTELLIGENT & FUZZY SYSTEMS

摘　　要： On account of the limitations of single sensor in obstacle detection, the paper investigates an obstacle detection method based on the fusion of 3D LiDAR and monocular visual. The spatial data fusion of the two sensors is realized according to their calibration results, and the time data fusion is realized by using double buffer technology. Considering the aspect ratio of vehicles, the image region of interest is determined based on the obstacle clustering of 3D LiDAR data. By using Haar-like features as effective characteristic of the front vehicle, integral figure is applied to extract Haar-like features of vehicle samples and non-vehicle samples. AdaBoost algorithm is used to choose weak classifiers to constitute strong classifiers, which combine into the cascade classifier. The cascade classifier has been trained to identify the vehicle target in the image region of interest. The relevant experimental results verify the effectiveness and real-time performance of the detection method.

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WOS 号： 000506856200039

第 5 篇

标　　题： Traffic Assignment Problem Under Tradable Credit Scheme In A Bi-Modal Stochastic Transportation Network: A Cumulative Prospect Theory Approach

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期　　刊：JOURNAL OF CENTRAL SOUTH UNIVERSITY

摘　　要：The traffic equilibrium assignment problem under tradable credit scheme (TCS) in a bi-modal stochastic transportation network is investigated in this paper. To describe traveler's risk-taking behaviors under uncertainty, the cumulative prospect theory (CPT) is adopted. Travelers are assumed to choose the paths with the minimum perceived generalized path costs, consisting of time prospect value (PV) and monetary cost. At equilibrium with a given TCS, the endogenous reference points and credit price remain constant, and are consistent with the equilibrium flow pattern and the corresponding travel time distributions of road sub-network. To describe such an equilibrium state, the CPT-based stochastic user equilibrium (SUE) conditions can be formulated under TCS. An equivalent variational inequality (VI) model embedding a parameterized fixed point (FP) model is then established, with its properties analyzed theoretically. A heuristic solution algorithm is developed to solve the model, which contains two-layer iterations. The outer iteration is a bisection-based contraction method to find the equilibrium credit price, and the inner iteration is essentially the method of successive averages (MSA) to determine the corresponding CPT-based SUE network flow pattern. Numerical experiments are provided to validate the model and algorithm.

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WOS 号：000511537800016

第 6 篇

标　　题：A Forward Collision Warning System Based On Self-Learning Algorithm Of Driver Characteristics

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期　　刊：JOURNAL OF INTELLIGENT & FUZZY SYSTEMS

摘　　要：The frequent false alarms in Forward Collision Warning systems not only disturb the normal operation of drivers, but also reduce the user acceptance of the warning systems. However, drivers with disparate driving characteristics possess different safety cognition of car-following braking behavior; systems with stationary warning thresholds inevitably lead to higher false positive and false negative rates for aggressive and conservative drivers, respectively. In this study, we proposed an adaptive algorithm that learns the characteristics of individual drivers during car-following braking processes, and determined the optimal threshold online to adapt to different drivers. Signal detection theory was employed and the results of the accuracy, false negative rate, and false positive rate were used to capture drivers' characteristics of car-following braking behavior. The optimal warning thresholds were continuously selected online during the learning stage based on changes in the drivers' characteristics. The developed algorithm by conducting actual vehicle tests with two participants were evaluated. The offline statistical analysis results of the participants' car-following braking

characteristics were compared with the online results of the warning threshold adjustments from the adaptive algorithm. The comparison results indicated that the adaptive algorithm could effectively capture the drivers' car-following braking characteristics and determine an appropriate warning threshold.

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WOS 号： 000514081100042

第 7 篇

标　　题： Evaluation Of Effectiveness Of Speed Reduction Markings On Driving Speed In Highway Tunnel Entrance And Exit Areas

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期　　刊： PROMET-TRAFFIC & TRANSPORTATION

摘　　要： Tunnels are critical areas for highway safety because the severity of crashes in tunnels tends to be more serious. Controlling vehicle speed is regarded as a feasible measure to reduce the accident rate in the tunnel entrance and exit areas. This paper aims to evaluate the effectiveness of three types of speed reduction markings (SRNs) in tunnel entrance and exit zones by conducting a driving simulation experiment. For this study, 25 drivers completed the driving tasks in the day and night scenarios. The vehicle speed and acceleration data were collected for analysing and the relative speed contrast, time mean speed and acceleration were adopted as indices to evaluate the effectiveness of SRMs. The repeated ANOVA test results revealed that SRNs have a significant effect in reducing vehicle speed, especially in the exit zone. Colour Anti-skid Markings (CASMs) produced a more obvious deceleration in the entrance zone. In the entrance zone, a similar downward trend was performed in the situation of NSRMs and Mils, but a lower speed occurred in case of SRNs. Besides, CASMs work better and cause an obvious gap of 10 km/h in daytime and 5 km/h at night compared to the speed without SRMs. In the exit zone, the present study supports the conclusion that the drivers are prone to accelerate. Our results showed that the drivers accelerated in case of NSRMs, while they slowed down in case of SRMs. Thus, SRMs are necessarily implemented in the highway tunnel entrance and exit zones. Our study also indicates that though CASMs result in lower speed at night, the Transverse Speed Reduction Markings (TSRMs) have a better performance than CASMs in daytime. The investigation provides essential information for developing a new marking design criterion and intelligent driver support systems in the highway tunnel zones.

WOS 号： 000520022100012

第 8 篇

标　　题：Experiments And Modeling On Chemical Kinetic Micro-Analysis Of Gasoline-Ethanol Surrogates Oxidation For Hcci Engines

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通讯作者：Zhang, CH (corresponding author), Changan Univ, Key Lab Shaanxi Prov Dev & Applicat New Transport, Xian 710064, Peoples R China.

期　　刊：ACTA MICROSCOPICA

摘　　要：Adding ethanol to gasoline is an effective way to improve anti-knock quality and reduce emissions. Computational fluid dynamic (CFD) model coupled with the gasoline-ethanol surrogate mechanism can be used for fuel design. A semi-detailed mechanism (278 species and 1439 reactions) at medium and low temperatures and experiments in a homogeneous charge compression ignition (HCCI) engine for the oxidation of gasoline-ethanol surrogates were presented in this paper. The initial mechanism derived from detailed primary reference fuel and semi-detailed ethanol mechanisms. In order to get a smaller-size model, directed relation graph with error propagation (DRGEP) method was used to remove insignificant components efficiently, and quasi-steady state assumption (QSSA) method was used to identify the species in quasi-steady-state. Subsequently, some elementary reactions involving the formation and consumption of H and OH radicals were revised and the kinetic parameters of the relevant elementary reactions were adjusted. To validate the mechanism, the HCCI experiments for the oxidation of gasoline-ethanol surrogates were conducted under different operating conditions. The new mechanism was also compared with the literature model by Li et al. (2019) under the selected operating conditions. The present mechanism can not only perform macro analysis of HCCI combustion process, but also can be coupled with CFD software to perform transient in-cylinder micro-field analysis efficiently.

WOS 号：000520844000021

第 9 篇

标　　题：Effects Of Linear Acceleration On Passenger Comfort During Physical Driving On An Urban Road

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期　　刊：INTERNATIONAL JOURNAL OF CIVIL ENGINEERING

摘　　要：In this exploratory study, we examined self-reports of physical discomfort among automobile passengers while being driven on an urban road. Eight adults participated as passengers in an automobile driven by a professional driver on a predetermined course through city traffic. Passengers were driven individually along the route. While

underway, participants used a handheld device to indicate momentary feelings of discomfort arising from discrete vehicle motions. We continuously recorded vehicle motion in three axes of linear acceleration and 3 axes of angular velocity. We examined vehicle acceleration during the 3 s preceding each subjective response. We found that the maximum absolute acceleration required to elicit subjective discomfort was lower when vehicle acceleration changed sign (from + to -, or vice versa) than when acceleration was of a constant sign. In addition, participants' reports of discomfort during the experiment were unrelated to their prior self-reports of generalized susceptibility to motion sickness. The results suggest that our method is valid, and has the potential to offer new insights into motion sickness causality.

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第 10 篇

标　　题： A Forward Collision Warning System Using Driving Intention Recognition Of The Front Vehicle And V2V Communication

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期　　刊： IEEE ACCESS

摘　　要： A forward collision warning (FCW) system is important for avoiding rear-end collisions. When the front vehicle slows down or the risk of rear-end collision increases, the FCW system sends a warning. However, if the warning is provided too late, the following vehicle may not have enough time to stop or slow down smoothly. Here, we propose a new FCW system that detects the driving intention of the front vehicle to provide earlier warning than previously used systems. The proposed FCW system consists of three steps. First, the driving intention of the front vehicle is determined by the driving intention recognition module. Second, the driving intention and other driving parameters of the front vehicle are transmitted to the following vehicle using vehicle-to-vehicle (V2V) communication. Finally, this information and the driving parameters of the following vehicle are used to determine the potential collision risk by the FCW module located in the second vehicle. To evaluate the proposed system, we conducted a simulation test based on PreScan (commercial software provided by TASS international) and actual road tests in various driving scenarios. The simulation test results demonstrated that the correct warning rate of the proposed system was 97.67%, which was 6.34% higher than that of the system with a fixed time-to-collision (TTC) threshold. The real vehicle test results showed that the proposed system was able to provide earlier warnings than the TTC-based system. The timely warning rate, i.e., the ratio of the number of warnings at the beginning of braking to the total number of

warnings was 93.33%. The proposed system proved effective for providing early warning to the following vehicle under different driving conditions of the front vehicle.

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WOS 号： 000525406600049

第 11 篇

标　　题： Experimental Research On Pmsm Ball Screw Actuator And Structural Design Suggestion Of Featured Active Suspension

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期　　刊： IEEE ACCESS

摘　　要： Aiming to develop a practical active suspension, a PMSM ball screw actuator prototype is manufactured and experimented for parameter identification. Based on identification results, a new double-vibration-reduction-structure for the featured active suspension is proposed to cope with the problem caused by the actuator's overlarge equivalent inertial mass. Unlike using a resistance to absorb output energy of the actuator, a method of varying charge voltage in steps is utilized to reclaim vibration energy into the battery pack directly. The mechanical and energy-regenerative characteristics are tested for verification of the marked parameters and identification of the unmarked parameters, especially for the Coulomb damping and the equivalent inertial mass of the actuator prototype. Besides, a high energy-regenerative efficiency and a large capability of electromagnetic control force are achieved, the overlarge equivalent inertial mass exists. To reduce the amplified demand of the active control force caused by the actuator's overlarge equivalent inertial mass directly exposed to the unsprung mass acceleration, the new double-vibration-reduction-structure (DVRS) based active suspension structure scheme suggestion with an added-vibration-reduction-structure (AVRS) between the actuator and the unsprung mass is proposed. Regulated by the corresponding LQG controller, the proposed active suspension can achieve almost the same performance of the conventional ideal active suspension.

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WOS 号： 000527415200018

第 12 篇

标　　题： Optimizing Battery-Electric-Feeder Service And Wireless Charging Locations With Nested Genetic Algorithm

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期　　刊：IEEE ACCESS

摘　　要：The technology of dynamic wireless power transfer (DWPT) has been recognized as an effective way to recharge battery electric bus and overcome some drawbacks (e.g. high battery cost and limited service range) with opportunity charging. This study develops a mixed integer non-linear model to optimize a feeder bus transit powered by DWPT. The decision variables consist of bus route networks, service frequency, locations of DWPT devices and battery capacity. The objective is to minimize total cost, including the costs of charging devices, battery, operation and travel time. A tangible nested genetic algorithm (NGA) is developed to find the optimal solution. The computational efficiency of NGA is demonstrated through numerical comparisons to the solutions founded by LINGO and GA. It was found that with NGA the solution converges to an acceptable level faster than using LINGO and GA. A real-world bus network is employed to explore the relation between the minimized costs and decision variables. The result suggested that DWPT outperforms terminal charging technology in terms of the least total cost, and that the yielded total infrastructure cost with DWPT is 16.6 & x0025; less than that with terminal charging technology.

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WOS 号：000527415900031

第 13 篇

标　　题：A Study On An Anthropomorphic Car-Following Strategy Framework Of The Autonomous Coach In Mixed Traffic Flow

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期　　刊：IEEE ACCESS

摘　　要：In this study, to explore the demand characteristics of autonomous coaches in mixed traffic flow, two sections of an expressway were selected for vehicle experiments. With personification as the goal, sensors of the ego-vehicle were used to collect naturalistic car-following behavior data of surrounding coaches. After analyzing the naturalistic car-following data, car-driving behavior characteristics of the coach drivers were acquired. The analysis results indicate that the overall car-following processes of coaches tend to be relatively stable, and most of the car-following processes are in the conditions of higher velocity, smaller acceleration, and smaller relative velocity than the front vehicle. The expected following spacing and time headway of the coach drivers increase with the increase of velocity. By analysis and comparison with existing safe following models, it is found that while the safety and the warning rate based on the car-following coach safety distance model are higher, the warning rate of the car-following time headway model at the relatively higher velocity is lower. The coach safety distance model established in this study considers the car-following risk and the acceptance rate of the drivers to the warning system. This model conforms to the driver & x2019;s car-following characteristics and fulfills the requirements of collision

avoidance. Applying the safety distance model to the autonomous coach would effectively improve the anthropopathic behavior characteristics of the autonomous coach. Additionally, the abnormality caused by the interference of other vehicles in mixed traffic flow of autonomous and human vehicles is successfully avoided under the premise of ensuring the safe driving of the autonomous coach.

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WOS 号： 000530832200168

第 14 篇

标　　题： Reliability Modeling And Analysis Of Generalized Majority Systems By Stochastic Computation

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期　　刊： IEEE ACCESS

摘　　要： The k-out-of-n: G(F) majority voter consists of n components (or modules) and a number of the components are required to be operating correctly for the overall system to be correct. As per the state discretization of the components, such a system is usually classified as either a binary system or a multi-state system. In practice, the operating conditions of different components may contribute differently to the operation of the entire system. In this manuscript, the k-out-of-n: G(F) majority voter is generalized as a consecutive-weighted-k-out-of-n: G(F) voter with either binary states or multiple states. To overcome the drawbacks of existing approaches, a stochastic analysis is proposed for assessing the system reliability. In the stochastic analysis, the input signal probabilities are encoded into non-Bernoulli sequences with fixed numbers of Os and is for the Boolean case, or randomly permuted sequences for the multi-state scenario. By using stochastic logic, the reliability of a general system consisting of consecutive-weighted-k-out-of-n majority voters is efficiently and accurately predicted. The results are validated by an analysis of several case studies. Although the accuracy of the stochastic analysis is closely related with the employed sequence length, it is shown that a stochastic approach is more efficient than a universal generating function (UGF) method, while still retaining an acceptable accuracy.

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WOS 号： 000538765600050

第 15 篇

标　　题： A Prediction Method Of Localizability Based On Deep Learning

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期　　刊：IEEE ACCESS

摘　　要：As a basis of many missions, the accuracy of localization is highly important for mobile robots. For the generally used map matching based localization algorithms, the accuracy of localization, which is described by localizability, is greatly impacted by the environment. Consequently, this paper proposed a novel method to predict the localizability for the map matching based localization algorithms, based on the environment map. Firstly, the uncertainty of localization in map matching and dead-reckoning is analyzed based on which entropy of localization is chosen to describe the localizability instead of the generally used covariance. Next, based upon the flow chart of the map-based localization algorithm, a localizability predictor, which is composed of three different models, is designed to predict the entropy. Here a Convolutional Neural Network (CNN) is designed for the first model to predict the entropy of localization that comes from map matching. A Long Short-Term Memory (LSTM) neural network is designed for the second model to predict the entropy that comes from the dead-reckoning. Finally, a Multilayer fully connected Neural Network (MNN) is designed for the last model to predict the entropy after fusing the entropy results that come from the two models described above. Both simulation results and experimental results have proven that the proposed predictor can offer a better estimator of localizability compared to other existing approaches.

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WOS 号：000546414000049

第 16 篇

标　　题：Factors Influencing The User Acceptance Of Automated Vehicles Based On Vehicle-Road Collaboration

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期　　刊：IEEE ACCESS

摘　　要：The development of smart highway and vehicle-road collaboration has stimulated the market applications of automated vehicles. However, consumer acceptance of automated vehicles will influence the time course of automated driving technology promotion. This research explores user acceptance and demand for automated vehicles based on vehicle-road collaboration and identifies which factors drive the acceptance of automated vehicles. A sample of 3900 questionnaires are obtained through classification sampling. The descriptive statistical analysis of 3594 effective multi-source sample data shows that the user acceptance of automated vehicles based on the vehicle-road collaborative environment is 70.94%. The results show that the five categories of groups have significant differences in the acceptance of automated vehicles, and the focus on individual variables is higher than the overall acceptance. Due to the contradiction and dependence among various variables, multiple regression analysis is

introduced. The results show that the six variables of safety, practicability, economy, highly automated driving functions, vehicle-road collaborative fusion application, and after-sale service have a significant positive impact on the acceptance of automated vehicles. The reasons why these six factors affect user acceptance are then analyzed in depth. The fitting model and acceptance value range obtained by this research can be used for market research. The research findings provide data support and theoretical reference for the research and development, marketing, teaching, and servicing of autonomous driving technology.

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WOS 号： 000554372400001

第 17 篇

标　　题： Multi-Objective Topological Optimization Of An Electric Truck Frame Based On Orthogonal Design And Analytic Hierarchy Process

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期　　刊： IEEE ACCESS

摘　　要： The electric truck frame as a vital load-bearing component has aroused growing attentions due to its enormous potential in lightweight. However, few systematic studies have been performed on the multi-objective topological design of the frame attributable to its complexity on loading and conflicting objectives. This paper aims to develop a multi-objective topology optimization strategy of the electric truck frame based on the hybrid decision making method combining orthogonal test design (OTD) and analytic hierarchy process (AHP). The hybrid strategy is performed to obtain a new set of weight ratio combination from objective data and subjective judgment. The topological results show that the overall performance of the optimal frame is better than any of the methods applied alone. By comparing, it is found that the strength and stiffness of the optimal frame is higher than that of the original frame from the perspective of static conditions, and the low-order natural frequency of the optimal frame is significantly improved. It demonstrates that the proposed approach could be as an effective tool for multi-objective topology optimization of the electric truck frame in seeking lightweight and comprehensive mechanical performance. The hybrid strategy might be expected to provide some guidance for more complicated engineering problems.

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WOS 号： 000556714100001

第 18 篇

标　　题：Development And Research Of Vehicle Virtual Test Simulation System Based On Real-Time Operation Data Acquisition

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期　　刊：JOURNAL OF ENVIRONMENTAL PROTECTION AND ECOLOGY

摘　　要：Aiming at the problem that a lot of vehicle tests are needed to optimise the design parameters during the stage of new vehicle development, the linear displacement sensor is used to collect the stroke of the three pedals, the angular displacement sensor is used to collect the steering angle of the steering wheel, and the position of the transmission joystick is acquired by the photoelectric coupler. Then, the vehicle virtual test simulation system is built by constructing a vehicle dynamics model. Finally, the driving operation data acquisition and the vehicle driving state simulation test are carried out under the combined driving condition. The experiment results show that the braking time (3.9 s) obtained by the simulation test of the system is 0.188 s longer than the braking time (3.712 s) obtained by CarSim software, the relative error is 5.065%. And the braking distance (55.357 m) is 4.249 m farther than that obtained by the CarSim, the relative error is 8.314%. It can meet the requirements of virtual test in the development stage of new models.

WOS 号：000566784600011

第 19 篇

标　　题：Human-Like Obstacle Avoidance Trajectory Planning And Tracking Model For Autonomous Vehicles That Considers The Driver'S Operation Characteristics

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期　　刊：SENSORS

摘　　要：Developing a human-like autonomous driving system has gained increasing amounts of attention from both technology companies and academic institutions, as it can improve the interpretability and acceptance of the autonomous system. Planning a safe and human-like obstacle avoidance trajectory is one of the critical issues for the development of autonomous vehicles (AVs). However, when designing automatic obstacle avoidance systems, few studies have focused on the obstacle avoidance characteristics of human drivers. This paper aims to develop an obstacle avoidance trajectory planning and trajectory tracking model for AVs that is consistent with the characteristics of human drivers' obstacle avoidance trajectory. Therefore, a modified artificial potential field (APF) model was established by adding a road boundary repulsive potential field and ameliorating the obstacle repulsive potential field based on the traditional APF model. The model predictive control (MPC) algorithm was combined with the APF model to make the planning model satisfy the kinematic constraints of the vehicle. In addition, a human driver's obstacle avoidance experiment

was implemented based on a six-degree-of-freedom driving simulator equipped with multiple sensors to obtain the drivers' operation characteristics and provide a basis for parameter confirmation of the planning model. Then, a linear time-varying MPC algorithm was employed to construct the trajectory tracking model. Finally, a co-simulation model based on CarSim/Simulink was established for off-line simulation testing, and the results indicated that the proposed trajectory planning controller and the trajectory tracking controller were more human-like under the premise of ensuring the safety and comfort of the obstacle avoidance operation, providing a foundation for the development of AVs.

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WOS 号： 000569831700001

第 20 篇

标　　题： Identification Of Driver Braking Intention Based On Long Short-Term Memory (Lstm) Network

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期　　刊： IEEE ACCESS

摘　　要： Driving intention identification is a key technology which can improve the adaptability of the intelligent driver assistance systems and the energy efficiency of electric vehicles. This article proposes a novel method for identifying the driver braking intention. In order to improve the identification accuracy of driving intention, a braking intention identification model based on Long Short-Term Memory (LSTM) Network is constructed. The data of slight braking, normal braking and hard braking that can use for offline training are obtained through tests on real vehicle at Chang'an University vehicle performance testing ground. Support vector machine - recursive feature elimination (SVM-RFE) algorithm is used to select the characteristic parameter of braking intention identification model. The random search is subsequently used to optimize the hyper-parameters of LSTM. LSTM-based and Gaussian Hidden Markov Model (GHMM)-based model under different time window are used to identify braking intention of slight braking, normal braking and hard braking respectively. The results show that the Precision, Recall, F-measure, Accuracy of the braking intention identification model which propose in this paper based on LSTM are better than that of the braking intention identification model based on GHMM. Moreover, the Recall and Accuracy of the LSTM-based braking intention identification models are above 0.95, indicating the good ability of intention identification.

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WOS 号： 000578633800001

第 21 篇

标　　题： Comparison Of The Pedestrian Crossing Intention Parameters And Research On Intention Recognition Model Under Different Road Conditions

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期　　刊：IEEE ACCESS

摘　　要：There have a large number of pedestrian-vehicle accidents on the pedestrian crossing area in China every year, causing huge loss of life and property. In view of different road conditions, it's crucial to establish a more accurate crossing intention recognition model to improve the safety of pedestrians. In this work, a pedestrian crossing area was chosen. Due to construction reasons, two road conditions appeared in the same crossing area at different periods, namely a condition with a zebra crossing and that without a zebra crossing. We compared pedestrian crossing intention parameters under two road conditions in the same crossing area. The results found that there was a great difference in the characterization parameters of pedestrian crossing intention when the site with and without a zebra crossing. Additionally, a more comprehensive crossing intention characteristic parameters set was established. The characteristic parameters were pedestrian speed, the distance between vehicle and crossing area, time to collision (TTC), and safe vehicle deceleration (SVD), pedestrian age, pedestrian gender, group, respectively. The pedestrian intention recognition model for the site with a and without a zebra crossing were established by long short-term memory network integrated with the attention mechanism (AT-LSTM). When the model recognized pedestrian crossing intention 0.6 seconds in advance, the recognition accuracies were 93.05% and 93.89% respectively. The research results are of great significance for improving the safety of autonomous vehicles in the future, and there are also important to improve pedestrian safety.

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WOS 号：000590306600001

第 22 篇

标　　题：Intelligent Distribution Framework And Algorithms For Connected Logistics Vehicles

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期　　刊：IEEE ACCESS

摘　　要：This study presents an intelligent distribution framework based on edge computing and proposes navigation and obstacle avoidance algorithms for connected logistics vehicles (CLVs) on the basis of Trimble BD982 positioning sensor and tentacle algorithm (TA). An edge computing framework for the distribution of CLVs is established, and the functions of three layers (cloud server, edge equipment, and terminal) are described in detail. The basic functions, hardware, and software systems of the CLV are designed and presented. Focusing on autonomous driving, a Global Positioning System (GPS) navigation algorithm and an obstacle avoidance control strategy on the layer of edge equipment are developed on the basis of the TA. Autonomous GPS navigation is

realized by combining the entire road network with the local road network to avoid obstacles. The TA is improved to help the CLV for avoiding obstacles. Experiments show that the hardware system and designed algorithms of the CLV are effective. The tracking error on the straight-line track is within 3 cm, the change rate of longitudinal velocity is within 0.3 g/s, the change rate of tire side deflection angle is less than 1 degrees/s, and the calculation time is shortened by 25% when the calculation time is 30 ms. These results indicate that the vehicle has good stability and performance during obstacle avoidance in real time, and the proposed algorithms are superior to traditional algorithms. The CLV can realize autonomous GPS navigation, with high navigation accuracy, reliable obstacle avoidance performance, and stable vehicle handling.

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WOS 号： 000590445300001

第 23 篇

标　　题： Application Of Xgboost For Hazardous Material Road Transport Accident Severity Analysis

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期　　刊： IEEE ACCESS

摘　　要： Hazardous material road transport accidents pose a serious threat to public life, property and the environment. Therefore, studying the factors influencing road transport accidents involving hazardous materials can help identify the main causes behind them and contribute to the adoption of specific and targeted measures to reduce casualty rates and improve traffic safety. However, most existing research either adopted methods based on statistical analysis or neglected to further evaluate the spatial relationships. This study aims to use the eXtreme Gradient Boosting (XGBoost) algorithm to analyze hazardous material road transport accident data from seven regions of China. Considering the rarity of these events, the classification performance of different methods is compared based on precision, recall, F-score and Area Under Curve (AUC). The results indicate that the proposed XGBoost method has the best modeling performance. There is some variation between regions in the features that have a significant impact on accident severity. The influence of the same feature on the severity of an accident even varies from region to region. The aforementioned results provide a theoretical basis for exploring the issues, sustainability, challenges, and tasks of safe transportation activities for hazardous materials in the future. These results can help regions develop targeted prevention and response policies to efficiently reduce the incidence and severity of accidents.

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WOS 号： 000594419300001

第 24 篇

标　　题：Research Of Vehicle Stability On Circular Mountain Road Based On Reconstruction Of Road Alignment Parameters

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期　　刊：JOURNAL OF ENVIRONMENTAL PROTECTION AND ECOLOGY

摘　　要：Aiming at the driving stability of the vehicles around the mountain at different speeds, a horizontal and vertical linear reconstruction algorithm of the vehicle trajectory is constructed. The motion conditions of the vehicle in the horizontal and longitudinal combined sections are analysed. The vehicle rollover prediction model, the side slip prediction model and the downhill driving steering stability prediction model are proposed. Also, the vehicle driving stability detection system is developed independently. The experiment results show that after inputting the vehicle parameters and setting the driving speed, the driving stability of the current road section can be predicted, and the critical speed and the unstable road section of the side slip, rollover and downhill steering instability can be obtained. As a result, the critical speed for safe operation in all sections can be got. The research results not only provide the theoretical basis for speed limitation and improvement of current road design, but also provide valuable decision-making reference for driving safety control of connected vehicles.

WOS 号：000588763300029

第 25 篇

标　　题：Intelligent Two-Step Estimation Approach For Vehicle Mass And Road Grade

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期　　刊：IEEE ACCESS

摘　　要：Vehicle mass and road grade information is important to improve the control capability and further intellectualization of vehicles. With the aim of real-time estimation of mass and grade without additional sensors, a two-step estimator is proposed in this paper. In the first-step estimator, the recursive least square with dual forgetting factors is used to estimate the vehicle mass with the consideration of the time-varying rolling friction coefficient and system error. In the second-step estimator, the road grade is estimated using an extended Kalman particle filter. Based on the data of CarSim/MATLAB co-simulation, the proposed approach has faster convergence rate and better tracking accuracy on the premise of meeting the real-time requirements by comparison with other estimation algorithms. The performance of the estimator is finally validated by the vehicle road test, and the results show that the mass and grade are estimated with great accuracy and robustness under different road conditions.

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WOS 号：000598236600001

第 26 篇

标　　题：A Driver's Car-Following Behavior Prediction Model Based On Multi-Sensors Data

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期　　刊：EURASIP JOURNAL ON WIRELESS COMMUNICATIONS AND NETWORKING

摘　　要：The prerequisite for the effective operation of vehicle collision warning system is that the necessary operation is not implemented. Therefore, the behavior prediction that the driver should perform when the preceding vehicle braking is the key to improve the effectiveness of the warning system. This study was conducted to acquire characteristics in the car-following behavior when confronted by the braking of the preceding vehicle, including the reaction time and operation behavior, and establish a behavior prediction model. A driving experiment on the expressway was conducted using devices, such as millimeter-wave radars and controller area network (CAN) bus data, to acquire 845 segments of car following when the brake lamps of the car ahead are on. Data analysis demonstrates that the mean of time distance of car following, mean of car-following distance, and time-to-collision (TTC) mean are closely related with whether or not the driver slowed the car down. The operation states of the driver were divided into keeping the unchanged state of the degree of accelerator pedal opening, loosening of accelerator pedal without braking, braking, and other special situations with the input variables of car-following distance, speed of driver's car, relative speed, time distance, and TTC using the support vector machine (SVM) method to build a prediction model for the operation behavior of the driver. The verification result showed that the model predicts driving behavior with an accuracy rate of 80%. It reflects the actual decision-making process of the driver, especially the normal operation of the driver, to loosen the accelerator pedal without braking. This model can help to optimize the algorithm of the rear-end accident warning system and improve intelligent system acceptance.

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WOS 号：000512694600001

第 27 篇

标　　题：Vehicle Stability Control Strategy Based On Recognition Of Driver Turning Intention For Dual-Motor Drive Electric Vehicle

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Vehicle stability control should accurately interpret the driving intention and ensure that the actual state of the vehicle is as consistent as possible with the desired state. This paper proposes a vehicle stability control strategy, which is based on recognition of the

driver's turning intention, for a dual-motor drive electric vehicle. A hybrid model consisting of Gaussian mixture hidden Markov (GHMM) and Generalized Growing and Pruning RBF (GGAP-RBF) neural network is constructed to recognize the driver turning intention in real time. The turning urgency coefficient, which is computed on the basis of the recognition results, is used to establish a modified reference model for vehicle stability control. Then, the upper controller of the vehicle stability control system is constructed using the linear model predictive control theory. The minimum of the quadratic sum of the working load rate of the vehicle tire is taken as the optimization objective. The tire-road adhesion condition, performance of the motor and braking system, and state of the motor are taken as constraints. In addition, a lower controller is established for the vehicle stability control system, with the task of optimizing the allocation of additional yaw moment. Finally, vehicle tests were carried out by conducting double-lane change and single-lane change experiments on a platform for dual-motor drive electric vehicles by using the virtual controller of the A&D5435 hardware. The results show that the stability control system functions appropriately using this control strategy and effectively improves the stability of the vehicle.

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WOS 号： 000510035000010

第 28 篇

标　　题： Assessing Fuel Properties Effects Of 2,5-Dimethylfuran On Microscopic And Macroscopic Characteristics Of Oxygenated Fuel/Diesel Blends Spray

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期　　刊： SCIENTIFIC REPORTS

摘　　要： 2,5-Dimethylfuran (DMF) is a type of attractive sustainable green energy for diesel engines that is designed to reduce soot emission. This study investigated the effect of fuel properties on the macroscopic and microscopic spray characteristics of four test blends under injection pressures of 90, 120 and 150MPa and ambient pressure of 5MPa in a common diesel rail injection system. The macroscopic results indicate that with higher density, lower viscosity and lower latent heating of DMF20, the spray tip penetration and spray area are increased and the average spray angle is slightly increased. Interestingly, the effect of latent heating on the average spray angle is more obvious than that of kinematic viscosity. The microscopic results suggest that higher density, lower viscosity and lower latent heating of DMF20 have an adverse effect on the breakup of small droplets. The results of comparative analysis show that the change rules of the spray parameters remain nearly unchanged with increased injection pressure, and the influence of DMF20 properties produces a different change in different spray parameters with increasing injection pressure. The meaningful

conclusion is that the properties of DMF are favourable to improvement of the spray and atomization parameters under high injection pressure.

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WOS 号： 000528915400007

第 29 篇

标　　题： Energy-Absorbing Mechanisms And Crashworthiness Design Of Cfrp Multi-Cell Structures

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期　　刊： COMPOSITE STRUCTURES

摘　　要： This study aims to investigate crashworthiness and energy-absorbing capacity of CFRP mull-cell structures under the quasi-static axial loading. In the present study, CFRP single-cell and mull-cell tubes are manufactured, and the same overall dimensions and mass for all specimens are guaranteed through allocating different thickness of each side. The crushing process and energy-absorbing capacity of all specimens are experimentally investigated under the quasi-static axial crushing load. According to the experimental results, it is known that the single-cell tube develops unstable local buckling mode, and the mull-cell tubes with two configurations crush progressively. Total energy absorption of the mull-cell tubes are almost 69% higher than that of the single-cell tube. Subsequently, numerical simulations are further conducted to provide additional insights into the underlying energy-absorbing mechanisms of the mull-cell tubes. The numerical results indicate that intralaminar energy is the primary energy-absorbing mechanism for all configurations, and the energy absorbed by each part in the mull-cell tubes are much higher than the corresponding part in the single-cell tube. Based on the validated numerical models, the influences of wall thickness and cells number (n) on crashworthiness characteristics of mull-cell tubes are further investigated by performing a comparative analysis. It is found that the energy-absorbing capacity is slightly increased with raising cells number, and energy-absorbing capacity gradually increases with increasing layer number of inner cross beam. Finally, the CFRP mull-cell tube with n = 3 is further optimized, and as a result SEA is improved by 4.68% from the initial design. This study is expected to provide guideline for crashworthiness design of CFRP multi-cell structures.

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WOS 号： 000504047200022

第 30 篇

标　　题： Mobile Phone Use In A Car-Following Situation: Impact On Time Headway And Effectiveness Of Driver'S Rear-End Risk Compensation Behavior Via A Driving Simulator Study

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Mobile phone use while driving has become one of the leading causes of traffic accidents and poses a significant threat to public health. This study investigated the impact of speech-based texting and handheld texting (two difficulty levels in each task) on car-following performance in terms of time headway and collision avoidance capability; and further examined the relationship between time headway increase strategy and the corresponding accident frequency. Fifty-three participants completed the car-following experiment in a driving simulator. A Generalized Estimating Equation method was applied to develop the linear regression model for time headway and the binary logistic regression model for accident probability. The results of the model for time headway indicated that drivers adopted compensation behavior to offset the increased workload by increasing their time headway by 0.41 and 0.59 s while conducting speech-based texting and handheld texting, respectively. The model results for the rear-end accident probability showed that the accident probability increased by 2.34 and 3.56 times, respectively, during the use of speech-based texting and handheld texting tasks. Additionally, the greater the deceleration of the lead vehicle, the higher the probability of a rear-end accident. Further, the relationship between time headway increase patterns and the corresponding accident frequencies showed that all drivers' compensation behaviors were different, and only a few drivers increased their time headway by 60% or more, which could completely offset the increased accident risk associated with mobile phone distraction. The findings provide a theoretical reference for the formulation of traffic regulations related to mobile phone use, driver safety education programs, and road safety public awareness campaigns. Moreover, the developed accident risk models may contribute to the development of a driving safety warning system.

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第 31 篇

标　　题： Estimation Of Regional Economic Development Indicator From Transportation Network Analytics

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期　　刊： SCIENTIFIC REPORTS

摘　　要： With the booming economy in China, many researches have pointed out that the improvement of regional transportation infrastructure among other factors had an important effect on economic growth. Utilizing a large-scale dataset which includes 3.5

billion entry and exit records of vehicles along highways generated from toll collection systems, we attempt to establish the relevance of mid-distance land transport patterns to regional economic status through transportation network analyses. We apply standard measurements of complex networks to analyze the highway transportation networks. A set of traffic flow features are computed and correlated to the regional economic development indicator. The multi-linear regression models explain about 89% to 96% of the variation of cities' GDP across three provinces in China. We then fit gravity models using annual traffic volumes of cars, buses, and freight trucks between pairs of cities for each province separately as well as for the whole dataset. We find the temporal changes of distance-decay effects on spatial interactions between cities in transportation networks, which link to the economic development patterns of each province. We conclude that transportation big data reveal the status of regional economic development and contain valuable information of human mobility, production linkages, and logistics for regional management and planning. Our research offers insights into the investigation of regional economic development status using highway transportation big data.

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第 32 篇

标　　题： On Energy-Absorbing Mechanisms Of Metal/Wf-Cfrp Hybrid Composite Columns

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期　　刊： POLYMER COMPOSITES

摘　　要： Hybrid material system, comprised of metal and carbon fiber reinforced plastic (CFRP), combines the excellent mechanical performance and lightweight feature of CFRP with the competitive material cost and superior toughness of metal. By virtue of such mingled feature, metal/CFRP hybrid structure exhibits great potential in automotive components. This study aims to investigate the crushing behavior of aluminum/WF-CFRP (woven fabric CFRP) hybrid columns subjected to dynamic loading condition by comparing with the corresponding individual columns made of single material (aluminum column and WF-CFRP column). The dynamic axial crushing tests indicate that specific energy absorption of WF-CFRP column is 45% higher than that of the aluminum column and 27% superior to that of the hybrid column, while the total energy absorption of the hybrid column is about 8% higher than the summation of WF-CFRP column and aluminum column. Afterward, several finite element models are developed to reveal the underlying energy-absorbing mechanisms and the influences of each factor for the hybrid columns. The numerical results show that specific energy absorption of the hybrid columns is negatively correlated with the metal volume fraction (F- m), when inner aluminum wall thickness (t(m)) equals to 1.0 mm. It is also found that crushing process of the hybrid columns with l = 2 (2 CFRP layers) is

dominated by the progressive folding of inner aluminum column, leading to a lower damage level of CFRP and lower load carrying capacity. With increasing wrapped CFRP layer number up to 8, the inner aluminum column starts to generate internal inversion deformation mode due to the restriction of the outer CFRP layers, and outer CFRP layers exhibit progressive failure. The energy-absorbing mechanisms analysis indicates that the internal energy of the internally inversed aluminum column is significantly higher than that of the progressively folded aluminum column, and thus such special deformation mode is capable to offer a more stable and higher load carrying capacity for the hybrid columns. Besides, it is also found that the plastic deformation of the inner aluminum column is the major energy-absorbing mechanism, which is followed by the crushing failure of outer CFRP layers. The combination mode of thinner aluminum column and thicker CFRP layers tends to offer higher energy-absorbing capacity, which is much higher than that of the summation of corresponding individual columns. Finally, a complex proportional assessment method is considered to select the optimal configuration achieving the balance of material cost and structural crashworthiness. The present study is expected to provide guideline for design of metal/CFRP hybrid columns.

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WOS 号： 000513695400001

第 33 篇

标　　题： Coordinated Stability Control Strategy For Intelligent Electric Vehicles Using Vague Set Theory

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Aiming at improving the tracking stability performance for intelligent electric vehicles, a novel stability coordinated control strategy based on preview characteristics is proposed in this paper. Firstly, the traditional stability control target is introduced with the two degrees of freedom model, which is realized by the sliding mode control strategy. Secondly, an auxiliary control target further amending the former one with the innovation formulation of the preview characteristics is established. At last, a multiple purpose Vague set leverages the contribution of the traditional target and the auxiliary preview target in various vehicle states. The proposed coordinated control strategy is analyzed on the MATLAB/CarSim simulation platform and verified on an intelligent electric vehicle established with A&D5435 rapid prototyping experiment platform. Simulation and experimental results indicate that the proposed control strategy based on preview characteristics can effectively improve the tracking stability performance of intelligent electric vehicles. In the double lane change simulation, the peak value of sideslip angle, yaw rate, and lateral acceleration of the vehicle is reduced by 13.2%, 11.4%, and 8.9% compared with traditional control strategy. The average deviations between the experimental and simulation results of yaw rate, lateral acceleration, and

steering wheel angle are less than 10% at different speeds, which demonstrates the consistency between the experimental and the simulation results.

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第 34 篇

标　　题： Multimodal Transport Path Optimization Model And Algorithm Considering Carbon Emission Multitask

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期　　刊： JOURNAL OF SUPERCOMPUTING

摘　　要： The globalization of the economy and trade has made the transportation industry flourish, and the traffic demand is growing. Under this trend, energy consumption is increasing and environmental pollution is becoming more and more serious, so the development of low-carbon transportation is inevitable. Intermodality is a green transportation method that reduces transportation costs, shortens transportation time, improves transportation quality, reduces road congestion and is environmentally friendly. It can reduce carbon emissions and noise pollution while improving energy efficiency. Therefore, strengthening the use of intermodality can significantly reduce carbon dioxide emissions, thereby reducing the greenhouse effect. In the present study, carbon emissions are added to the intermodality route study, and an intermodality path selection model in a low-carbon environment is established. Through the use of genetic algorithms and step-by-step method to solve this problem, we find the best low-carbon transportation methods and routes. It has practical application value, enabling decision makers to balance the economic interests of the company while making decisions and to meet the government's carbon dioxide emission limitations.

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第 35 篇

标　　题： Study On Driving Cycle Synthesis Method For City Buses Considering Random Passenger Load

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： This paper proposes a novel driving cycle construction method in consideration of velocity, road slope, and passenger load, based on a real-world bus route with a plug-in hybrid electric bus (PHEB). The main purpose is to address the disadvantage that an

inaccurate reflection of the real-world driving characteristics for city buses will be caused when ignoring the passenger load in the course of a driving cycle synthesis. Two contributions are supplemented to distinguish from the previous research. Firstly, a novel station-based method is proposed aiming at developing a driving cycle with high accuracy. The kinematic segments are partitioned according to the distance of adjacent bus stops, while a two-dimensional Markov chain Monte Carlo method is employed to synthesize driving cycle between each interval of adjacent bus stops. Secondly, the random passenger load for different bus stops is treated as a discrete Markov chain model, according to the correlation analysis of the measured passenger data which are distinguished for off-peak and peak hours. Meanwhile, Monte Carlo simulation and maximum likelihood estimation are utilized to determine the most likely number of passengers for each bus stop. At last, the fuel consumption of the PHEB is simulated with the best-synthesized driving cycle and contrasted to the mean fuel consumption of the later measured data which is composed of the velocity, road slope, and the passenger load. The results demonstrate that the synthesized driving cycle has a higher accuracy on fuel consumption estimation.

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第 36 篇

标　　题： Aging-Aware Co-Optimization Of Battery Size, Depth Of Discharge, And Energy Management For Plug-In Hybrid Electric Vehicles

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期　　刊： JOURNAL OF POWER SOURCES

摘　　要： Plug-in hybrid electric vehicles (PHEVs) have a large battery pack, and the depth of discharge (DOD) significantly affects the battery longevity. In this paper, the battery degradation is considered in the co-optimization of battery size and energy management for PHEVs using convex programming. The impact of DOD on battery degradation and energy management is also investigated. The cost function consists of fuel consumption, electrical energy consumption, and equivalent battery life loss. A real-world speed profile collected from the urban city bus route up to about 70 km is used as an input to evaluate the proposed method. The results suggest that, for both cases with and without battery degradation, the total cost curve with respect to the preset final state of charge (SOC) is an upward parabola, where the optimal DOD can be identified, and the optimal battery size and energy management can be determined. The results also show that, with an initial SOC of 0.9, the proposed method can reduce

the total cost by 3.6 CNY compared to other existing studies with the fixed final SOC. Moreover, a sensitivity analysis is conducted to explore the effect of battery price and initial SOC on the optimal DOD and total cost.

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WOS 号： 000517663800109

第 37 篇

标　　题： Design And Implementation Of Luenberger Model-Based Predictive Torque Control Of Induction Machine For Robustness Improvement

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期　　刊： IEEE TRANSACTIONS ON POWER ELECTRONICS

摘　　要： This letter proposes a Luenberger model-based predictive torque control (LM-PTC) of induction machine to compensate prediction error caused by mismatched parameters. In the traditional predictive torque control (T-PTC), stator current, stator flux vector, and electromagnetic torque are predicted in one sampling period by open-loop prediction model, which will inevitably lead to prediction error by mismatched parameters, first. Inspired by the idea of closed-loop Luenberger observer, in the torque and flux prediction, the feedback correction part is introduced into prediction equations for LM-PTC. Second, the steady prediction errors of T-PTC and LM-PTC are, respectively, analyzed with mismatched parameter. Finally, the proposed LM-PTC is verified by the comparison experiments including dynamic-state, transient-state, and steady-state experiments.

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WOS 号： 000507286000005

第 38 篇

标　　题： Improved Combustion And Emission Characteristics Of Ethylene Glycol/Diesel Dual-Fuel Engine By Port Injection Timing And Direct Injection Timing

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期　　刊： FUEL PROCESSING TECHNOLOGY

摘　　要： In this study, the performance of a diesel ethylene glycol (DEG) dual-fuel engine with four low EG energy ratios (named EGO, EG5, EG10 and EG15 respectively) is tried to improve by port injection timing (PIT) and direct injection timing (DIT). The combustion results show that combustion process is even highly affected by DIT than by PIT. Peak cylinder pressure, peak heat release rates (PHRRs) and pressure rise rate increase with the augmentation of EG energy ratios and advanced DIT. Combustion duration decreases with the increase of EG energy ratios and advanced DIT. Brake

thermal efficiency (BTE) can be improved 19.45% by raising EG energy ratios and advancing DIT. In consideration of emission, the emissions of NOx, THC, CO2 and soot decrease followed by the rise of EG energy ratio at the same time, while CO emission increases. The emission is more obviously affected by DIT than PIT. The emission of soot and THC decreases with advanced DIT, while the emission of CO2 and NOx increases. Advanced DIT can reduce PM, and EG can decrease the average diameter of PM. Overall, the advanced DIT, suitable EG energy ratio and proper PIT are expected to achieve optimization on DEG dual-fuel engine in the aspect of performance and emissions.

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WOS 号： 000513295200027

第 39 篇

标　　题： Research On A Pedestrian Crossing Intention Recognition Model Based On Natural Observation Data

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期　　刊： SENSORS

摘　　要： Accurate identification of pedestrian crossing intention is of great significance to the safe and efficient driving of future fully automated vehicles in the city. This paper focuses on pedestrian intention recognition on the basis of pedestrian detection and tracking. A large number of natural crossing sequence data of pedestrians and vehicles are first collected by a laser scanner and HD camera, then 1980 effective crossing samples of pedestrians are selected. Influencing parameter sets of pedestrian crossing intention are then obtained through statistical analysis. Finally, long short-term memory network with attention mechanism (AT-LSTM) model is proposed. Compared with the support vector machine (SVM) model, results show that when the pedestrian crossing intention is recognized 0 s prior to crossing, the recognition accuracy of the AT-LSTM model for pedestrian crossing intention is 96.15%, which is 6.07% higher than that of SVM model; when the pedestrian crossing intention is recognized 0.6 s prior, the recognition accuracy of AT-LSTM model is 90.68%, which is 4.85% higher than that of the SVM model. The determination of pedestrian crossing intention parameter set and the more accurate recognition of pedestrian intention provided in this work provide a foundation for future fully automated driving vehicles.

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WOS 号： 000529139700234

第 40 篇

标　　题： Relationship Between Speed Perception And Eye Movement-A Case Study Of Crash-Involved And Crash-Not-Involved Drivers In China

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期　　刊： PLOS ONE

摘　　要： Speed perception tests are already used in several countries as part of the driver licensing curriculum; however, this test is not compulsively required in China. The purpose of this study was to investigate the relationship between speed perception and eye movement for different driver groups. Forty-eight drivers, including 28 crash-involved (CI), with rear-end or side collisions, and 20 crash-not-involved (CNI) drivers, were recruited for the speed perception experiments. Drivers' reaction characteristics as well as eye movement data were analyzed. The results showed that CI drivers were more likely to overestimate the speed of visual stimuli and react in advance. The speed perception of CI drivers was more accurate than that of CNI drivers for visual stimuli with middle to high moving speeds, indicating that CNI drivers are more cautious and conservative when driving. Regarding eye movement, significant differences in saccade speed were found between the CI and CNI drivers in the occlusion area under high speed and the occlusion ratio. The relationship between visual pattern and speed perception accuracy was found to some extent. Implications of the speed perception test for the driver aptitude test were discussed.

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WOS 号： 000535284700031

第 41 篇

标　　题： Long-Term Evolution Mechanism Of The Rail Weld Irregularity In Metro Lines Based On The Wear Theory

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期　　刊： WEAR

摘　　要： This paper aims to investigate the formation and long-term evolution of the rail weld regularity in metro lines on the basis of the rail wear. To this end, a field measurement was first carried out to acquire the longitudinal geometrical characteristics of the rail weld irregularity. Based on the experimental data, the initial rail irregularity and hardness softening are regarded as two principal reasons that result in the formation of rail weld irregularity. In order to illustrate the causes, a hybrid theoretical model was then developed and well validated by the experimental data, which includes a typical 2-demensional vehicle-track coupled model, a nonlinear wheel-rail contact relationship and a rail wear model. By means of the validated model, the long-term evolution process of the rail weld irregularity was demonstrated and the influences of the axle

load, running speed, hardness difference and long-wave length on the evolution characteristics of the rail weld regularity were studied.

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WOS 号： 000513001800014

第 42 篇

标　　题： Active Disturbance-Rejection-Based Speed Control In Model Predictive Control For Induction Machines

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期　　刊： IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS

摘　　要： Finite set model predictive torque control (FCSMPTC) of induction machines has received widespread attention in recent years due to its fast dynamic response, intuitive concept, and ability to handle nonlinear constraints. However, FCSMPTC essentially belongs to the open-loop control paradigm, and unmatched parameters inevitably cause electromagnetic torque tracking error. In addition, the outer loop (i.e., the speed loop) based on a proportional-integral (PI) regulator cannot achieve optimal control between speed dynamic response and torque tracking error compensation. The traditional control paradigm is abbreviated as PI-MPTC. In order to solve the aforementioned problem, this paper proposes active disturbance-rejection-based model predictive torque control (ADR-MPTC). First, the influence mechanism of mismatched parameters on torque prediction error in PI-MPTC is studied, and then the performance of a traditional PI regulator used to compensate for torque prediction error is analyzed. Second, this paper introduces several parts of the proposed ADR-MPTC, including the design of the torque prediction error observer, nonlinear prediction error compensation strategies, an enhanced predictive torque control, and a simplified full-order flux observer. Finally, PI-MPTC and ADR-MPTC are studied experimentally. The experimental results show that compared with PI-MPTC, ADR-MPTC performs better in dynamic and steady states, and has stronger robustness.

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WOS 号： 000507307000009

第 43 篇

标　　题： The Influence Of A Viaduct On Pm Dispersion In A Typical Street: Field Experiment And Numerical Simulations

作　　者： [Zhi, Huinan; Qiu, Zhaowen; Wang, Wazi; Wang, Guan; Hao, Yanzhao; Liu, Yili] Changan Univ, Sch Automobile, Changan Rd, Xian 710064, Shaanxi, Peoples R China

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期　　刊： ATMOSPHERIC POLLUTION RESEARCH

摘　　要： To investigate the effects of a viaduct on particle diffusion below the viaduct, field measurements for particulate matter (PM) concentration along roadsides with and without viaducts were conducted in this study. Air flow and particle (PM2.5) distribution around a viaduct were simulated by Computational Fluid Dynamic (CFD) equipped with the Discrete Phase Model in a Lagrange coordinate system. Experimental results of this case study indicate that the average mass concentrations of PM10 (156.7 mu g m(-3)), PM2.5 (77.3 mu g m(-3)) and PM1 (56.5 mu g m(-3)) on an elevated highway exceeded those on the ground-level expressway by 15%, 10% and 12%, respectively. Simulation found that two main vortices as well as two or three secondary vortices are generated in the canyon when both a viaduct and a barrier are added, while there was only one main vortex in the street canyon without a viaduct. A viaduct causes the particulate matter to be distributed unevenly, and the concentration on the leeward side near the ground is the highest. The vortex center is elevated as the value of Delta T (ground-level air temperature) increases, but the concentrations are basically maintained. We concluded that a viaduct increases the concentration of particulate matter in the street canyons and greatly affects the airflow field. Both Delta T and a sound barrier on a viaduct reduce the PM concentrations, but the effects are limited.

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WOS 号： 000520028700018

第 44 篇

标　　题： Development Of A Representative Urban Driving Cycle Construction Methodology For Electric Vehicles: A Case Study In Xi'An

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期　　刊： TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT

摘　　要： This paper develops a systematic and practical construction methodology of a representative urban driving cycle for electric vehicles, taking Xi'an as a case study. The methodology tackles four major tasks: test route selection, vehicle operation data collection, data processing, and driving cycle construction. A qualitative and quantitative comprehensive analysis method is proposed based on a sampling survey and an analytic hierarchy process to design test routes. A hybrid method using a chase car and on-board measurement techniques is employed to collect data. For data processing, the principal component analysis algorithm is used to reduce the dimensions of motion characteristic parameters, and the K-means and support vector machine hybrid algorithm is used to classify the driving segments. The proposed driving cycle construction method is based on the Markov and Monte Carlo simulation

method. In this study, relative error, performance value, and speed-acceleration probability distribution are used as decision criteria for selecting the most representative driving cycle. Finally, characteristic parameters, driving range, and energy consumption are compared under different driving cycles.

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WOS 号： 000524455600008

第 45 篇

标　　题： A Novel Star Auxetic Honeycomb With Enhanced In-Plane Crushing Strength

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期　　刊： THIN-WALLED STRUCTURES

摘　　要： Auxetic honeycombs exhibit low weight, shear stiffness, and excellent energy absorption capacity and thus have great potential for achieving the requirements of crashworthiness and lightweight in automotive fields. This work presents a novel auxetic structure called the star-triangular honeycomb (STH), in which the horizontal and vertical ligaments of the star honeycombs (SH) are replaced with triangular structures. The dynamic crushing behaviors of the STH under three different crushing velocities were investigated using 1D shock theory. The results show that the STH has a more obvious negative Poisson's ratio effect than the SH and that transverse contraction mainly occurs in the first plateau stage. Theoretical models were deduced based on the collapse mechanism of the typical unit revealed by numerical simulation for STH crushing strength prediction. The theoretical predictions agreed well with the simulation results, and two different plateau stresses appeared under low-velocity crushing. In addition, the influences of the STH geometric parameters and crushing velocity on the energy-absorbing capacity and densification strain were systematically explored. The parameter analysis indicated that the effects of the cell-wall thickness and incline angle on the dynamic response and energy absorption capacity of the STH under low-and medium-velocity crushing are more significant than those under high-velocity crushing. Moreover, the STH showed better energy absorption capacity than the SH. Thus, this design is expected to provide a novel means of improving the mechanical properties of honeycombs.

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WOS 号： 000530705200003

第 46 篇

标　　题： The Biochemical Clogging Of Landfill Leachate Collection System: Based On Laboratory Studies

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要：Leachate collection system (LCS) clogging is a common operational problem in municipal solid waste (MSW) landfills in China, which can result in high leachate levels that threaten the safety of landfill operations and subsequently increase the leachate leakage risk. In our previous research, a filtration test was conducted and the physical clogging effect was evaluated. To fully analyze the LCS failure, in this study, a set of column experiments were carried out to investigate the biochemical clogging development and mechanisms. Results showed that the biofilm and deposited CaCO3 composed the primary clogging materials. During the experimental period, the hydraulic conductivities in simulated gravel and nonwoven geotextile drainage layers were observed (91.7% and five orders of magnitude reduction), and decreased to 10(-4) and 10(-8) m s(-1), respectively. Therefore, the significance of the geotextile layer in LCS designing needs to be reconsidered. The biochemical clogging was positively correlated with volatile fatty acids (VFAs), and Ca2+ loading and the Ca2+ played the dominant role. Meanwhile, an improved method for analyzing biochemical clogging development was proposed.

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第 47 篇

标　　题：Human-Like Lane Change Decision Model For Autonomous Vehicles That Considers The Risk Perception Of Drivers In Mixed Traffic

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期　　刊：SENSORS

摘　　要：Determining an appropriate time to execute a lane change is a critical issue for the development of Autonomous Vehicles (AVs).However, few studies have considered the rear and the front vehicle-driver's risk perception while developing a human-like lane-change decision model. This paper aims to develop a lane-change decision model for AVs and to identify a two level threshold that conforms to a driver's perception of the ability to safely change lanes with a rear vehicle approaching fast. Based on the signal detection theory and extreme moment trials on a real highway, two thresholds of safe lane change were determined with consideration of risk perception of the rear and the subject vehicle drivers, respectively. The rear vehicle's Minimum Safe Deceleration (MSD) during the lane change maneuver of the subject vehicle was selected as the lane change safety indicator, and was calculated using the proposed human-like lane-change decision model. The results showed that, compared with the driver in the front extreme moment trial, the driver in the rear extreme moment trial is more conservative during the lane change process. To meet the safety expectations of the subject and rear vehicle drivers, the primary and secondary safe thresholds were determined to be 0.85 m/s(2) and 1.76 m/s(2), respectively. The decision model can help make AVs safer and more

polite during lane changes, as it not only improves acceptance of the intelligent driving system, but also further ensures the rear vehicle's driver's safety.

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第 48 篇

标　　题： City-Level China Traffic Safety Analysis Via Multi-Output And Clustering-Based Regression Models

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期　　刊： SUSTAINABILITY

摘　　要： In the field of macro-level safety studies, road traffic safety is significantly related to socioeconomic factors, such as population, number of vehicles, and Gross Domestic Product (GDP). Due to different levels of economic and urbanization, the influence of the predictive factors on traffic safety measurements can differ between cities (or regions). However, such region-level or city-level heterogeneities have not been adequately concerned in previous studies. The objective of this paper is to adopt a novel approach for traffic safety analysis with a dataset containing multiple target variables and samples from different subpopulations. Based on a dataset with annual traffic safety and socioeconomic measurements from 36 major cities in China, we estimate single-output regression models, multi-output regression models, and clustering-based regression models. The results indicate that the 36 cities can be clustered into a metropolitan city class and a non-metropolitan city class, and the class-specified models can notably improve the goodness-of-fit and the interpretability of city-level heterogeneities. Specifically, we note that the effect of primary and secondary industrial GDP on traffic safety is opposite to that of tertiary industrial GDP in the metropolitan city class, while the effects of the two decomposed GDP on traffic safety are consistent in the non-metropolitan city class. We also note that the population has a positive effect on the number of fatalities and the number of injures in metropolitan cities but has no significant influence on traffic safety in non-metropolitan cities.

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第 49 篇

标　　题： An Investigation Of Reliability Optimization In Standby Systems

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期　　刊：PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART O-JOURNAL OF RISK AND RELIABILITY

摘　　要：Due to the limitations of space or extra costs incurred, the reliability optimization problem of a spare system is of great interest and importance. In this article, we devote our efforts into the investigation of reliability optimization problem of the warm spare gate and cold spare gate. For a spare gate with fixed components, we first examine the relationship between the component order and the corresponding reliability; then, the equivalence of a cascaded model with a multiple-input spare gate is further presented. We find that for a warm spare gate, the corresponding reliability value is anticipated to be affected by the adopted component replacing order; nevertheless, the reliability is a fixed value once the components are provided for a cold spare gate. This finding indicates that reliability is irrespective of the component order for a cold spare gate. Therefore, for the warm spare gate, the component order can be varied to improve the corresponding system reliability, whereas for the cold spare gate, we should attempt to improve the reliabilities of the spare components aiming to obtain a higher reliability. These findings are potentially useful in the design process of a system consisting of spare gates.

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WOS 号：000523535400001

第 50 篇

标　　题：What Is The Difference Between Perceived And Actual Risk Of Distracted Driving? A Field Study On A Real Highway

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期　　刊：PLOS ONE

摘　　要：Distracted driving is a leading cause of traffic accidents. It is influenced by driver attitude toward secondary tasks; however, field-based studies on the effects of low-perceived-risk tasks on lateral driving have rarely been reported. A total of 17 experienced non-professional drivers were recruited to participate in two secondary tasks: a cognitive experiment (conversation) and a visual distraction experiment (observation of following vehicles), each representing low-perceived-risk secondary tasks. One-way analysis of variance (ANOVA) was conducted to evaluate the effects of low-perceived-risk tasks on lateral driving performance. ANOVA results indicated that compared with baseline (no task) lateral performance, lane-keeping ability was enhanced during cognitive distractions. In the visual distraction experiment, more than 50% of the distractions required 1-2 s. Lane deviation and its growth rate increased with the duration of distraction. Compared with cognitive distraction, lane deviation increased significantly with visual distraction, and lane-keeping performance was seriously impaired. For low-perceived-risk tasks, visual distractions impaired driving safety more seriously, compared with cognitive distractions, suggesting that drivers

misjudge the risks associated with visual tasks. These results can contribute to the design of advanced driving-assistance systems and improve professional driver programs, potentially reducing the frequency of traffic accidents caused by distracted driving.

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第 51 篇

标　　题： Effect Of Alcohols On Combustion Characteristics And Particle Size Distribution Of A Diesel Engine Fueled With Diesel-Castor Oil Blended Fuel

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期　　刊： ASIA-PACIFIC JOURNAL OF CHEMICAL ENGINEERING

摘　　要： The research was motivated to experimentally study the effect of alcohol addition on the performance, combustion characteristics, particle size distribution (PSD) and exhaust emissions of a common rail direct injection (CRDI) diesel engine fueled with diesel-castor oil blended fuels. The main properties of the blended fuels were measured by the standard test procedures. The results revealed that, compared with diesel fuel, the brake specific fuel consumption (BSFC) was increased by an average of 7.7%, 8.5% and 16.5% for DA80B10E10, DC80B20, and DC60B20E20 fuels respectively. The brake thermal efficiency (BTE) kept almost identical for the blended fuels. The peak in-cylinder pressure was about 0.4 MPa higher and the heat release rate (HRR) was evidently higher than that of diesel fuel, and the combustion duration was 5-12 crank angles shorter. The blended fuels exhibited bi-modal PSD, and diesel fuel showed uni-modal behavior under all operating conditions. The total number concentration (TNC) of particles was larger, but the geometric mean diameter (GMD) was lower than that of diesel fuel. Nitrogen oxide (NOx) emissions were increased by about 30% and hydrocarbon (HC) was evidently higher for the blended fuels under almost all operating conditions, but carbon monoxide (CO) emissions were about 22% lower than that of diesel fuel.

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WOS 号： 000526024500001

第 52 篇

标　　题： Parametric Study On Effects Of Excess Air/Fuel Ratio, Spark Timing, And Methanol Injection Timing On Combustion Characteristics And Performance Of Natural Gas/Methanol Dual-Fuel Engine At Low Loads

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期　　刊：ENERGY CONVERSION AND MANAGEMENT

摘　　要：A parametric investigation of the effects of excess air/fuel ratio (lambda), spark timing (ST), and methanol injection timing (MIT) on the combustion characteristics and performance of a natural gas/methanol dual-fuel engine was conducted. The operation was carried out at 1600 rpm and a low load. lambda was varied from 1.2 to 1.6, in increments of 0.1. The ST was kept close to the optimized value of brake thermal efficiency (eta(et)) and varied from advanced by an 8 degrees crank angle (8 degrees CA) to retarded by 8 degrees CA. The results indicated that the flame development period (CA0-10) and the flame propagation period (CA(10-90)) were prolonged when. increased from 1.2 to 1.6. The prolonged CA(0-10) and CA(10-90) could be shortened via the addition of methanol. eta(et) increased with an increase in lambda and the methanol energy substitution ratio (MSR). The ST corresponding to the maximum value of.et was delayed with an increase in the MSR. When the MIT is changed from -720 to 0 degrees CA BTDC, two types of air-fuel mixtures can be formed: a stratified-like mixture (when the MIT is set at the timing of intake only) and a homogeneous mixture (when the MIT is set at the timing of the intake valve closing). The most suitable MIT proved to be approximately 60 degrees CA after the intake valve closed. When the MIT was set at this point, CA(0-10) and CA(10-90) were shortened, and the coefficient of variation in the indicated mean effective pressure was reduced.

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WOS 号：000524316000048

第 53 篇

标　　题：Do Situational Or Cognitive Factors Contribute More To Risky Driving? A Simulated Driving Study

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通讯作者：Zhang, Z (corresponding author), Changan Univ, Sch Automobile, Xian, Peoples R China.

期　　刊：COGNITION TECHNOLOGY & WORK

摘　　要：Previous research has identified cognitive and situational factors as causes of risky driving; however, little is known about what roles cognitive and situational factors have on a specific risky driving behavior. In this study, two simulated drives were conducted to examine the impact of cognitive factors, reflected as working memory capacity and response inhibition capacity, and situational factor, reflected as time pressure, on several risky driving measures. These measures included the percentage of the distance traveled while speeding, the standard deviation of the lateral lane position on curves, safety scores, and accident frequency. Fifty-one participants were recruited by means of monetary rewards. Similar to the results from previous studies, working memory capacity, response inhibition, and time pressure were found to be significantly correlated with risky driving behaviors. Further investigation showed that (1) time pressure, as a situational factor, contributed more to speeding; (2) response inhibition, as a cognitive factor, contributed more to lane-keeping precision; (3) cognitive factors (working memory capacity and response inhibition capacity) and situational factor had

almost equal effects on responses to critical events. The results also indicated no significant interaction between cognitive and situational factors on risky driving behaviors. Our findings conclude that the mechanisms behind risky driving behaviors differ, and these results have possible implications for traffic safety interventions.

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WOS 号： 000557884700001

第 54 篇

标　　题： Analysis Of Factors Affecting A Driver'S Driving Speed Selection In Low Illumination

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： To better understand a driver's driving speed selection behaviour in low illumination, a self-designed questionnaire was applied to investigate driving ability in low illumination, and the influencing factors of low-illumination driving speed selection behaviour were discussed from the driver's perspective. The reliability and validity of 243 questionnaires were tested, and multiple linear regression was used to analyse the comprehensive influence of demographic variables, driving speed in a low-illumination environment with street lights and driving ability on speed selection behaviour in low illumination without street lights. Pearson's correlation test showed that there was no correlation among age, education, accidents in the past 3 years, and speed selection behaviour in low illumination, but gender, driving experience, number of night-driving days per week, and average annual mileage were significantly correlated with speed selection behaviour. In a low-illumination environment, driving ability has a significant influence on a driver's speed selection behaviour. Technical driving ability under low-illumination conditions of street lights has the greatest influence on speed selection behaviour on a road with a speed limit of 120 km/h (beta = 0.51). Risk perception ability has a significant negative impact on speed selection behaviour on roads with speed limits of 80 km/h and 120 km/h (beta = -0.25 and beta = -0.34, respectively). Driving speed in night-driving environment with street lights also has a positive influence on speed selection behaviour in low illumination (beta = 0.61; beta = 0.28; beta = 0.37).

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第 55 篇

标　　题： A Data-Driven Power Management Strategy For Plug-In Hybrid Electric Vehicles Including Optimal Battery Depth Of Discharging

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期　　刊： IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS

摘　　要： For hybrid electric vehicles, higher depth of discharge (DOD) indicates more use of battery energy, which can supply more inexpensive propulsions than the fossil fuel but accelerate the battery aging, thus leading to the increase in the equivalent battery life loss cost (EBLLC) related to battery aging. While developing an energy management strategy considering the battery aging effect for plug-in hybrid electric vehicles (PHEVs), a tradeoff between energy consumption cost (ECC) and EBLLC should be made to identify the optimal DOD and minimize the total cost (TC). Furthermore, the optimal DOD is changeable with the initial state of charge (SOC) level. To develop a robust controller to deal with varying initial SOCs for PHEVs, this paper proposes a data-driven method, namely, a three-layer artificial neural network (ANN) to realize real-time power distribution including battery life model. Real-world speed profiles and Pontryagin's minimum principle (PMP) are leveraged to identify the optimal DODs and generate the neural network training data based on cases with a range of initial SOCs. The results clearly demonstrate the robustness of the proposed ANN and also indicate that the data-driven method can effectively reduce the total of ECC and EBLLC compared to typical optimization algorithms without a battery aging model, including the dynamic programming, PMP, and the rule-based strategy. In particular, the ANN can reduce the TC by 19.99%, 25.97%, and 33.13%, respectively, for cases with the initial SOC of 0.95, 0.85, and 0.65, compared to the rule-based method. And the TC of the ANN is comparable to the PMP including the battery degradation model. Moreover, the training sample scale on forecasting accuracy and computational efficiency of the ANN is evaluated. Finally, the computational time of these methods is comprehensively discussed to evaluate the time efficiency of the proposed method.

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第 56 篇

标　　题： Three-Dimensional Discrete Element Modeling Of The Irregularly Shaped Pebbles Used In A Truck Escape Ramp

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期　　刊： COMPUTATIONAL PARTICLE MECHANICS

摘　　要： The truck escape ramp is a clump of pebbles that is located alongside downgrades. As the pebbles are randomly placed in arrester beds, few studies have been conducted on simulation methods of the irregularly shaped pebbles. This paper proposed a pebble DEM model to analyze the micro-contact mechanism of the pebbles. Based on a polynomial algorithm, the 7th fit was selected and the coefficients of the edge curves were recorded. Second, the main view and left view were filled with preset numbers of

ball elements. According to the ball element parameters, the ball elements were extended to three-dimensional models. Third, based on the edges of the main view and the top view, the ball element parameters were recalculated. Then, compression tests were conducted, and the key parameters of the pebble DEM model were calibrated. Based on the built pebble DEM model, compression tests were simulated with different pressing plate velocities and laying thicknesses. The results indicate that for increases in the pressing plate velocity, the contacting forces on the plate correspondingly increase, and this increase is linearly shaped. The results for different laying thicknesses indicate that for increases in the laying thickness, the contacting forces on the plate correspondingly decrease.

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WOS 号： 000526816500002

第 57 篇

标　　题： Research On The Influence Of Vehicle Speed On Safety Warning Algorithm: A Lane Change Warning System Case Study

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期　　刊： SENSORS

摘　　要： Speed has an important impact on driving safety, however, this factor is not included in existing safety warning algorithms. This study uses lane change systems to study the influence of vehicle speed on safety warning algorithms, aiming to determine lane change warning rules for different speeds (DS-LCW). Thirty-five drivers are recruited to carry out an extreme trial and naturalistic driving experiment. The vehicle speed, relative speed, relative distance, and minimum safety deceleration (MSD) related to lane change characteristics are then analyzed and calculated as warning rule characterization parameters. Lane change warning rules for a rear vehicle in the target lane under four-speed levels of 60 <= v < 70 km/h, 70 <less than or equal to> v < 80 km/h, 80 <less than or equal to> v < 90 km/h, and v <greater than or equal to> 90 km/h are established. The accuracy of lane change warning rules not considering speed level (NDS-LCW) and ISO 17387 are found to be 87.5% and 79.8%, respectively. Comparatively, the accuracy rate of DS-LCW under four-speed levels is 94.6%, 93.8%, 90.0%, and 92.6%, respectively, which is significantly superior. The algorithm proposed in this paper provides warning in the lane change process with a smaller relative distance, and the accuracy rate of DS-LCW is significantly superior to NDS-LCW and ISO 17387.

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WOS 号： 000537106200247

第 58 篇

标　　题： Adaptive Trajectory Tracking Control Strategy Of Intelligent Vehicle

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期　　刊： INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS

摘　　要： The trajectory tracking control strategy for intelligent vehicle is proposed in this article. Considering the parameters perturbations and external disturbances of the vehicle system, based on the vehicle dynamics and the preview follower theory, the lateral preview deviation dynamics model of the vehicle system is established which uses lateral preview position deviation, lateral preview velocity deviation, lateral preview attitude angle deviation, and lateral preview attitude angle velocity deviation as the tracking state variables. For this uncertain system, the adaptive sliding mode control algorithm is adopted to design the preview controller to eliminate the effects of uncertainties and realize high accuracy of the target trajectory tracking. According to the real-time deviations of lateral position and lateral attitude angle, the feedback controller is designed based on the fuzzy control algorithm. For improving the adaptability to the multiple dynamic states, the extension theory is introduced to design the coordination controller to adjusting the control proportions of the preview controller and the feedback controller to the front wheel steering angle. Simulation results verify the adaptability, robustness, accuracy of the control strategy under which the intelligent vehicle has good handling stability.

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WOS 号： 000538459100001

第 59 篇

标　　题： Construction Of Electric Vehicle Driving Cycle For Studying Electric Vehicle Energy Consumption And Equivalent Emissions

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通讯作者： Ye, YM (corresponding author), Changan Univ, Sch Automobile, Xian, Peoples R China.

期　　刊： ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要： This paper proposes an effective and scientific method for the construction of a representative driving cycle for electric vehicles (EV) and takes it as a foundation for studying the energy consumption and equivalent emissions for EV. First, a test route is developed through the analysis of the topology of the Xi'an road structure and traffic flow. Second, the vehicle driving pattern data is gathered through an integrated method of chase car method and on-board method. The velocity-acceleration (V-A) grid method is used to divide speed and acceleration data into micro-states. Third, the proposed driving cycle construction method incorporates the Markov chain and Monte Carlo (MCMC) simulation method. Then, a filter process is designed to screen out the most representative driving cycle. Finally, the comparison of the simulation result and test results shows the constructed EV driving cycle is in line with reality, and estimating the EV's energy consumption per kilometer, driving range, and equivalent emissions under official driving cycles results in large relative errors. Therefore, the construction of a

real-world driving cycle for specific cities or areas is necessary to evaluate energy consumption, driving range, and equivalent emissions of EV.

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WOS 号： 000531793800014

第 60 篇

标　　题： Commuter Exposure To Particulate Matter In Urban Public Transportation Of Xi'An, China

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期　　刊： JOURNAL OF ENVIRONMENTAL HEALTH SCIENCE AND ENGINEERING

摘　　要： Purpose To investigate commuter exposures to particulate matter (PM) in urban public transportation buses and subways, PM concentrations were simultaneously monitored for these two modes, over the same routes, in Xi'an, China. Methods The microenvironment variabilities in each stage of the total trip were analyzed. Exposure doses for the different commute processes were estimated based on the heart rates of volunteers. Experimental measurements were taken during peak traffic hours in July and October (summer and autumn) on two typical commute routes, for a total of 36 trips. One-way ANOVA was used to analyze the effects of different variables on commuter exposures. Results On the same route, the average PM exposure concentration of bus commuters was higher than those of subway commuters. For example, on Route 1 in the case study, the average PM10, PM2.5, and PM1 exposure concentrations of bus commuters were 71.6%, 19%, and 10.4% higher, respectively, than those of subway commuters. In the ground transportation mode, the exposure concentration of bus commuters was affected by the type of vehicle. Particle concentrations were significantly higher inside compressed natural gas (CNG) buses, than in pure electric (PE) buses, and in summer, the PM10 concentration in a CNG bus was 4.3 times higher than that in a PE bus. In a CNG bus, commuters in the back door area suffered the highest PM10 exposure concentration (179.6 mu g/m(3)), followed by those in the rear of the carriage (142.8 mu g/m(3)), and then those in the front door area (105.4 mu g/m(3)). Conclusion Commuters' avoidance of ground traffic sources, effective ventilation systems in buses, and the use of screens in subway systems can all help to lower the PM exposure of commuters. For all the modes of transportation in our study, the hottest spots for PM exposure appeared in the period when commuters were waiting for transit vehicles to arrive.

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第 61 篇

标　　题： Road Traffic Accident Scene Detection And Mapping System Based On Aerial Photography

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期　　刊： INTERNATIONAL JOURNAL OF CRASHWORTHINESS

摘　　要： Road traffic accident scenes provide useful information for understanding how accidents happen and calculating the speeds of the vehicles involved. Unmanned aerial vehicles can obtain photographs of accident scenes, but utilizing these photographs has problems such as low target resolution and scale changes. An improved Resnet-Single-Shot Multibox Detector (R-SSD) algorithm based on a deep residual network (Resnet) is presented to address these problems. A residual network with better characterisation ability is proposed to replace the basic network, and residual learning is employed to reduce difficulty in network training and improve target detection accuracy. The proposed aerial target detection algorithm, based on feature information fusion (I-SSD), addresses the problems of repeated detection and small-sample missed detection in the original SSD target detection algorithm. Based on the detection results, a road traffic accident scene mapping system using either AutoCAD or hand-drawing can be designed.

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第 62 篇

标　　题： Crash Prediction Based On Random Effect Negative Binomial Model Considering Data Heterogeneity

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期　　刊： PHYSICA A-STATISTICAL MECHANICS AND ITS APPLICATIONS

摘　　要： In order to improve traffic safety, a large amount of works focusing on crash prediction and identifying factors contributing to crashes. However, the ignorance of data unobserved heterogeneity in some traditional models may lead to biased parameter estimation and erroneous inferences. To investigate the relationship between crash and the potential contributing factors, the crash data occurred in 3-year survey period on Interstate highways in Washington, including 134 fatal crashes, 13936 injury crashes, and 34,084 property damage only (PDO) crashes were collected. A data quality control method based on sensitivity analysis is used to determine the road segments. Then a negative binomial (NB) model and a random negative binomial (RENB) model are constructed to predict crash number. The inverse stepwise procedure was applied to examine the significance of explanatory variable. The horizontal alignment type, speed limit, visibility, road surface condition, and AADT are identified as significant factors

on the crash. In the comparison, four standard errors are designed as indicators, and the results show that the errors of RENB model are lower than that of NB model. The comparing results illustrate that the RENB model outperforms the NB model in crash number prediction and safety service level prediction (C) 2019 Elsevier B.V. All rights reserved.

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第 63 篇

标　　题： Exploring Factors Affecting The Yellow-Light Running Behavior Of Electric Bike Riders At Urban Intersections In China

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Electric bikes play an important role in the urban transportation system in China. Yellow-light running behavior of riders is one of the most critical factors for e-bike riders involved in traffic crashes at intersection. The main purpose of this study is to explore how a variety of factors affect e-bike riders' yellow-light running behaviors at intersection by a field observation conducted in Xi'an, China. Based on 396 e-bike riders who faced yellow-light samples, two analytical methods, the principle component analysis logistics model and a base logistics model, were employed to evaluate the impacts of contributing factors on e-bike riders' yellow-light running behavior. The modeling results showed that seven variables significantly affect the e-bike riders' yellow-light running behavior, which were the approaching speed of e-bike, the distance to stop line, riders' age and gender attributes, type of e-bike, and the characteristics of intersection including the width of intersection and the existence of physical barriers. This study can provide valuable insights into understanding e-bike riders' yellow-light running behavior and may also help decision makers propose countermeasures to reduce e-bike rider-related crashes at intersection.

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第 64 篇

标　　题： Coordinated Management Of Connected Plug-In Hybrid Electric Buses For Energy Saving, Inter-Vehicle Safety, And Battery Health

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期　　刊：APPLIED ENERGY

摘　　要：For plug-in hybrid electric vehicles, deeper battery discharge provides more electrical energy at a lower cost than fossil fuel, which reduces the overall energy consumption cost. However, it also accelerates battery degradation and increases the equivalent cost of battery life loss. Therefore, the battery depth of discharge (DOD) needs to be optimized to minimize the overall cost. For connected plug-in hybrid electric vehicles, the longitudinal velocity planning determines the energy demands, which directly affects the charging or discharging current to the battery and therefore affects DOD, aging, and fuel consumption as well. For connected plug-in hybrid electric buses running on fixed routes, in order to coordinate the velocity planning and battery health protection, this paper proposes a real-time energy management strategy aimed at achieving the minimum overall cost by optimizing the DOD and velocity planning. The proposed method is evaluated in an urban traffic scenario, and the goal of achieving optimal DOD is divided into a co-optimization problem over each moving horizon, where the velocity planning and energy management are traded off by minimizing the sum of driving safety cost, energy consumption cost, and equivalent cost of battery life loss. The results show that the proposed far-sighted economy-oriented methodology is superior to a short-sighted velocity planning and energy management method, and has an obvious advantage in the total cost compared with other conventional methods using a preset DOD. Moreover, the impacts of possible communication delays and prediction horizon lengths on the optimization performance and computational cost are investigated. The proposed method provides a promising management strategy for future connected and autonomous mobility design, which can mitigate battery capacity degradation and improve the fuel economy.

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第 65 篇

标　　题：One-Dimensional Cellular Automaton Traffic Flow Model Based On Defensive Driving Strategy

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期　　刊：INTERNATIONAL JOURNAL OF CRASHWORTHINESS

摘　　要：In a SDNaSch model, vehicles tend to brake sharply, leading to an inherent safety risk cellular automata based on defensive driving, considering the deceleration behavior of the preceding vehicle before the braking process. A numerical simulation is performed to determine the flow-density relationship, average speed-density relationship, emergency brake ratio-density relationship and space-time diagram under different defensive deceleration probabilities, and the safety and stability of the defensive driving model are analyzed. The results show that the use of the defensive driving model improves the traffic flow in the medium-high density area, delays the occurrence of

static congestion, considerably reduces the emergency braking behavior of operating vehicles, and improves the stability and safety during transportation. In the medium-high density area, a stable and uniform synchronized flow appears, and the speed transition phenomenon consistent with the measured data is observed simultaneously. Compared with the traditional SDNaSch model, the proposed model can better describe the actual running state of the traffic flow.

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第 66 篇

标　　题： Comparative Study On Metal/Cfrp Hybrid Structures Under Static And Dynamic Loading

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期　　刊： INTERNATIONAL JOURNAL OF IMPACT ENGINEERING

摘　　要： This study aims to explore the crushing behavior of aluminum (AL) - carbon fiber reinforced plastic (CFRP) tubes with different hybrid configurations subjected to quasi-static and dynamic loading conditions. First, a series of experimental tests are carried out to explore the crushing behaviors of hybrid tubes in comparison with the corresponding individual tubes made of single material. The experimental results indicate that the H-II hybrid tube, made of an outer aluminum circular tube and internally adhered CFRP layers, generates a unique deformation pattern; whose outer aluminum tube inverses externally and inner CFRP layers crush progressively. With these distinctive deformation features, the H-II hybrid tubes are considered to be ideal with superior crashworthiness and energy-absorbing capacity. It is also found that loading rate has little influence on deformation pattern of hybrid tubes and single material tubes, while energy-absorbing capacity of hybrid tubes and individual CFRP tubes under dynamic loading are substantially lower than those under quasi-static loading. Second, numerical simulations are performed for the H-II hybrid tubes to provide further insights into their underlying energy-absorbing mechanisms. It is found that the external inversion mode of the outer aluminum tube is the major energy-absorbing mechanism, in which the contribution of the outer aluminum tube to total energy absorption decreases with increase in thickness of CFRP layers. The internal energy of the externally inversed aluminum tube is considerably higher than internal energy of typical progressively-folded AL tube (sole aluminum tube). Third, a parametric study is further conducted, which indicates that with increasing aluminum

wall thickness, the specific energy absorption (SEA) increases. Besides, it is found that varying fiber orientation of inner CFRP layers leads to no evident change in the deformation mode and SEA of the H-II hybrid tubes. When the interfacial strength in between aluminum and CFPR reaches a certain level, there is no evident increase in the total energy absorption with further increase of the interface strength, but the initial peak crushing force increases notably. These results are expected to deepen the understanding of crushing behavior of the H-II hybrid tubes, thereby providing guidance for the crashworthiness design.

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第 67 篇

标　　题： Fatigue Driving Prediction On Commercial Dangerous Goods Truck Using Location Data: The Relationship Between Fatigue Driving And Driving Environment

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： The approaches monitoring fatigue driving are studied because of the fact that traffic accidents caused by fatigue driving often have fatal consequences. This paper proposes a new approach to predict driving fatigue using location data of commercial dangerous goods truck (CDT) and driver's yawn data. The proposed location data are from an existing dataset of a transportation company that was collected from 166 vehicles and drivers in an actual driving environment. Six different categories of the predictor set are considered as fatigue-related indexes including travel time, day of week, road type, continuous driving time, average velocity, and overall mileage. The driver's yawn data are used as a proxy for ground truth for the classification algorithm. From the six different categories of the predictor set, we obtain a set of 17 predictor variables to train logistic regression, neural network, and random forest classifiers. Then, we evaluate the predictive performance of the classifiers based on three indexes: accuracy, F1-measure, and area under the ROC curve (AUROC). The results show that the random forest is more suitable for predicting fatigue driving using location data according to its best accuracy (74.18%), F1-measure (62.02%), and AUROC (0.8059). Finally, we analyze the relationship between fatigue driving and driving environment according to variable importance described by random forest. In summary, our results obviously exhibit the potential of location data for reducing the accident rate caused by fatigue driving in practice.

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第 68 篇

标　　题： An Innovative Design Of Decoupled Regenerative Braking System For Electric City Bus Based On Chinese Typical Urban Driving Cycle

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：This paper proposes a novel decoupled approach of a regenerative braking system for an electric city bus, aiming at improving the utilization of the kinetic energy for rear axle during a braking process. Three contributions are added to distinguish from the previous research. Firstly, an energy-flow model of the electric bus is established to identify the characteristic parameters which affect the energy-saving efficiency of the vehicle, while the key parameters (e.g., driving cycles and the recovery rate of braking energy) are also analyzed. Secondly, a decoupled braking energy recovery scheme together with the control strategy is developed based on the characteristics of the power assistance for electric city bus which equips an air braking system, as well as the regulatory requirements of ECE R13. At last, the energy consumption of the electric city bus is analyzed by both the simulation and vehicle tests, when the superimposed and the decoupled regenerative braking system are, respectively, employed for the vehicle. The simulation and actual road test results show that compared with the superposition braking system of the basic vehicle, the decoupled braking energy recovery system after the reform can improve the braking energy recovery rate and vehicle energy-saving degree. The decoupled energy recovery system scheme and control strategy proposed in this paper can be adopted by bus factories to reduce the energy consumption of pure-electric buses.

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第 69 篇

标　　题：Accelerated Failure Time Model To Explore The Perception Response Times Of Drivers In Simulated Car-Following Scenarios

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：In the development of effective rear-end collision alarm systems, understanding the factors that influence the perception response times (PRT) of drivers is important for the design of a reasonable lead time for the warning (or intervention) of likely collisions. Previous studies have proposed different approaches for examining the impact of situational or individual factors on the PRT of drivers. However, unobserved heterogeneity has not been considered and neither has a duration-modeling approach been used, resulting in a lack of accurate estimation. The purpose of the present study was to explore the effect of the driving situation and individual differences on the PRT of drivers while also considering unobserved heterogeneity. A total of 101 participants

were exposed to different levels of secondarily cognitive load and situational urgency in simulated d scenarios. Several accelerated failure time (AFT) duration models, both with and without heterogeneity, were developed to model the PRT of drivers, while factors related to driving situation and individual differences were incorporated. The results indicate that influential factors include age, working memory capacity (WMC), cognitive load, and initial time headway exerted significant effects on the PRT of drivers. The hazard rate changed by 14.4%, 22.6%, and 7.5% when age, cognitive load, and initial time headway changed by one unit, respectively. Furthermore, the hazard rate decreases by more than 20% for individuals with higher WMC compared with baseline individuals. These results suggest that the AFT model that considers unobserved heterogeneity can provide a more accurate estimation of the PRT compared to other duration models. These findings can be expected to provide a further understanding of drivers' braking behaviors, which will contribute to the development of advanced driving assistant systems as well as safety assessments of in-vehicle information and communication technologies.

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第 70 篇

标　　题： A Comparative Study Of Accident Risk Related To Speech-Based And Handheld Texting During A Sudden Braking Event In Urban Road Environments

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： The use of mobile phones while driving is a very common phenomenon that has become one of the main causes of traffic accidents. Many studies on the effects of mobile phone use on accident risk have focused on conversation and texting; however, few studies have directly compared the impacts of speech-based texting and handheld texting on accident risk, especially during sudden braking events. This study aims to statistically model and quantify the effects of potential factors on accident risk associated with a sudden braking event in terms of the driving behavior characteristics of young drivers, the behavior of the lead vehicle (LV), and mobile phone distraction tasks (i.e., both speech-based and handheld texting). For this purpose, a total of fifty-five licensed young drivers completed a driving simulator experiment in a Chinese urban road environment under five driving conditions: baseline (no phone use), simple speech-based texting, complex speech-based texting, simple handheld texting, and complex handheld texting. Generalized linear mixed models were developed for the brake reaction time and rear-end accident probability during the sudden braking events. The results showed that handheld texting tasks led to a delayed response to the sudden

braking events as compared to the baseline. However, speech-based texting tasks did not slow down the response. Moreover, drivers responded faster when the initial time headway was shorter, when the initial speed was higher, or when the LV deceleration rate was greater. The rear-end accident probability respectively increased by 2.41 and 2.77 times in the presence of simple and complex handheld texting while driving. Surprisingly, the effects of speech-based texting tasks were not significant, but the accident risk increased if drivers drove the vehicle with a shorter initial time headway or a higher LV deceleration rate. In summary, these findings suggest that the effects of mobile phone distraction tasks, driving behavior characteristics, and the behavior of the LV should be taken into consideration when developing algorithms for forward collision warning systems.

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第 71 篇

标　　题： Research On A Cognitive Distraction Recognition Model For Intelligent Driving Systems Based On Real Vehicle Experiments

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期　　刊： SENSORS

摘　　要： The accurate and prompt recognition of a driver's cognitive distraction state is of great significance to intelligent driving systems (IDSs) and human-autonomous collaboration systems (HACSs). Once the driver's distraction status has been accurately identified, the IDS or HACS can actively intervene or take control of the vehicle, thereby avoiding the safety hazards caused by distracted driving. However, few studies have considered the time-frequency characteristics of the driving behavior and vehicle status during distracted driving for the establishment of a recognition model. This study seeks to exploit a recognition model of cognitive distraction driving according to the time-frequency analysis of the characteristic parameters. Therefore, an on-road experiment was implemented to measure the relative parameters under both normal and distracted driving via a test vehicle equipped with multiple sensors. Wavelet packet analysis was used to extract the time-frequency characteristics, and 21 pivotal features were determined as the input of the training model. Finally, a bidirectional long short-term memory network (Bi-LSTM) combined with an attention mechanism (Atten-BiLSTM) was proposed and trained. The results indicate that, compared with the support vector machine (SVM) model and the long short-term memory network (LSTM) model, the proposed model achieved the highest recognition accuracy (90.64%) for cognitive distraction under the time window setting of 5 s. The determination of time-frequency characteristic parameters and the more accurate recognition of cognitive distraction driving achieved in this work provide a foundation for human-centered intelligent vehicles.

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第 72 篇

标　　题： Design And Analysis Of Magnetic Coils For Optimizing The Coupling Coefficient In An Electric Vehicle Wireless Power Transfer System

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期　　刊： ENERGIES

摘　　要： Although the wireless power transfer (WPT) system for electric vehicles (EVs) provides numerous advantages, there is still a low coupling coefficient and the misalignment between the primary coil and the secondary coil needs to be solved. In this paper, the transmission efficiency and transmitted power were calculated based on Series-Series (SS) compensation topology. The coupling coefficient is related to the coil parameters and misalignments. A simulation study was carried out to explore the variation in the coupling coefficient for different coil configurations under different air gaps and coil misalignments. Moreover, the influence of the internal parameters of the square coil on the coupling coefficient was further studied. Finally, this paper discusses the influence of ferrite cores with a square coil on the coupling coefficient. The results of this paper show that designing the optimal internal parameters of the square coil and the ferrite core can increase the coupling coefficient between the coils, which can also provide guidelines for the design and optimization of the magnetic coupling coils for a wireless charging system for electric vehicles.

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第 73 篇

标　　题： Pyrolysis Characters And Fire Behavior Of Bus Ceiling Materials

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期　　刊： JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY

摘　　要： The pyrolysis characters and fire behavior of ceiling materials have a great impact on the fire retardant of the whole bus because the fire might spread along the ceiling. This study investigated the pyrolysis characters of five plastic ceiling components with TG tests at four heating rates, and then, the kinetic parameters were calculated with Kissinger method, Friedman method and an advanced isoconversional Vyazovkin method. The obtained kinetic parameters were also validated by reconstruction of conversion curves. Finally, the flammability of each component from three ceiling materials was estimated using PCFC, and the fire behavior of three ceiling materials was investigated with cone calorimeter at different heat fluxes. Results show the pyrolysis characters of surface material could explain the early stage fire behavior of

ceiling materials. The ignition and fire resistance were also highly dependent on the properties of surface materials. A transition between limited and more fierce combustion occurs at some heat flux for three ceiling materials. This property was related to the composition and structure of ceilings. Below this transition heat flux level, only the surface layer of ceiling was ignited and the fire load was limited. Above this level, the underlying layer was involved in combustion and leads to a sharply increased heat release. These results suggest that the flame retardant of surface material was important to promote fire retardant of the whole ceiling. Moreover, the obtained parameters can be used for predicting fire propagation in bus ceiling.

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第 74 篇

标　　题： Comparison Of Car-Following Behavior In Terms Of Safety Indicators Between China And Sweden

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期　　刊： IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS

摘　　要： Understanding car-following behavior in different countries is essential for the design and development of autonomous driving and further development of active safety systems that can function well worldwide, in particular, in mixed traffic conditions. However, very few studies exist that compare car-following behaviors in different countries based on real driving data. This paper analyses the similarities and differences of drivers' car-following behavior, in terms of time gap, gap distance, and time to collision (TTC), using both China and Sweden datasets from real road driving studies, in a bid to identify how these indicators affect drivers' speed control in car-following situations. The results indicate that the highest frequency of gap distance is observed in the same value range in both datasets, while the highest frequency of time gap in the Sweden dataset is found at a lower value range than the corresponding value range in the China dataset. For both datasets, time gap is observed to be a more reliable indicator for car-following analysis than gap distance since it is less sensitive to speed variations. Furthermore, TTC in the low travel speed ranges ($v < 50$ km/h) tends to be steady in comparison with the TTC at other speed ranges, so the time gap in the high-speed ranges is ($v > 90$ km/h). Therefore, time gap is recommended as the safety indicator for car-following analysis in high-speed conditions, while a combination of time gap and TTC is recommended for low-speed conditions, especially on urban roads.

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第 75 篇

标　　题： A Hybrid Approach For Turning Intention Prediction Based On Time Series Forecasting

And Deep Learning

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期　　刊：SENSORS

摘　　要：At an intersection with complex traffic flow, the early detection of the intention of drivers in surrounding vehicles can enable advanced driver assistance systems (ADAS) to warn the driver in advance or prompt its subsystems to assess the risk and intervene early. Although different drivers show various driving characteristics, the kinematic parameters of human-driven vehicles can be used as a predictor for predicting the driver's intention within a short time. In this paper, we propose a new hybrid approach for vehicle behavior recognition at intersections based on time series prediction and deep learning networks. First, the lateral position, longitudinal position, speed, and acceleration of the vehicle are predicted using the online autoregressive integrated moving average (ARIMA) algorithm. Next, a variant of the long short-term memory network, called the bidirectional long short-term memory (Bi-LSTM) network, is used to detect the vehicle's turning behavior using the predicted parameters, as well as the derived parameters, i.e., the lateral velocity, lateral acceleration, and heading angle. The validity of the proposed method is verified at real intersections using the public driving data of the next generation simulation (NGSIM) project. The results of the turning behavior detection show that the proposed hybrid approach exhibits significant improvement over a conventional algorithm; the average recognition rates are 94.2% and 93.5% at 2 s and 1 s, respectively, before initiating the turning maneuver.

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第 76 篇

标　　题：Simulation-Based Research On Driver Visibility Of Black-And-White Striped Vehicles

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：The vehicle color is considered to be a significant factor affecting driver visibility. The primary objective of this study is therefore to determine the impact of black-and-white striped vehicles (BWVs) on driver visibility through simulation-based experiments. In these experiments, subjects were asked to perform front and rear target identification tasks under daylight and twilight conditions. Then, a 2 (lighting conditions) x 2 (vehicle

size) x 5 (vehicle color) analysis of variance was conducted for each task. Under the front identification scenario, the main factors affecting visibility were found to be lighting conditions, vehicle size, vehicle color, and the interactions between these factors. Under the rear identification scenario, lighting conditions and vehicle color were found to be the main factors. The results of this study demonstrate that driver visibility of BWVs is poorer than that of other colors of vehicles and that BWV visibility is susceptible to lighting conditions.

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第 77 篇

标　　题： Research On The Comfort Of Vehicle Passengers Considering The Vehicle Motion State And Passenger Physiological Characteristics: Improving The Passenger Comfort Of Autonomous Vehicles

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Comfort is a significant factor that affects passengers' choice of autonomous vehicles. The comfort of an autonomous vehicle is largely determined by its control algorithm. Therefore, if the comfort of passengers can be predicted based on factors that affect comfort and the control algorithm can be adjusted, it can be beneficial to improve the comfort of autonomous vehicles. In view of this, in the present study, a human-driven experiment was carried out to simulate the typical driving state of a future autonomous vehicle. In the experiment, vehicle motion parameters and the comfort evaluation results of passengers with different physiological characteristics were collected. A single-factor analysis method and binary logistic regression analysis model were used to determine the factors that affect the evaluation results of passenger comfort. A passenger comfort prediction model was established based on the bidirectional long short-term memory network model. The results demonstrate that the accuracy of the passenger comfort prediction model reached 84%, which can provide a theoretical basis for the adjustment of the control algorithm and path trajectory of autonomous vehicles.

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第 78 篇

标　　题： Modeling Car-Following Behaviors And Driving Styles With Generative Adversarial Imitation Learning

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期　　刊：SENSORS

摘　　要：Building a human-like car-following model that can accurately simulate drivers' car-following behaviors is helpful to the development of driving assistance systems and autonomous driving. Recent studies have shown the advantages of applying reinforcement learning methods in car-following modeling. However, a problem has remained where it is difficult to manually determine the reward function. This paper proposes a novel car-following model based on generative adversarial imitation learning. The proposed model can learn the strategy from drivers' demonstrations without specifying the reward. Gated recurrent units was incorporated in the actor-critic network to enable the model to use historical information. Drivers' car-following data collected by a test vehicle equipped with a millimeter-wave radar and controller area network acquisition card was used. The participants were divided into two driving styles by K-means with time-headway and time-headway when braking used as input features. Adopting five-fold cross-validation for model evaluation, the results show that the proposed model can reproduce drivers' car-following trajectories and driving styles more accurately than the intelligent driver model and the recurrent neural network-based model, with the lowest average spacing error (19.40%) and speed validation error (5.57%), as well as the lowest Kullback-Leibler divergences of the two indicators used for driving style clustering.

DOI：10.3390/s20185034

WOS 号：000581977400001

第 79 篇

标　　题：Experimental Study Of The Effects Of Spark Timing And Water Injection On Combustion And Emissions Of A Heavy-Duty Natural Gas Engine

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期　　刊：FUEL

摘　　要：The growing concern over global warming and stricter emissions regulations (EURO 6 standards) have led to natural gas engines being operated in stoichiometric combustion conditions with three-way catalytic (TWC) and exhaust gas recirculation (EGR) equipment. However, natural gas engines suffer from high thermal load, knock onset, and high turbine inlet temperatures at stoichiometric combustion conditions. Water injection is a promising approach to reduce thermal load and NOx emissions and suppress knock onset. In this study, the effects of water injection on the combustion and performance characteristics of a heavy-duty natural gas engine were experimentally studied. The experiments were conducted with four water to natural gas mass ratios (WNMRs) and various spark timings. The results showed that water injection decreased the burning velocity of natural gas, leading to a decrease in peak in-cylinder pressure, peak heat release rate, and combustion temperature. The flame development period

(CA(0-10)) and the flame propagation period (CA(10-90)) increased with an increase in WNMR. Compared to pure natural gas, the brake thermal efficiency at the optimum spark timing increased from 27.8% to 28.2% at WNMR = 0.35. BSNOx emissions consistently decreased with an increase in WNMR, while BSTHC emissions and BSCO emissions increased slightly.

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WOS 号： 000537626900051

第 80 篇

标　　题： Linking Executive Functions To Distracted Driving, Does It Differ Between Young And Mature Drivers?

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期　　刊： PLOS ONE

摘　　要： Distracted driving is a leading cause of traffic accidents. Certain executive functions significantly affect the willingness of distracted driving; however, little research has compared the effects of executive functions on distracted driving behaviors in different aged populations. This study explores and compares the behavioral and cognitive processes underlying distracted driving behaviors in young and mature drivers. A total of 138 participants aged 18-65 years old completed a self-report questionnaire for measuring executive function index and distracted driving behaviors. Independent sample t-tests were conducted for executive functions (motivational drive, organization, strategic planning, impulse control, and empathy) and driving variables to examine any differences between young and mature groups. Partial correlation coefficients and z-score of these comparisons were calculated to compare the differences between age groups. Furthermore, multiple hierarchical regression models were constructed to determine the relative contributions of age, gender, and executive functions on distracted driving behaviors. Results demonstrated the following: (1) Mature drivers performed better for impulse control, the executive function index as well as the measure of distracted driving behavior than young drivers; (2) the relationships between executive functions and distracted driving behaviors did not significantly differ between young and mature drivers; (3) for both young and mature drivers, motivational drive and impulse control were found to significantly improve the prediction of distracted driving behavior in regression models. The findings emphasize that similar behavioral and cognitive processes are involved in distracted driving behavior of young and mature drivers, and can promote a single strategy for driver education and accident prevention interventions for both age groups.

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WOS 号： 000576265600099

第 81 篇

标　　题： Seating Provision And Configuration Of A 12M City Bus Considering Passenger

Crowding

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期　　刊：INTERNATIONAL JOURNAL OF AUTOMOTIVE TECHNOLOGY

摘　　要：Seating capacity of a limited area significantly affects passenger crowding on a 12 m city bus, which is the main type of buses for public transport in China. This study aimed to provide an optimal solution for the seating capacity to adapt the passenger flow during operational periods. The study claimed that the seating capacity was defined by an overall crowding effect considering both the standees and seated passengers, whose demands for seat supply are different. It investigated the projected area of the seated passengers on board, defined the criteria regarding whether the current trip was a peak shift, and proposed a passenger crowding index for optimizing the seating capacity during two operational periods. It not only provided a recommended table between actual seating capacity and intensity coefficient varying along the two periods, but also discussed the number of 12 m buses with different seating capacities allocated to the bus line. It demonstrated the feasibility of the passenger crowding index through a case study and compared the effects of three main seat configurations existing on the 12 m city bus. It displayed that a seat capacity preferably ranged from 21 to 43 while only one seat configuration was allowed by the public transport enterprises.

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WOS 号：000574473700016

第 82 篇

标　　题：Improving The User Acceptability Of Advanced Driver Assistance Systems Based On Different Driving Styles: A Case Study Of Lane Change Warning Systems

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期　　刊：IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS

摘　　要：The low user acceptability of advanced driver assistance systems (ADASs) is one of the fundamental problems limiting their wider adoption. One of the key factors affecting the frequency of warning signals is the standard warning thresholds set in ADASs, which may not be compatible with all drivers owing to various driver characteristics affecting their cognition of risk, such as comfort, skill, and experience. The present study focuses on the lane change warning (LCW) system to evaluate driving styles according to the perception of lane change risk, and determine appropriate warning thresholds corresponding to the different driving styles. A theoretical lane change warning model is established to calculate the deceleration required for the rear approaching vehicle in the target lane. The results of risk assessment experiments

conducted on an actual expressway using 15 proficient drivers are employed to evaluate the risk cognitions of the participants, where the participants are divided into four different driving styles according to their adaptive warning thresholds, which are denoted as very low threshold, low threshold, medium threshold, and high threshold driving styles. Signal detection theory is then employed to determine lane change warning thresholds appropriate to the different driving styles. Our results clearly demonstrate the disparate perceptions of lane change risk for the different drivers. Therefore, the LCW system should adopt different warning thresholds for different drivers according to their driving style. The findings provide evidence supporting the exploitation of driving styles for adopting different warning thresholds in the LCW system to enhance its user acceptability.

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第 83 篇

标　　题： Aerodynamic-Aware Coordinated Control Of Following Speed And Power Distribution For Hybrid Electric Trucks

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期　　刊： ENERGY

摘　　要： In a truck platoon, a smaller inter-vehicle gap reduces aerodynamic drag, which is beneficial for energy savings, but can also elevate the risk of crashing against the lead vehicle. Therefore, a reasonable speed for the following truck should be planned to balance safety and energy consumption. Moreover, for hybrid electric trucks, optimizing the power split among different energy sources also contributes to energy savings. Following distance and power distribution are therefore coupled. To achieve cost savings in a hybrid truck following situation, a co-optimization should be performed on speed planning and power split to achieve an optimal trade-off between safety, drag reduction, and energy consumption. In this paper, such an approach is developed and analyzed. Model predictive control is adopted to implement the optimization strategy. Real-world speed profiles are used to assess the proposed method, and the results demonstrate that the coordinated control method outperforms a manual following strategy by flexibly tuning the following distance, resulting in cost savings of about 5.2%. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000571208700005

第 84 篇

标　　题： The Effect Of Image Recognition Traffic Prediction Method Under Deep Learning And Naive Bayes Algorithm On Freeway Traffic Safety

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期　　刊： IMAGE AND VISION COMPUTING

摘　　要： In order to study and predict the freeway traffic safety and realize the traffic flow in the nonlinear big data environment, based on deep learning, the long-short-time memory (LSTM) model based on recurrent neural network is proposed. The traffic flowis predicted and the predicted value of traffic flow is comparedwith the actual value at different times. The mean absolute percentage error of LSTM prediction model is tested and compared with the error of time proximity, periodicity, and trend. At the same time, the naive Bayes algorithm is used to carry out image recognition processing for attributes such as license plate number and vehicle color to conduct vehicle matching. The data processing, training process, and model realization of the model are studied, and the accuracy of the naive Bayesian algorithm is tested. The results show that the predicted value of the traffic flow prediction model based on LSTM is not much different from the actual value. The average prediction error for the period from May 7, 2018 to May 9, 2018 is approximately 13.8%. When the time series is 6, the error of the predictionmodel based on LSTMis 10.72%, and the prediction errors of the three sequences of time proximity, periodicity, and trend are 15.66%, 17.59%, and 20.67%, respectively. Considering the three sequences comprehensively, the prediction model can achieve good prediction effect. The accuracy of the vehicle matching model based on naive Bayes is about 82.7%, which can meet the requirements of the system. Therefore, it can be concluded that the LSTM traffic flow prediction model based on deep learning and the image recognition vehicle matching model based on naive Bayes can realize the traffic safety prediction of freeway, which has great practical significance. (c) 2020 Published by Elsevier B.V.

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第 85 篇

标　　题： Effect Of Isopropanol And N-Pentanol Addition In Diesel On The Combustion And Emission Of A Common Rail Diesel Engine Under Pilot Plus Main Injection Strategy

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期　　刊： ENERGY REPORTS

摘　　要： In this study, isopropanol and n-pentanol are blended in diesel with 20% ratio by volume, named D80IP20 and D80NP20. Their combustion and emission performances were compared with diesel on a four cylinder common rail diesel engine under pilot plus main injection strategy. The pilot injection duration decreases and the main injection duration increases with engine loads. For test fuels, the starts of pilot and main injection and the durations of pilot injection are remained unchanged in each engine operation. D80IP20 has the longest ignition delay due to the lowest cetane number and the shortest combustion duration due to the highest fuel oxygen. However, the peak

combustion temperature of D80IP20 is lower than that of D80NP20 under double injection strategy. Compared to diesel, both D80IP20 and D80NP20 obviously reduce the particle number concentrations (PNCs) and the particle volume concentrations (PVCs), while increase the NOx emissions. D80IP20 has the lowest PNCs and PVCs and its number geometric mean diameter (NGMD) and volume geometric mean diameter (VGMD) are the lowest among the three fuels. D80IP20 has higher NOx emission than diesel, but lower than D80NP20 due to lower PCT. Further, D80IP20 with 10% EGR can achieve the simultaneous reduction for NOx emission and PNCs at low and high loads compared to diesel without EGR. Results indicate that blending isopropanol in diesel has better effects in combustion improvement and emission control and is more suitable than n-pentanol under pilot plus main injection strategy. (C) 2020 The Authors. Published by Elsevier Ltd.

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第 86 篇

标　　题： Influence Of Water Port Injection On Cycle-To-Cycle Variations In Heavy-Duty Natural Gas Engine Under Low Load

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期　　刊： FUEL

摘　　要： Water injection is regarded as an effective approach to decrease thermal load and suppress knock onset in heavy-duty natural gas engines. However, the cycle-to-cycle variations in heavy-duty natural gas engines via water injection has rarely been investigated. In this study, the effects of water port injection on cycle-to-cycle variations in a natural gas engine were analyzed experimentally. The engine speed was fixed at 1600 r/min, and engine load was set at a low load with a brake mean effective pressure of 0.387 MPa. Three excess air-fuel ratios (lambda = 1.0, 1.2, and 1.4) were defined; and four water to natural gas mass ratios (WNMRs) were set. The results demonstrated that the variations of multicycle cylinder pressure traces consistently increased with the increase in WNMR. The interdependence between the peak in-cylinder pressure (P-max) and its corresponding crank angle became more dispersed, and the frequency distribution of P-max covered a wider range with increasing WNMR. The obvious fluctuations and wide range of distribution of indicated mean effective pressure (IMEP) were determined by water addition. The higher the lambda, the larger the fluctuations and wider the range of distribution of IMEP. The coefficient of variation of IMEP (COVIMEP) increased with the increase in WNMR and lambda. However, the maximum COVIMEP among the three lambda s and four WNMRs did not exceed 3%. Thus, it can be concluded that no drivability problem is associated with water injection under low load.

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第 87 篇

标　　题：Optimal Vehicle Size And Driving Condition For Extended-Range Electric Vehicles In China: A Life Cycle Perspective

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期　　刊：PLOS ONE

摘　　要：Many researchers use life cycle assessment methodology to investigate the energy and environmental impacts of energy-saving and new energy vehicles. However, in the context of China, the life cycle energy-saving and emission-reduction effects of extended-range electric vehicles (EREVs), and the optimal applicable vehicle size and driving conditions for EREVs have been rarely studied. In this study, based on the life cycle assessment theory, the resource consumption, energy exhaustion, and environmental impact of EREVs were comprehensively analyzed. In addition, a differential evaluation model of ecological benefits was established for comparing EREVs with other vehicles with different power sources. Finally, scenario analysis was performed in terms of different vehicle sizes and driving conditions. The results have shown that EREV has great advantages in reducing mineral resource consumption and fossil energy consumption. The consumption of mineral resources of EREV is 14.68% lower than that of HEV, and the consumption of fossil energy is 34.72% lower than that of ICEV. In terms of environmental impact, EREV lies in the middle position. The scenario analysis has revealed that, for EREV in China, the optimal vehicle size is the passenger car and the optimal driving condition is the suburban condition. This work helps to understand the environmental performance of EREVs in China and may provide a decision-making reference for the government.

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第 88 篇

标　　题：Learning The Car-Following Behavior Of Drivers Using Maximum Entropy Deep Inverse Reinforcement Learning

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：The present study proposes a framework for learning the car-following behavior of drivers based on maximum entropy deep inverse reinforcement learning. The proposed framework enables learning the reward function, which is represented by a fully connected neural network, from driving data, including the speed of the driver's vehicle, the distance to the leading vehicle, and the relative speed. Data from two field tests with

42 drivers are used. After clustering the participants into aggressive and conservative groups, the car-following data were used to train the proposed model, a fully connected neural network model, and a recurrent neural network model. Adopting the fivefold cross-validation method, the proposed model was proved to have the lowest root mean squared percentage error and modified Hausdorff distance among the different models, exhibiting superior ability for reproducing drivers' car-following behaviors. Moreover, the proposed model captured the characteristics of different driving styles during car-following scenarios. The learned rewards and strategies were consistent with the demonstrations of the two groups. Inverse reinforcement learning can serve as a new tool to explain and model driving behavior, providing references for the development of human-like autonomous driving models.

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WOS 号： 000600047400003

第 89 篇

标　　题： Multimode Traffic Travel Behavior Characteristics Analysis And Congestion Governance Research

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： The rapid aggregation of modern urban population and the rapid growth of car travel lead to traffic congestion, environmental pollution, and other problems. In view of the limited land resources in our country, it is impractical to meet residents' travel demand by blindly increasing traffic supply. Therefore, addressing the urban road congestion problem for sustainable development of modern cities, the paper makes research on residents' travel behavior characteristics and travel preference under the condition of multimodal transportation to formulate reasonable traffic demand management strategy for the guide on public traffic demand, bus priority strategy, and congestion management. The operation characteristic of each transportation mode is analyzed by comparing its related traffic and economic characteristics. Multimode traffic choice behavior is discussed by establishing multiple logistic regression models to analyze the main influencing factors to travelers' social and economic attributes, travel characteristics, and preference based on travel survey data of urban residents. The paper proposes the development of an urban public transportation system and travelling mode shift from cars to public transportation as reasonable travel structure for congestion management and sustainable development of modern cities.

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WOS 号： 000597935200003

第 90 篇

标　　题： Determination Of Curve Speed Zones For Mountainous Freeways

作　　者：[Liu, Yongtao; Qiao, Jie; Hu, Yanting; Fang, Tengyuan; Han, Yi] Changan Univ, Sch Automobile, Xian 710064, Peoples R China; [Xu, Ting] Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China; [Xiang, Yusheng] Karlsruhe Inst Technol, Inst Vehicle Syst Technol, D-76131 Karlsruhe, Germany

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Different vehicular speed limits may have an impact on the balance between safety and efficiency of travel on mountainous road corners associated with complex road conditions. Placing suitable speed limit warning signs does not merely effectively improve traffic safety but can also improve traffic efficiency. In this study, a global positioning system (GPS) terminal and Metrocount were used to collect vehicle speed data from more than 40 provincial-level curves in 8 provinces over the course of 1 year. Each road data collection time-period lasted approximately 8 hours. A descriptive statistics method was adopted by means of data screening and pretreatment. Additionally, both a velocity difference estimation model was established and a linear model of velocity differential estimation was constructed. Quantitative analysis was carried out on the safe speed, the driver's expected speed, and the location of the speed limit warning signs. This demonstrated a positive correlation with the initial speed. When the difference in speed was greater than 15 km/h, a safety warning sign was required to limit the design speed to 80 km/h. A safety warning sign was also required when the corner radius was less than 300 m. The location of safety warning signs could be calculated based on the operating speed and taking driving safety and the visual range of drivers into consideration. The results can provide a theoretical reference for setting up appropriate safe speed limiting signs on road corners in mountainous areas.

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WOS 号：000598345700008

第 91 篇

标　　题：Global Sensitivity Analysis For Multivariate Output Model And Dynamic Models

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期　　刊：RELIABILITY ENGINEERING & SYSTEM SAFETY

摘　　要：Global sensitivity analysis has mainly been analyzed for scalar output and static models, though many mathematical and computational models used in engineering produce multivariate output that show some degree of correlation, and most physical systems are dynamic models. This paper focuses on global sensitivity analysis for multivariate output and dynamic models and a novel procedure is proposed to research

the influence of inputs and model modes on the synthetic uncertainty of output. Introducing an additional variable to represent the variation of model modes which is viewed as model framework uncertainty, the variance decompositions of multivariate output and dynamic models are obtained and the significance of variance contributions is presented in detail. Two numerical examples and two practical models are employed to illustrate the validity and usefulness of the novel global sensitivity analysis approach.

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WOS 号： 000583913400055

第 92 篇

标　　题： Robust Predictive Torque Control Of Permanent Magnet Synchronous Machine Using Discrete Hybrid Prediction Model

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期　　刊： IEEE TRANSACTIONS ON ENERGY CONVERSION

摘　　要： In the prediction stage of finite control set-predictive torque control for permanent magnet synchronous machine (PMSM), the mismatched parameters will inevitably bring about the predictive errors, which will cause the wrong selection of voltage vector in the optimization stage, and even affect the stability of the entire control system. In order to eliminate the prediction errors, a discrete hybrid prediction model-based predictive torque control (DHPM-PTC) of PMSM is proposed to improve robustness. In the stator current prediction model, the traditional open-loop prediction model is abandoned, and the closed-loop model prediction equation is established. In the stator flux prediction model, this article gets rid of the traditional open-loop integral prediction model, and establishes the closed-loop flux prediction model integrating the current model and the voltage model. Secondly, the stability and parameter design principles of the closed-loop current prediction model and the closed-loop flux prediction model are discussed. Finally, the verification of the proposed algorithm is made on a PMSM test platform. The test results indicate that the proposed DHPM-PTC is superior to the traditional predictive torque control (T-PTC) in dynamic, steady and robust performances.

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WOS 号： 000594377000054

第 93 篇

标　　题： Effects Of Injection Timing And Rail Pressure On Combustion Characteristics And Cyclic Variations Of A Common Rail Di Engine Fuelled With F-T Diesel Synthesized From Coal

作　　者： [Geng, Limin; Li, Shijie; Xiao, Yonggang; Xie, Yuantao; Chen, Hao] Changan Univ, Sch Automobile, Xian 710064, Peoples R China; [Chen, Xubo] Chongqing Vehicle Test & Res Inst Co, Chongqing 401122, Peoples R China

通讯作者： Geng, LM (corresponding author), Changan Univ, Sch Automobile, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF THE ENERGY INSTITUTE

摘　　要： The use of Fischer-Tropsch (F-T) diesel synthesized from coal in automobiles can alleviate the shortage of petroleum and promote clean utilization of coal. In this study, the effects of injection timing (IT) and rail pressure (RP) on the brake thermal efficiency (BTE), combustion characteristics, and cyclic variations of F-T diesel were investigated on a turbocharged, 6-cylinder, common rail direct injection (CRDI) diesel engine. The results indicate that increasing RP results in higher BTE, whereas advancing IT results in an initial BTE increase and a subsequent BTE decrease. In comparison with petroleum diesel, the BTE of F-T diesel increased by 0.54% on average and by a maximum of 1% under different conditions. When the IT was advanced from 2 degrees CA to 18 degrees CA BTDC, the ignition delay periods (IDP) first decreased and then increased, whereas the combustion durations (CD) first lengthened and then shortened; peak cylinder pressure (PCP), peak pressure rise rate (PPRR), and peak combustion temperature (PCT) gradually increased; peak heat release rate (PHRR) first decreased and then increased at the low loads, whereas it always increased at medium and high loads. In comparison with petroleum diesel, the IDP of F-T diesel decreased by 22-31% at various conditions, and the CD was slightly longer than that of petroleum diesel at most conditions. Additionally, increasing RP resulted in a decrease in the IDP and CD, and a significant increase in PCP, PPRR, PHRR, and PCT. At low loads, the PPRR and PHRR of F-T diesel were 32.72% and 32.13% lower than that of diesel owing to the shorter ignition delay. This implies that using F-T diesel can help in attaining smoother engine running and has lower combustion noise. Advancing the injection timing or increasing the engine loads can decrease the cyclic variations, whereas increasing rail pressure results in the increment of COVp(max) at low loads and the significant decrement of COVp(max) at medium and high loads. In comparison with petroleum diesel, F-T diesel exhibits higher combustion stability owing to the better volatility and higher fuel reactivity. (C) 2020 Energy Institute. Published by Elsevier Ltd. All rights reserved.

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第 94 篇

标　　题： Analysis Of Pedestrian Street-Crossing Decision-Making Based On Vehicle Deceleration-Safety Gap

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通讯作者： Wang, C (corresponding author), Changan Univ, Sch Automobile, Xian 710064, Peoples R China.

期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Numerous traffic crashes occur every year on zebra crossings in China. Pedestrians are vulnerable road users who are usually injured severely or fatally during human-vehicle

collisions. The development of an effective pedestrian street-crossing decision-making model is essential to improving pedestrian street-crossing safety. For this purpose, this paper carried out a naturalistic field experiment to collect a large number of vehicle and pedestrian motion data. Through interviewed with many pedestrians, it is found that they pay more attention to whether the driver can safely brake the vehicle before reaching the zebra crossing. Therefore, this work established a novel decision-making model based on the vehicle deceleration-safety gap (VD-SGM). The deceleration threshold of VD-SGM was determined based on signal detection theory (SDT). To verify the performance of VD-SGM proposed in this work, the model was compared with the Raff model. The results show that the VD-SGM performs better and the false alarm rate is lower. The VD-SGM proposed in this work is of great significance to improve pedestrians' safety. Meanwhile, the model can also increase the efficiency of autonomous vehicles.

DOI： 10.3390/ijerph17249247

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第 95 篇

标　　题： Model Predictive Torque Control For Permanent Magnet Synchronous Motor Based On Dynamic Finite-Control-Set Using Fuzzy Control

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通讯作者： Li, YH (corresponding author), Changan Univ, Key Lab Automot Transportat Safety Enhancement Te, Minist Commun, Middle Sect South Er Huan Rd, Xian 710064, Peoples R China.

期　　刊： ENERGY REPORTS

摘　　要： Aiming at the problem of fixed candidate voltage vector (VV) in conventional finite-control-set (FCS) model predictive torque control (MPTC) of permanent magnet synchronous motor (PMSM), fuzzy control is use to determine dynamic candidate VVs based on effects of the value and angle of applying VV on stator flux and torque. The inputs of fuzzy controller are errors of stator flux and torque and outputs are 3 candidate VVs. Simulation results show compared with conventional FCS-MPTC, the proposed strategy can decrease stator flux and torque's ripples and calculation burden of MPTC, but it will increase average switching frequency. In order to decrease average switching frequency, zero VV is also used as candidate VV, but it will decrease dynamic torque response. Thus the method that zero VV is used only at steady state is given. Simulation results show the control performance of the system remains basically unchanged and the average switching frequency is reduced. (C) 2020 The Author(s). Published by Elsevier Ltd.

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第 96 篇

标　　题： Simplified Multi-Step Predictive Control For Surface Permanent Magnet Synchronous

Motor

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期　　刊：ENERGY REPORTS

摘　　要：Aiming at reducing computational complexity in the multi-step model predictive torque control (MPTC), a novel simplified multi-step MPTC algorithm (P-MPTC) was proposed. Firstly, a multi-step MPTC model was established, and the computational burden of the traditional MPTC (T-MPTC) was discussed. Secondly, based on the MPTC with simplified voltage set (S-MPTC), a simplified MPTC with voltage holding approach (P-MPTC) was proposed, which avoided enumerating all the voltage vectors in candidate set to simplify the computation. Finally, the proposed MPTC algorithm was compared with T-MPTC and S-MPTC to analyze the differences of control performance and computational burden. The result shows that, the proposed simplified algorithm can greatly reduce the computational complexity of multi-step MPTC while the control performance almost not change. For example, in the six-step MPTC, the computational burden in the proposed simplified algorithm is only 0.02% of that in the traditional algorithm, which verifies the effectiveness of the proposed algorithm. (C) 2020 The Authors. Published by Elsevier Ltd.

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WOS 号：000604392100052

第 97 篇

标　　题：Model Predictive Torque Control Of Pmsm Based On Data Drive

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通讯作者：Li, YH (corresponding author), Changan Univ, Key Lab Automot Transportat Safety Enhancement Te, Minist Commun, Middle Sect, South Er Huan Rd, Xian 710064, Peoples R China.

期　　刊：ENERGY REPORTS

摘　　要：Aiming at the problem of bad real-time performance caused by the large calculation of the finite control set model predictive torque control(MPTC), a data-driven method for MPTC of the permanent magnet synchronous motor(PMSM) is proposed. The data produced by PMSM-MPTC system are used to train DNN to learn its selective laws and then replace it to select the optimal voltage vector. This paper also analyzes the data-driven out-of-control problems caused by the difference between the steady data and dynamic data of the MPTC and solves the above issue by extending and balancing the data set, which further proves the feasibility of the data-driven MPTC. The simulation experiments show that the torque ripple, stator flux ripple and the system switching frequency of the data-driven MPTC are further reduced, indicating has

certain superiority. (C) 2020 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/). Peer-review under responsibility of the scientific committee of the 7th International Conference on Power and Energy Systems Engineering (CPESE 2020).

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WOS 号： 000604392100188

第 98 篇

标　　题： Dead-Beat Control Of Permanent Magnet Synchronous Motor Based On Extended Voltage Vectors Set

作　　者： [Li Yaohua; Zhou Yifan; Zhao Chenghui; Qin Yugui] Changan Univ, Middle Sect, Minist Commun, Key Lab Automot Transportat Safety Enhancement Te, South Er Huan Rd, Xian 710064, Shaanxi, Peoples R China

通讯作者： Li, YH (corresponding author), Changan Univ, Middle Sect, Minist Commun, Key Lab Automot Transportat Safety Enhancement Te, South Er Huan Rd, Xian 710064, Shaanxi, Peoples R China.

期　　刊： ENERGY REPORTS

摘　　要： Simplified models to calculate the change of stator flux and torque of permanent magnet synchronous motor (PMSM) on stator flux coordinate system are proposed. In order to solve high torque ripples of PMSM direct torque control (DTC) system, dead-beat (DB) control of stator flux and torque is proposed. The calculation of ideal voltage vector (VV) for the DB control of stator flux and torque using simplified models are given, and a simplified VV selecting method is used to implement the DB control. In order to improve control performances, a novel way to expand VVs based on both angle and amplitude is proposed. The angle and amplitude of ideal VV are used to determine the angle and amplitude of output VV and the look-up table is used to generate output VVs. Simulation results show this novel method can decrease stator flux and torque ripples dramatically, but increase switching frequency. (C) 2020 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/). Peer-review under responsibility of the scientific committee of the 7th International Conference on Power and Energy Systems Engineering, CPESE, 2020.

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WOS 号： 000604392100189

第 99 篇

标　　题： An Automatic Emergency Braking Model Considering Driver'S Intention Recognition Of The Front Vehicle

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Driver's intention of the front vehicle plays an important role in the automatic emergency braking (AEB) system. If the front vehicle brakes suddenly, there is potential collision risk for following vehicle. Therefore, we propose a driver's intention recognition model for the front vehicle, which is based on the backpropagation (BP) neural network and hidden Markov model (HMM). The brake pedal, accelerator pedal, and vehicle speed data are used as the input of the proposed BP-HMM model to recognize the driver's intention, which includes uniform driving, normal braking, and emergency braking. According to the recognized driver's intention transmitted by Internet of vehicles, an AEB model for the following vehicle is proposed, which can dynamically change the critical braking distance under different driving conditions to avoid rear-end collision. In order to verify the performance of the proposed models, we conducted driver's intention recognition and AEB simulation tests in the cosimulation environment of Simulink and PreScan. The simulation test results show that the average recognition accuracy of the proposed BP-HMM model was 98%, which was better than that of the BP and HMM models. In the Car to Car Rear moving (CCRm) and Car to Car Rear braking (CCRb) tests, the minimum relative distance between the following vehicle and the front vehicle was within the range of 1.5 m-2.7 m and 2.63 m-5.28 m, respectively. The proposed AEB model has better collision avoidance performance than the traditional AEB model and can adapt to individual drivers.

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WOS 号：000601120100001

第 100 篇

标　　题：Real-Time Estimation And Prediction Of Lateral Stability Of Coaches: A Hybrid Approach Based On Ekf, Bpnn, And Online Autoregressive Integrated Moving Average Algorithm

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期　　刊：IET INTELLIGENT TRANSPORT SYSTEMS

摘　　要：This study aimed to develop a coach state estimation and prediction system to enhance driving safety. Different from existing vehicle stability estimation studies, the authors propose a hybrid method to estimate and predict the state of a coach in real time. First, the vehicle sideslip angle and yaw rate are estimated by a three-degrees-of-freedom vehicle model combined with an extended Kalman filter (EKF) estimation algorithm. Then, a steering system is established that replaces the front-wheel angle with the steering wheel input torque. Next, a seven-degrees-of-freedom vehicle model analyses the effects of various driving influencing factors on the vehicle sideslip angle and the boundary of the stable region of the phase plane of the vehicle sideslip angle rate, and a boundary value parameter database is obtained. A back propagation neural network (BPNN) model is then established to obtain the boundary function parameter values

under multifactor coupling conditions. Furthermore, an online prediction of the steering wheel input torque in a time series is done, and the prediction value is input to the steering system and neural network model. The effectiveness of the proposed method was evaluated via simulations based on MATLAB/Simulink and TruckSim software.

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WOS 号： 000619167800017

第 101 篇

标　　题： A 3D Image Reconstruction Model For Long Tunnel Geological Estimation

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通讯作者： Qiao, J (corresponding author), Changan Univ, Sch Automobile, Xian 710064, Peoples R China.; Xu, T (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Long tunnels often collapse during the construction period. To ensure personnel safety, the geological characteristics must be predicted before tunnel face excavation. In this study, the ground-penetrating radar (GPR) technique is introduced to obtain information regarding the tunnel excavation face at a certain interval. The amplitude of the radar echo signal is expressed as a function of the position and travel time. A B-scan strategy is selected for the GPR to obtain tunnel information. A frequency-domain (w-k) focusing algorithm, namely, a synthetic aperture radar focusing algorithm, is applied to focus scattered radar signals to obtain focused images. A low-pass filter is designed to remove noises from the original signals. The contours of target objects are extracted from the background information using the edge detection technique. Space coordinate values of the objects are converted to polar coordinates using the Hough transform algorithm for 3D modeling. Visual C++ and AutoCAD are combined to develop a 3D CAD model to help managers in controlling the construction process. The system creates 3D visualization model images and evaluates the geological characteristics of the tunnel excavation faces. The Taigu Tunnel located in the Shanxi Province of China is taken as a case study. A procedure for the geological analysis of this tunnel is introduced in detail, and a 3D image model is built. The results show that the 3D model can help predict rock compositions and locate potential hazards. Moreover, it has better accuracy than conventional models and can be applied to similar transportation construction projects.

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WOS 号： 000607918400002

信息工程学院

第 1 篇

标　　题：Efficient Privacy-Preserving Data Sharing For Fog-Assisted Vehicular Sensor Networks

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通讯作者：Ming, Y (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊：SENSORS

摘　　要：Vehicular sensor networks (VSNs) have emerged as a paradigm for improving traffic safety in urban cities. However, there are still several issues with VSNs. Vehicles equipped with sensing devices usually upload large amounts of data reports to a remote cloud center for processing and analyzing, causing heavy computation and communication costs. Additionally, to choose an optimal route, it is required for vehicles to query the remote cloud center to obtain road conditions of the potential moving route, leading to an increased communication delay and leakage of location privacy. To solve these problems, this paper proposes an efficient privacy-preserving data sharing ((EPDS)-D-2) scheme for fog-assisted vehicular sensor networks. Specifically, the proposed scheme utilizes fog computing to provide local data sharing with low latency; furthermore, it exploits a super-increasing sequence to format the sensing data of different road segments into one report, thus saving on the resources of communication and computation. In addition, using the modified oblivious transfer technology, the proposed scheme can query the road conditions of the potential moving route without disclosing the query location. Finally, an analysis of security suggests that the proposed scheme can satisfy all the requirements for security and privacy, with the evaluation results indicating that the proposed scheme leads to low costs in computation and communication.

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WOS 号：000517790100188

第 2 篇

标　　题：Multi-Objective Quantum Inspired Evolutionary Slm Scheme For Papr Reduction In Multi-Carrier Modulation

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通讯作者：Wang, W; Zhang, Y (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊：IEEE ACCESS

摘　　要：As an efficient wireless transmission technology, multi-carrier communication find its way in many applications. However, high peak to average power ratio (PAPR) of the signal degrades the system performance. Selected mapping is a distortion-less scheme that can reduce the PAPR dramatically without spectrum loss, while its realization requires solving an integer-programming problem (NP-hard problem). To remedy this, a novel multi-objective quantum inspired evolutionary based scheme is proposed in the paper. With objective fitness function characteristics ranking, angle increment updating and information sharing, the new scheme can dramatically reduce the search iterations. Simulation results show that proposed evolutionary scheme can achieve a significant

improvement with a low complexity.

DOI： 10.1109/ACCESS.2020.2971633

WOS 号： 000524662200009

第 3 篇

标　　题： An Image Encryption Scheme Based On Hyper Chaotic System And Dna With Fixed Secret Keys

作　　者： [Liu, Lidong; Wang, Dan; Lei, Yuhang] Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China

通讯作者： Wang, D (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： A novel image encryption scheme combining the 5D hyper chaotic system and DNA technology is proposed in this paper. The proposed scheme is related to the plaintext and external secret key, which does not need to manage the huge amounts of dynamic secret keys and does not to design synchronization method as the one-time-pad encryption scheme. The proposed scheme consists of four parts: pixel-level diffusion, pixel-level permutation, DNA-level diffusion and second permutation. In pixel-level diffusion process, chaotic sequences iterated by 5D hyper chaotic system with initial values (which are set as secret keys) are used to rewrite the pixel values of plaintext image and they are also used to generate second permutation rule. Then the pixel-level permutation rules are obtained by chaotic system with modified initial values that are related to the plaintext image and external secret key. In this case, the permutation rules are different when the plaintext images are different. In the DNA-level diffusion process, we select a part of pixel values of the pixel-level permutated image and external secret key to generate key streams used in DNA-level diffusion process. In this case, the decryption part can obtain the selected pixel values during the decryption process, which avoids transmitting huge secret keys and synchronizing them with plaintext images. In the second permutation, we rearrange the position of the selected pixel values, which can enhance the security of the proposed scheme. Finally, experimental results and security analysis verify that the proposed scheme can achieve good encryption effect and resist various attacks.

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WOS 号： 000524575400030

第 4 篇

标　　题： A Fast Chaotic Image Encryption Scheme With Simultaneous Permutation-Diffusion Operation

作　　者： [Liu, Lidong; Lei, Yuhang; Wang, Dan] Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China

通讯作者： Lei, YH (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： In this paper, a secure and fast chaotic image encryption scheme with simultaneous

permutation-diffusion operation is proposed. We combine permutation and diffusion processes into a whole, namely, simultaneous permutation and diffusion operation (SPDO). This can solve the problem of traditional encryption scheme in which the permutation and diffusion are two independent processes, that leads attackers to crack the two processes separately. In SPDO, the initial value of the current Sine-Sine chaotic map is related to the secret keys and the previous encrypted pixels' values. In this case, the proposed scheme can generate dynamic key streams and indexes that are related to plaintext, which improves the sensitivity to plaintext for the encryption scheme. In addition, the pixel values are processed by row and column (row-level and column-level) during the encryption procedure. Thus, the proposed scheme presents lower time complexity and faster running speed compared with bit-level or pixel-level image encryption schemes, which makes the proposed scheme be conducive to the batch transmission and real-time transmission of digital images. The simulation results and security analysis show that our scheme can resist common attacks, such as statistical attack, differential attack, chosen plaintext attack and other comprehensive attacks.

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WOS 号： 000525466900069

第 5 篇

标　　题： Exploiting Deeply Supervised Inception Networks For Automatically Detecting Traffic Congestion On Freeway In China Using Ultra-Low Frame Rate Videos

作　　者： [Sun, Zhu; Wang, Ping; Jin, Yinli] Changan Univ, ITSER, Xian 710064, Peoples R China; [Sun, Zhu] Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China; [Wang, Ping; Peng, Xiaoyu; Jin, Yinli] Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China; [Wang, Jun] Toll Collect Ctr Shaanxi Freeway, Xian 710021, Peoples R China

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期　　刊： IEEE ACCESS

摘　　要： Traffic congestion detection plays an important role for road management. However, it is difficult to automatically report traffic congestion when it occurs in large-scale road network. One of key challenges for rapidly and precisely identifying early congestion is huge variations in appearance caused by illumination, weather, camera settings and other traffic conditions. To address it, we proposed a traffic-oriented model to classify congestion from large dataset of ultra-low frame rate video captured from traffic surveillance system. The proposed deeply supervised traffic congestion detector has two modules: attention proposal module and deeply supervised inception network. Specifically, within the shallow layers, the binary edge/corner density features are used in attention proposal module to generate the rang of interest (ROI) mask automatically. This strategy keeps the training process focusing on the congestion features without disturbances. Following the attention proposal module, a very deep structure based on the inception network was used together to effectively extract rich and discriminative

features then detect traffic congestion. The approach was tested on a self-established dataset based on empirical data, which contains images captured from 14470 surveillance cameras for monitoring 5,215 km of freeway in Shaanxi province, China. The experimental results show that the accuracy of the proposed method could reach 95.77% considering various disturbances, conditions and other limitations, which is improved than unsupervised networks.

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WOS 号： 000525391900049

第 6 篇

标　　题： Local Codes With Cooperative Repair In Distributed Storage Of Cyber-Physical-Social Systems

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期　　刊： IEEE ACCESS

摘　　要： Integrating cyber, physical, and social spaces together, cyber-physical-social systems (CPSS) bring more conveniences to humans. For practical applications and user convenience, it is essential that the Big Data produced in CPSS be stored in the distributed storage systems of CPSS. In this paper, we study the fault tolerance scheme for distributed storage systems of CPSS, and propose a framework that can recover multiple failed nodes simultaneously. Considering the reliability of storage nodes in distributed storage systems, the research on locally repairable codes has mostly focused on repairing failed nodes within each repair group. However, when entire repair groups have failed, existing locally repairable codes cannot repair more than one failed group. In this paper, local codes with cooperative repair that can recover more than one failed group are proposed. Specifically, the proposed local codes are constructed based on minimum storage regenerating (MSR) codes, and have an interleaving structure among the local codes, so that the parity symbols of any local code can be generated from the MSR codes in its two adjacent local codes. Taking advantage of this property, more than one failed local group can be repaired cooperatively by their adjacent local groups with lower repair locality. Furthermore, the key parameters of local codes with cooperative repair are derived. Theoretical analysis and simulation results show that, compared with previous codes with local regeneration, our codes have higher bandwidth overhead when repairing failed nodes, but advantages in storage overhead and repair locality either for repair of a single failed node or one failed local group. Moreover for a single failed local group, local codes with cooperative repair achieve almost the same tradeoff curve of storage overhead and bandwidth overhead as MSR-local codes and minimum bandwidth regenerating local (MBR-local) codes.

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WOS 号： 000525545900096

第 7 篇

标　　题： A Multistage Full In Phase P-Stable Scheme With Optimized Properties

作　　者： [Shi, Xin] Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China; [Simos, Theodore E.] King Saud Univ, Coll Sci, Dept Math, POB 2455, Riyadh 11451, Saudi Arabia; [Simos, Theodore E.] Ural Fed Univ, Grp Modern Computat Methods, 19 Mira St, Ekaterinburg 620002, Russia; [Simos, Theodore E.] Neijiang Normal Univ, Data Recovery Key Lab Sichuan Prov, Dongtong Rd 705, Neijiang 641100, Peoples R China; [Simos, Theodore E.] Democritus Univ Thrace, Dept Civil Engn, Sect Math, Xanthi, Greece

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期　　刊： MATCH-COMMUNICATIONS IN MATHEMATICAL AND IN COMPUTER CHEMISTRY

摘　　要： A fourteen algebraic order P-stable symmetric four-stages two-step scheme with zeroing phase-lag and it's derivatives up to order three, is constructed, for the first time in the literature, in this paper. The new four-stages method is built based on the following procedure: Gratification of the conditions for the characteristic of the P-stability (necessary and sufficient). Gratification of the condition of the zeroing of the phase-lag. Gratification of the junctures of the zeroing of the derivatives of the phase-lag up to order three. The above procedure leads to the construction, for the first time in the literature, of a four-stages P-stable fourteen algebraic order symmetric two-step method with phase-lag and its first, second and third derivatives equal to zero. For the newly introduced method, a numerical and theoretical analysis is presented, which consists of the following stages: the construction of the newly introduced four-stages method, the feat of the determination of its local truncation error (LTE), the development of the asymptotic form of the LTE of the newly introduced four-stages method, the determination of the stability and interval of periodicity of the newly introduced four-stages method, the determination of an embedded algorithm and the definition of the variable step methodology for the foundation of the step sizes, the estimation of the computational effectiveness of the newly introduced four- stages method which consists of its application on: the resonance problem of the radial Schrodinger equation and on: - the system of the coupled differential equations arising from the Schrodinger equation. Based on the above research, we conclude that the newly introduced four-stages method is more efficient than the existed ones.

WOS 号： 000529089500010

第 8 篇

标　　题： Research On Steering-Following System Of Intelligent Vehicle-In-The-Loop Testbed

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期　　刊：IEEE ACCESS

摘　　要：Intelligent Vehicle (IV) is expected to revolutionize the way vehicles operating in the next few decades. The most commonly used method to test the functionality of the IV is to use the IV testbed for operable and economic reasons. However, the traditional testbed only has the ability to test the longitudinal movement and is not capable of studying the lateral movement of the IV, which extremely restricts the developments of the IV testing technologies (e.g., IV lane-keeping and lane-changing testing). To this end, this paper presents a novel steering-following system (SFS) for the intelligent vehicle-in-the-loop (VIL) testbed. The SFS is able to obtain the real-time steering angle differences between the front wheels and the drum roller by two-pair laser distance sensors equipped on the testbed. Then the value and changing rate of the obtained real-time steering angle difference are set as the inputs of a fuzzy sliding mode control (FSMC) algorithm. The outputs of the FSMC algorithm are used to control the operation of the servo motors. With that, the testbed accurately tracks the steering maneuver of the IV at any time. A simulation-based experiment and a VIL-based experiment show that the designed SFS with the FSMC algorithm is able to provide accurate and stable tracking results for the IV steering maneuvers under different scenarios.

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WOS 号：000527684600102

第 9 篇

标　　题：A Novel Illumination-Insensitive Feature Extraction Method

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期　　刊：IEEE ACCESS

摘　　要：Image description is a great challenge in the field of computer vision under complex illumination condition. The complex illumination condition is usually unavoidable and unpredictable in real application. In this paper, we propose a novel generalized image descriptor, named as Anisotropy Weber Adapted Symmetric Ternary Pattern (AWASTP), which can overcome the directional inseparability of Weber Local Descriptor (WLD) and invariant threshold of Local Ternary Pattern (LTP). More particularly, we heighten the discriminative effectiveness of image description under complex illumination condition in several ways to restrain the effect of illumination variation. Firstly, a novel selection scheme for scale and angle is proposed. Based on this, an improved anisotropic Laplacian of Gaussian(ALOG) operator model is

established by introducing the scale and angle parameter, moreover, an Anisotropic Weber Local Descriptor (AWLD) is presented, which can achieve more rich detailed information of illumination-insensitive feature. Secondly, an Adaptive Symmetric Ternary Pattern (ASTP) algorithm is proposed based on Weber criterion to generate more accurate threshold judgment according to the region characteristics. Thirdly, a two-dimensional AWASTP histogram is created to enhance the discriminative power and represent illumination-insensitive feature description. We conduct many experiments on benchmark databases, such as CMUPIE, FERET, PhoTex, RawFoot, and etc. Experimental results demonstrate the effectiveness of the proposed approach under different illumination conditions.

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第 10 篇

标　　题： A Plaintext-Related Dynamical Image Encryption Algorithm Based On Permutation-Combination-Diffusion Architecture

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期　　刊： IEEE ACCESS

摘　　要： In this paper, a novel high security plaintext-related dynamical image encryption algorithm is proposed. Compared with the classical permutation-diffusion encryption architecture, we add the combination operation before the diffusion, which uses the 3D intertwining Logistic map (3D-ILM) to generate dynamic interference matrix with the same size of the grayscale plaintext image, and then combine the permutated image with interference matrix. It can be seen as an improvement to enhance the connection between permutation and diffusion operation, which makes adversaries are difficult to crack the permutation and diffusion algorithm separately. Besides, the permutated pixels are hidden in the dynamic interference matrix during the combination process, which reduces the correlation among local adjacent pixels. Thus, it can increase the resistance of chosen-plaintext attack. After the permutation, combination, and diffusion operation, a dynamic color cipher image is generated. Note that the generated color cipher image is dynamic changing even the same plaintext image is encrypted with identical secret keys. Ultimately, simulation results and security analysis show that the proposed algorithm has high-security performance and can resist most known common attacks.

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第 11 篇

标　　题： Omni-Directional Obstacle Detection For Vehicles Based On Depth Camera

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期　　刊： IEEE ACCESS

摘　　要： At present, the vehicle obstacle detection system usually uses different devices or sensors to perceive and obtain the obstacle information. However, omni-directional obstacle detection is difficult to realize because these devices or sensors are usually easy to be affected by environmental lighting and the material properties of the obstacle surface. Furthermore, most sensors have limited information regarding distance, which limits their application to omni-directional obstacle detection. To solve this problem, this paper proposes a method using depth camera for omni-directional obstacle detection. A method applying region growth for depth image and a fast inpainting method for depth image are proposed to extract and repair the obstacle regions in the depth images obtained by installing depth cameras around the car body. An improved method applying iterative normalized cut is also proposed to cluster and segment fragmentary and irregular obstacle regions to generate the complete obstacle regions. Finally, the obstacle regions are overviewed using a three-dimensional visualization method to realize omni-directional obstacle viewing. The results of experiments conducted in an environment with different obstacles during the day and night demonstrate that, compared with other methods, our proposed approach can effectively promote the ability to detect complex obstacles, and largely improve the detection speed; furthermore, obstacle detection using our method will be unaffected by environmental lighting. Each of these advantages provided by our method can significantly promote the driving safety of unmanned or other types of vehicles.

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WOS 号： 000541121800061

第 12 篇

标　　题： A Novel Uav Sensing Image Defogging Method

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期　　刊： IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING

摘　　要： Imaging of unmanned aerial vehicle easily suffer from haze, resulting in decline in the quality of required remote sensing images. The influence brings great challenges in later analysis and process. Although dark channel prior has acquired substantial achievements, some limitations, including imprecise estimation of atmospheric light, color distortion, and lower brightness of defogging image, still exist. In this article, to target these drawbacks, a novel defogging method for single image is proposed. First, a novel atmospheric scattering model is proposed to define the more accurate atmospheric light by introducing an adaptive variable strategy. Next, unlike traditional dark channel prior, a novel estimation method is presented by fusing dark and light

channels to estimate more precise atmospheric light and transmittance. Then, we adopt the gray image corresponding to color image as a guidance image to refine the transmittance to further decrease the time complexity. Aiming at the region of low transmittance, a novel compensation function is created to improve the region of low transmittance and avoid color distortion. Moreover, a simple and effective calculation method is proposed to determine parameters in compensation function. Finally, the clear remote sensing image is established by an improved atmospheric scattering model. Extensive experiments on real-world datasets demonstrate that the proposed method outperforms several other state-of-the-art approaches both on subjective and objective quality evaluations.

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WOS 号： 000544047400004

第 13 篇

标　　题： A Practical Weather Detection Method Built In The Surveillance System Currently Used To Monitor The Large-Scale Freeway In China

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期　　刊： IEEE ACCESS

摘　　要： Road weather conditions are closed-related to the transportation safety and traffic capacity. With the development of road surveillance systems, weather conditions could be recognized from video. However, it is hard to be detected by machine. To address it, a deeply supervised convolution neural network (DS-CNN) is designed and trained on a self-established dataset. The traffic image dataset includes five groups labeled with sunny, overcast, rainy, snowy and foggy. Each group has manually labeled and selected more than 2500 images. The DS-CNN, can achieve the precision rate of 0.9681 and the recall rate of 0.9681. This practical weather detection method has been built in the surveillance system covers five freeways. The experimental result used in practice shows much worse detection results at first with disturbance of difference scenarios, worn camera, transmission failure and so on. With further improvement of DS-CNN, we found that it was much more effective than hand-crafted features in this task, and a deeper neural architecture could derive more powerful features. Moreover, the results show that dense weather information has more details in a small scale. In order to fast report the regional weather detection result, a designed visualization method is also proposed in spatiotemporal dimension to fuse with currently-used system. The high accuracy and fast detection speed with friendly visualization would lead to more precise traffic management and prompt the road weather traffic control to more intelligence levels.

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WOS 号： 000546414500007

第 14 篇
标　　题： Multi-Carrier Information Hiding Algorithm Based On Angle Structure Descriptor
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期　　刊： IEEE ACCESS
摘　　要： Aiming at the problem that the embedded capacity and security of the single-carrier information hiding algorithm can not be further improved because of the number of carriers, the carrier pre-processing and the embedding of secret information are combined with the image angle structure descriptor, and a multi-carrier information hiding algorithm based on the angle structure descriptor (ASD) is proposed. Firstly, the angle structure descriptors of the extracted image are used to classify the carrier set, and the image angle structure descriptor direction field coding is obtained. Secondly, the secret information is segmented according to the carrier classification number and the preprocessing such as scrambling and optimization is performed. Finally, based on the angle structure the coded data of the feature direction field performs information hiding on a plurality of types of carriers according to the information hiding rule. In particular, the judgment selection option is designed during secret information extraction to further improve the performance of the algorithm. The experimental analysis shows that the algorithm has good concealment, strong anti-analysis ability and robustness, and is suitable for applications such as large-capacity secret information covert communication with high security requirements.
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WOS 号： 000555530500001

第 15 篇
标　　题： Evaluating Angularity Of Coarse Aggregates Using The Virtual Cutting Method Based On 3D Point Cloud Images
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期　　刊： IEEE ACCESS
摘　　要： In this paper, a new method called the Virtual Cutting Method is proposed to evaluate the angularity index (AI) values of 3D point cloud coarse aggregate images with the aim of characterizing the angularity of aggregates on conveyor belts. The 3D point cloud images of coarse aggregates were first captured, preprocessed, and segmented

into single 3D aggregate objects. Based on the processed 3D aggregate images, intersection contours were extracted using a series of intersection planes with an equivalent angle between two adjacent planes. The AI was evaluated by averaging the angularity of the contours using the gradient method, which was used in the AIMS2 system. Statistical analysis was then performed to select the optimum angle between two adjacent planes. It was found that an angle of five degrees was the ideal angle, as it can balance the execution time and effectiveness of the method. Finally, the AI results of the Virtual Cutting Method were compared with those of 2D and 3D Projection Methods. It was found that the AI rankings of the three methods for different aggregate textures are generally consistent. The findings of this study conclude that the Virtual Cutting Method can be employed to quantify the angularity of a single aggregate or aggregates in piles on conveyor belts based on 3D point cloud images.

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WOS 号： 000560334500001

第 16 篇

标　　题： Efficient Anonymous Certificate-Based Multi- Message And Multi-Receiver Signcryption Scheme For Healthcare Internet Of Things

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期　　刊： IEEE ACCESS

摘　　要： Healthcare Internet of Things (IoT) is an emerging paradigm, which can provide comprehensive and different types of health services and enable various types of medical sensors to monitor patient's health conditions. In the healthcare IoT, patient is deployed with a variety of medical sensors, which continuously monitors and collects patient's sensitive health data that needs specially protection for preventing privacy leakage. To safely send multiple different health data monitored by multiple different medical sensors to multiple corresponding healthcare professionals in one data report, several multi-message and multi-receiver signcryption schemes have been introduced by employing the traditional public key cryptography, identity-based cryptography or certificateless cryptography. However, these schemes suffer from the certificate management, key escrow and key distribution problem. Besides, due to the resource-constraint property of medical sensors, they are unsuitable for healthcare IoT in terms of both performance and privacy requirements. To solve these issues, this paper introduces an efficient anonymous certificate-based multi-message and multi-receiver signcryption scheme for healthcare IoT, where the certificate-based cryptography and elliptic curve cryptography are combined to simplify the certificate management problem, eliminate the key escrow problem, solve the key distribution problem and ensure the privacy-preserving. Furthermore, the security analysis suggests that the proposed scheme is able to achieve the confidentiality, unforgeability, receiver anonymity, sender anonymity and decryption fairness; the performance evaluation indicates that the proposed scheme brings to the lower computation cost and

communication cost in comparison to the existing schemes.

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第 17 篇

标　　题： A Zero-Inflated Ordered Probit Model To Analyze Hazmat Truck Drivers' Violation Behavior And Associated Risk Factors

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期　　刊： IEEE ACCESS

摘　　要： There are few studies on the violation of truck drivers, especially the hazmat truck driver, although truck driver's violation may cause serious casualties. This paper aims to investigate hazmat truck drivers' violation behavior and identify associated risk factors. Different data sources in intelligent transportation system (ITS) including hazmat transportation management system and traffic safety management system are extracted and emerged together. Three years (2016-2018) of violation data that comprised 11612 trip record in China are employed in this research. Based on Bayesian theory, this study proposes zero-inflated ordered probit (ZIOP) model and three alternative models to exploring the relationship between hazmat truck drivers' violation frequency and the key risk factors. The results show that ZIOP model can handle excessive zero observation problem of violation data properly and differentiate between 'always-zero group' drivers and drivers who did not violate the traffic rules during research period but would do so in different surroundings. The results also indicate that the violation probability and the violation frequency level of hazmat truck drivers are influenced by driver characteristics, freight order attributes, and drivers' violation records. This research provides guidance for driving training and safety education of hazmat truck drivers, and will be helpful in building better driving simulation models.

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第 18 篇

标　　题： A Dynamic Triple-Image Encryption Scheme Based On Chaos, S-Box And Image Compressing

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期　　刊：IEEE ACCESS

摘　　要：To guarantee the security and high-efficiency of image transmission, a novel triple-image encryption scheme based on chaotic system, S-box and image compressing is proposed in this paper. Firstly, the combination process is performed by compressing three plain images to 25% and combining the compressed images with a stochastic matrix generated by the 2D-LSCM system to construct a new image. This process makes the proposed image encryption scheme have higher image transmission efficiency comparing to that of the state-of-the-art methods. Then, Z-scan and the proposed coded lock scrambling algorithm with low time complexity is used to randomly scramble the positions of pixels in the new construct image. Next, a cipher image is obtained by performing the diffusion operation on the scrambled image through S-box and chaotic sequences. In addition, the added stochastic matrix in the combination process makes the cipher image dynamic. In other words, the generated cipher images are always different to each other even when they are generated by the proposed encrypt scheme with identical plain images under the same secret keys, which can resist chosen-plaintext attacks. Finally, experimental results and simulation analysis are performed, which shows the proposed scheme can effectively resist common kinds of attacks.

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WOS 号：000595988600001

第 19 篇

标　　题：Identifiable Tampering Multi-Carrier Image Information Hiding Algorithm Based On Compressed Sensing

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通讯作者：Wang, M (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊：IEEE ACCESS

摘　　要：Aiming at the security problem of secret information preprocessing and the difficulty of improving the capacity and robustness of the single-carrier image information hiding algorithm, an identifiable tampering multi-carrier image information hiding algorithm based on compressed sensing is proposed. Firstly, the angle structure descriptor feature vector was used to preprocess and classify the image carrier set. Secondly, the GHM multiwavelet transform was applied to different types of image carriers to obtain the secret information hiding area which can balance the invisibility and robustness. Thirdly, the secret image was processed by compressed sensing, the resulting observation matrix was decomposed by singular value, and the chaotic scrambling was encoded by logistic mapping. Finally, the secret information was embedded in the image singular value to complete the information hiding of different types of multi-quantity image carriers. Combined with the angle structure descriptor of the image, the algorithm proposed an effective way to organize multiple carriers, which improved the embedding quality and efficiency of secret information. The verification

data and segmented secret information classification and embedding strategy made the proposed algorithm have a keen ability to detect tampering and effectively improve the efficiency and integrity of secret information extraction. Experimental results show that compared with image sharing information hiding algorithm and the single-carrier information hiding algorithm based on compressed sensing, the invisibility and robustness of our algorithm are significantly improved. At the same time, the proposed algorithm has strong anti-analysis ability, can effectively resist most image processing attacks, and is suitable for large capacity secret communication and high-security applications.

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WOS 号： 000597191300001

第 20 篇

标　　题： Conditional Privacy-Preserving Anonymous Authentication Scheme With Forward Security In Vehicle-To-Grid Networks

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期　　刊： IEEE ACCESS

摘　　要： In the Vehicle-to-Grid (V2G) network, the electric vehicles (EVs) need to report their respective information, such as vehicle identity, battery capacity, battery state of charge (SoC), current location, and driving direction, to the power grid through the distributed local aggregators (LAGs), so that the power grid can dispatch power reasonably. However, the information has much to do with privacy of the EVs. The issue of how to solve the contradictory needs of privacy protection and information report is a challenging problem in the V2G network. This paper proposed a privacy preserving authentication mechanism together with a key exchange between the EVs and the LAGs, in which the EVs do not use any pseudonyms. Besides satisfying the requirements of anonymity, confidentiality, unlinkability, nonrepudiation, traceability and revocation, the scheme can further support forward security. The performance analysis shows that the proposed scheme is efficient in terms of computation and communication overhead. The experimental results show that the proposed scheme has fewer exchanged messages in the authentication process among compared schemes.

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WOS 号： 000597791300001

第 21 篇

标　　题： A Car-Following Model To Assess The Impact Of V2V Messages On Traffic Dynamics

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期　　刊：TRANSPORTMETRICA B-TRANSPORT DYNAMICS

摘　　要：Connected vehicles (CVs) are considered to have the potential to significantly improve traffic flow stability. Although several studies have been devoted to modelling car-following behaviour in a connected environment, most model formulations are based on assumptions without empirical observations. Therefore, this paper utilizes data from field experiments to explore the dynamics of CVs. Data mining analysis shows that the driver is more responsive to velocity differences with safety messages. According to the data analysis results, we present a modified car-following model based on the intelligent driver model (IDM). Then, the parameters of our modified IDM are calibrated. It is shown that the modified IDM is able to reproduce the observed experimental data better than the original IDM. Next, we conduct a linear stability analysis of the modified IDM to explore the properties of the model. Finally, simulation experiments are conducted to verify the theoretical analysis.

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WOS 号：000588149100001

第 22 篇

标　　题：Trajectory Planning Method For Mixed Vehicles Considering Traffic Stability And Fuel Consumption At The Signalized Intersection

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Traffic lights force vehicles to stop frequently at signalized intersections, which leads to excessive fuel consumption, higher emissions, and travel delays. To address these issues, this study develops a trajectory planning method for mixed vehicles at signalized intersections. First, we use the intelligent driver car-following model to analyze the string stability of traffic flow upstream of the intersection. Second, we propose a mixed-vehicle trajectory planning method based on a trigonometric model that considers prefixed traffic signals. The proposed method employs the proportional-integral-derivative (PID) model controller to simulate the trajectory when connected vehicles (equipped with internet access) follow the optimal advisory speed. Essentially, only connected vehicle trajectories need to be controlled because normal vehicles simply follow the connected vehicles according to the Intelligent Driver Model (IDM). The IDM model aims to minimize traffic oscillation and ensure that all vehicles pass the signalized intersection without stopping. The results of a MATLAB simulation indicate that the proposed method can reduce fuel consumption and NOx, HC, CO2, and CO concentrations by 17%, 22.8%, 17.8%, 17%, and 16.9% respectively when the connected vehicle market penetration is 50 percent.

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WOS 号：000508371400004

第 23 篇

标　　题：Analysis Of V2V Messages For Car-Following Behavior With The Traffic Jerk Effect

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：The existing model of sudden acceleration changes, referred to as the traffic jerk effect, is mostly based on theoretical hypotheses, and previous research has mainly focused on traditional traffic flow. To this end, this paper investigates the change in the traffic jerk effect between inactive and active vehicle-to-vehicle (V2V) communications based on field experimental data. Data mining results show that the correlation between the jerk effect and the driving behavior increases by 50.6% on average when V2V messages are received. In light of the data analysis results, a new car-following model is proposed to explore the jerk effect in a connected environment. The model parameters are calibrated, and the results show that the standard deviation between the new model simulation data and the observed data decreases by 38.2% compared to that of the full velocity difference (FVD) model. Linear and nonlinear analyses of the calibrated model are then carried out to evaluate the connected traffic flow stability. Finally, the theoretical analysis is verified by simulation experiments. Both the theoretical and simulation results show that the headway amplitude and velocity fluctuations are reduced when considering the jerk effect in a connected environment, and the traffic flow stability is improved.

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第 24 篇

标　　题：Dynamic Eco-Driving On Signalized Arterial Corridors During The Green Phase For The Connected Vehicles

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Inappropriate driving behaviours can result in additional fuel consumption and emissions. Drivers can be informed of the accurate signal phase and timing (SPaT) and distance information of the current intersection and downstream intersections via vehicle-to-everything (V2X) communications. The real-time information has been

utilized to assist drivers in taking reasonable manoeuvres and gain lots of benefits on fuel consumption and emissions in some existing studies. In order to cooperatively address the optimization problem on the signalized arterial corridors, this paper presents an eco-driving optimization model considering preceding SPaT and position information. This model can be applied to pass two successive traffic signals cooperatively during green phase. In this study, a multi-stage optimal approach is proposed to minimize the fuel consumption. Field experiments are carried out for comparative analysis between the connected vehicle with speed advisory and the uninformed vehicle without speed advisory. The results indicate that the fuel saving of the connected vehicle guided by the dynamic optimization algorithm shows significant improvement. In addition, the rolling optimization among three signalized intersections is conducted and the results show that a considerable improvement can be obtained compared with the one-by-one optimization.

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第 25 篇

标　　题： Tracking And Climbing Behavior Recognition Of Heavy-Duty Trucks On Roadways

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期　　刊： INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS

摘　　要： The tracking and behavior recognition of heavy-duty trucks on roadways are keys for the development of automated heavy-duty trucks and an advanced driver assistance system. The spatiotemporal information of trucks from trajectory tracking and motions learnt from behavior analysis can be employed to predict possible driving risks and generate safe motion to avoid roadway accidents. This article presents a unified tracking and behavior recognition algorithm that can model the mobility of heavy-duty trucks on long inclined roadways. Random noise within the sampled elevation data is addressed by time-based segmentation to extract time-continuous samples at geographical locations. A Kalman filter is first used to distinguish error offsets from random noise and to estimate the distribution of truck elevations for different time intervals. A Markov chain Monte Carlo model is then applied to classify truck behaviors based on the change in elevation between two geographical locations. A heavy-duty truck mobility (HVMove) model is constructed based on the map information to apply the roadway geometry to the tracking and behavior recognition algorithm. We develop an extended Metropolis-Hastings algorithm to tune the parameters of the HVMove model. The proposed model is verified and evaluated through extensive experiments based on a real-world trajectory dataset covering sections of an expressway and national and provincial highways. From the experimental results, we conclude that the HVMove model provides sufficient accuracy and

efficiency for automated heavy-duty trucks and advanced driver assistance system applications. In addition, HVMove can generate maps with the elevation information marked automatically.

DOI： 10.1177/1550147720903620

WOS 号： 000511983100001

第 26 篇

标　　题： A Complete In Phase Finitdiff Procedure For Diffequns In Chemistry

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期　　刊： JOURNAL OF MATHEMATICAL CHEMISTRY

摘　　要： A new FinitDiff (= Finite Difference) procedure is obtained for the efficacious solution of the DiffEquns (= Differential Equations) in quantum chemistry.

DOI： 10.1007/s10910-019-01095-0

WOS 号： 000512023000004

第 27 篇

标　　题： Automatic Coal And Gangue Segmentation Using U-Net Based Fully Convolutional Networks

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期　　刊： ENERGIES

摘　　要： Sorting gangue from raw coal is an essential concern in coal mining engineering. Prior to separation, the location and shape of the gangue should be extracted from the raw coal image. Several approaches regarding automatic detection of gangue have been proposed to date; however, none of them is satisfying. Therefore, this paper aims to conduct gangue segmentation using a U-shape fully convolutional neural network (U-Net). The proposed network is trained to segment gangue from raw coal images collected under complex environmental conditions. The probability map outputted by the network was used to obtain the location and shape information of gangue. The

proposed solution was trained on a dataset consisting of 54 shortwave infrared (SWIR) raw coal images collected from Datong Coalfield. The performance of the network was tested with six never seen images, achieving an average area under the receiver operating characteristics (AUROC) value of 0.96. The resulting intersection over union (IoU) was on average equal to 0.86. The results show the potential of using deep learning methods to perform gangue segmentation under various conditions.

DOI： 10.3390/en13040829

WOS 号： 000522492700057

第 28 篇

标　　题： Modeling And Field Experiments On Autonomous Vehicle Lane Changing With Surrounding Human-Driven Vehicles

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期　　刊： COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING

摘　　要： Autonomous vehicle (AV) technology is widely studied in both industrial and academic communities since it is regarded as a promising means for improving transportation safety and efficiency. Lane changing is a critical link for higher-level AV operations. However, few studies on AV lane changing consider the dynamics of surrounding vehicles, particularly in a mixed traffic environment including human-driven vehicles (HVs). Therefore, this article presents a dynamic lane-changing model for AV incorporating human driver behavior in mixed traffic. The proposed model includes four key components: car following (and lane keeping), lane-changing decision, dynamic trajectory generation, and model predictive control (MPC)-based trajectory tracking. AV longitudinal control algorithm is also depicted in detail in this article. Field experiments are conducted on a large-scale test track to test and validate the proposed model. An AV and three HVs are used in the lane-changing experiments. Different human driver behaviors are considered in the experiment settings. Experimental results show that the proposed lane-changing model can complete lane-changing maneuvers efficiently when HVs are cooperative and can also robustly abort them when HVs are uncooperative. Compared with the measured human lane-changing maneuvers, AV lane-changing maneuvers from the proposed model are more comfortable and safer.

DOI： 10.1111/mice.12540

WOS 号： 000513910400001

第 29 篇

标　　题： Offline Mapping For Autonomous Vehicles With Low-Cost Sensors

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期　　刊：COMPUTERS & ELECTRICAL ENGINEERING

摘　　要：This paper presents an offline mapping algorithm for autonomous vehicles (AV) with low-cost sensors. The mapping algorithm consists of five key steps. First, data pre-processing is conducted to calibrate the original odometry data. Then, based on a 2D laser scanner and the calibrated odometry data, a virtual 3D light detection and ranging (LiDAR) is built. In the third step, loop closure is performed to search the revisited region and calculate the distance displacement. Afterward, the optimizer is applied to generate the final trajectory. Finally, by fusing the point cloud data from virtual 3D LiDAR and the final trajectory, the point cloud map is generated. Field experiments are conducted in both open and urban areas. In these two cases, satisfactory point cloud maps are built even the vehicle travels a long distance with loop closure, and the constructed point cloud map can be used for AV localization. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号：000521116900003

第 30 篇

标　　题：A Parallel Sliding-Window Belief Propagation Algorithm Forq-Ary Ldpc Codes Accelerated By Gpu

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通讯作者：Fang, Y (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊：MULTIMEDIA TOOLS AND APPLICATIONS

摘　　要：In this paper, a parallel Sliding-Window Belief Propagation algorithm to decodeQ-ary Low-Density-Parity-Codes is proposed. This algorithm is accelerated by taking advantage of high parallel features of GPU, and applied to video compression under distributed video coding framework. The experiment results show that our parallel algorithm achieves 2.3x to 30.3x speedup ratio under 256 to 2048 codeword length and 69.21x to 78.31x speedup ratio under 16,384 codeword length than sequential algorithm.

DOI：10.1007/s11042-020-08738-4

WOS 号：000560968200003

第 31 篇

标　　题：Vehicle Counting System Using Deep Learning And Multi-Object Tracking Methods

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通讯作者：Song, HS (corresponding author), Changan Univ, Sch Informat Engn, Xian, Shaanxi, Peoples R China.

期　　刊：TRANSPORTATION RESEARCH RECORD

摘　　要：Using deep learning technology and multi-object tracking method to count vehicles accurately in different traffic conditions is a hot research topic in the field of intelligent

transportation. In this paper, first, a vehicle dataset from the perspective of highway surveillance cameras is constructed, and the vehicle detection model is obtained by training using the You Only Look Once (YOLO) version 3 network. Second, an improved multi-scale and multi-feature tracking algorithm based on a kernel correlation filter (KCF) algorithm is proposed to avoid the KCF extracting single features and single-scale defects. Combining the intersection over union (IoU) similarity measure and the row-column optimal association criterion proposed in this paper, matching strategy is used to process the vehicles that are not detected and wrongly detected, thereby obtaining complete vehicle trajectories. Finally, according to the trajectory of the vehicle, the traveling direction of the vehicle is automatically determined, and the setting position of the detecting line is automatically updated to obtain the vehicle count result accurately. Experiments were conducted in a variety of traffic scenes and compared with published data. The experimental results show that the proposed method achieves high accuracy of vehicle detection while maintaining accuracy and precision in tracking multiple objects, and obtains accurate vehicle counting results which can meet real-time processing requirements. The algorithm presented in this paper has practical application for vehicle counting in complex highway scenes.

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WOS 号： 000524450900001

第 32 篇

标　　题： Pavement Crack Detection On Geodesic Shadow Removal With Local Oriented Filter On Lof And Improved Level Set

作　　者： [Wang Weixing; Li Hongxia; Bai Minghui] Chang An Univ, Sch Informat Engn, Xian 710064, Peoples R China; [Wang Weixing; Kevin, Wang] Royal Inst Technol, Stockholm, Sweden; [He Changtao] Sichuan Jiuzhou Elect Grp Co Ltd, 6 Jiuhua Rd,Pioneer Pk, Mianyang 621000, Sichuan, Peoples R China

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： In order to detect cracks on pavement accurately and quickly in an image, a new algorithm is proposed to combines geodesic shadow removal (GSR), local outlier factor (LOF) and improved Level set algorithms. It includes four steps: (1) GRS algorithm and Gaussian filter are used to remove shadow and noise; (2) the local oriented filter algorithm based on LOF is applied to enhance the crack information and suppress image noise; (3) the algorithm based on improved level set combined with crack indication function is utilized to extract the crack edges, and it has the self adaptability and the higher segmentation accuracy than an ordinary level set algorithm; and (4) in the binary image, a number of post processing functions are made for noise removal, and short and long gap fillings. In algorithm comparison, we tested different kinds of pavement crack images, and for the images, we compared several traditional image segmentation algorithms, such as Canny operator, FCM, Adaptive threshold, Minimum Spanning Tree (MST), Clustering analysis and CV model etc. The experimental results

show that the proposed algorithm can improve the image segmentation accuracy and is effective in extracting pavement cracks. (C) 2019 Elsevier Ltd. All rights reserved.

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WOS 号： 000527320400079

第 33 篇

标　　题： Video-Based Vehicle Counting For Expressway: A Novel Approach Based On Vehicle Detection And Correlation-Matched Tracking Using Image Data From Ptz Cameras

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Vehicle counting plays a significant role in vehicle behavior analysis and traffic incident detection for established video surveillance systems on expressway. Since the existing sensor method and the traditional image processing method have the problems of difficulty in installation, high cost, and low precision, a novel vehicle counting method is proposed, which realizes efficient counting based on multivehicle detection and multivehicle tracking. For multivehicle detection tasks, a construction of the new expressway dataset consists of a large number of sample images with a high resolution (1920 x 1080) captured from real-world expressway scenes (including the diversity climatic conditions and visual angles) by Pan-Tilt-Zoom (PTZ) cameras, in which vehicle categories and annotation rules are defined. Moreover, a correlation-matched algorithm for multivehicle tracking is proposed, which solves the problem of occlusion and vehicle scale change in the tracking process. Due to the discontinuity and unsmooth of the trajectories that occurred during the tracking process, we designed a trajectory optimization algorithm based on least square method. Finally, a new vehicle counting method is designed based on the tracking results, in which the driving direction information of the vehicle is added in the counting process. The experimental results show that the proposed counting method in this research can achieve more than 93% accuracy and an average speed of 25 frames per second in expressway video sequence.

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WOS 号： 000524590500003

第 34 篇

标　　题： Modelling Heterogeneous Traffic Dynamics By Considering The Influence Of V2V Safety Messages

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期　　刊：IET INTELLIGENT TRANSPORT SYSTEMS

摘　　要：In recent years, more attention has been paid to the study of modelling heterogeneous traffic flow dynamics consisting of regular vehicles (RVs) and connected vehicles (CVs). However, the establishment of current mixed traffic flow models mostly lacks the support of field experimental data analysis results. In this study, a new heterogeneous car-following model is presented on the basis of data mining results to study the impact of vehicle-to-vehicle (V2V) safety messages on traffic flow stability. The analytically critical stability criterion of this proposed heterogeneous model is obtained by linear stability analysis. Then, the effect of the market penetration rate (MPR) of CVs on heterogeneous traffic stability is investigated. Finally, simulation experiments are carried out under periodic boundary conditions to test the critical stability condition. Both the theoretical derivation and simulation experiment results show that the traffic flow stability can decline despite improvements in traffic safety in the case of considering only the safety information of the nearest-neighbour leading vehicle. However, both the safety and stability of traffic flow can be enhanced by considering the V2V messages of more leading vehicles. Moreover, the heterogeneous traffic flow stability is improved with an increase in the MPR of CVs.

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WOS 号：000526637500004

第 35 篇

标　　题：Field Experiments On Longitudinal Characteristics Of Human Driver Behavior Following An Autonomous Vehicle

作　　者：[Zhao, Xiangmo; Wang, Zhen; Xu, Zhigang] Changan Univ, Sch Informat Engn, Xian 710064, Shaanxi, Peoples R China; [Wang, Yu; Li, Xiaopeng] Univ S Florida, Dept Civil & Environm Engn, Tampa, FL 33620 USA; [Qu, Xiaobo] Chalmers Univ Technol Gothenburg, Dept Architecture & Civil Engn, Gothenburg, Sweden

通讯作者：Li, XP (corresponding author), Univ S Florida, Dept Civil & Environm Engn, Tampa, FL 33620 USA.

期　　刊：TRANSPORTATION RESEARCH PART C-EMERGING TECHNOLOGIES

摘　　要：Although mixed traffic, including both autonomous vehicles (AV) and human-driven vehicles (HV), is expected to prevail in the foreseeable future, our current understanding of the longitudinal characteristics of mixed traffic is limited and, in particular, lacks evidence from field experiments. To bridge this gap, we designed and conducted a set of field experiments to reveal differences in carfollowing behaviors between a human driver following-AV and following-HV on both constant speed traffic characteristics with discrete speeds ({10,20, ..., 60}km/h) and dynamic car-following behaviors with continuous speeds (within 0-60 km/h) in both the indifferentiable and differentiable appearance settings of the AV. We recruited 10 drivers for the experiment (14 runs for each driver and collected position and speed data of the tested vehicles along their complete trajectories based on vehicle gaps, headways, and standard deviations of vehicle speed. A K-means clustering algorithm was applied to classify drivers based on their responses in following-AV vs. following-HV with both constant speed and dynamic speed characteristics. The analyses of the differentiable appearance

setting show that different drivers exhibit different behaviors in following-AV vs. following-HV: some are AV-believers, some are AV-skeptics, and the others are insensitive. Yet in the indifferentiable appearance setting, there is no significant difference between following a lead AV and following a lead HV. This reveals that drivers' response to the lead vehicle depends on their subjective trusts on AV technologies rather than the actual driving behavior. The results suggest that, depending on the characteristics and composition of the drivers, classic car-following behavior in pure HV traffic may need to be updated for modeling mixed traffic in the near future.

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WOS 号： 000528280900011

第 36 篇

标　　题： Long Short-Term Memory And Convolutional Neural Network For Abnormal Driving Behaviour Recognition

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期　　刊： IET INTELLIGENT TRANSPORT SYSTEMS

摘　　要： Abnormal driving behaviours, such as rapid acceleration, emergency braking, and rapid lane changing, bring great uncertainty to traffic, and can easily lead to traffic accidents. The accurate identification of abnormal driving behaviour helps to judge the driver's driving style, inform surrounding vehicles, and ensure the road traffic safety. Most of the existing studies use clustering and shallow learning, it is difficult to accurately identify the types of abnormal driving behaviours. Aimed at addressing the difficulty of identifying driving behaviour, this study proposed a recognition model based on a long short-term memory network and convolutional neural network (LSTM-CNN). The extreme acceleration and deceleration points are detected through the statistical analysis of real vehicle driving data, and the driving behaviour recognition data set is established. By using the data set to train the model, the LSTM-CNN can achieve a better result.

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WOS 号： 000530480700006

第 37 篇

标　　题： A Cross Entropy Based Deep Neural Network Model For Road Extraction From Satellite Images

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通讯作者： Fang, Y (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊： ENTROPY

摘　　要：This paper proposes a deep convolutional neural network model with encoder-decoder architecture to extract road network from satellite images. We employ ResNet-18 and Atrous Spatial Pyramid Pooling technique to trade off between the extraction precision and running time. A modified cross entropy loss function is proposed to train our deep model. A PointRend algorithm is used to recover a smooth, clear and sharp road boundary. The augmentated DeepGlobe dataset is used to train our deep model and the asynchronous training method is applied to accelerate the training process. Five salellite images covering Xiaomu village are taken as input to evaluate our model. The proposed E-Road model has fewer number of parameters and shorter training time. The experiments show E-Road outperforms other state-of-the-art deep models with 5.84% to 59.09% improvement, and can give the accurate predictions for the images with complex environment.

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WOS 号：000541900700057

第 38 篇

标　　题：Fusion Of 3D Lidar And Camera Data For Object Detection In Autonomous Vehicle Applications

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期　　刊：IEEE SENSORS JOURNAL

摘　　要：It is vital that autonomous vehicles acquire accurate and real-time information about objects in their vicinity, which fully guarantees the safety of the passengers and vehicle in various environments. Three-dimensional light detection and ranging (3D LIDAR) sensors can directly obtain the position and geometric structure of an object within its detection range, whereas the use of vision cameras is most suitable for object recognition. Accordingly, in this paper, we present a novel object detection and identification method that fuses the complementary information obtained by two types of sensors. First, we utilise 3D LIDAR data to generate accurate object-region proposals. Then, these candidates are mapped onto the image space from which regions of interest (ROI) of the proposals are selected and input to a convolutional neural network (CNN) for further object recognition. To precisely identify the sizes of all the objects, we combine the features of the last three layers of the CNN to extract multi-scale features from the ROIs. The evaluation results obtained on the KITTI dataset demonstrate that: (1) unlike sliding windows that produce thousands of candidate object-region proposals, 3D LIDAR provides an average of 86 real candidates per frame and the minimal recall rate is better than 95%, which greatly decreases the extraction time; (2) The average processing time for each frame of the

proposed method is only 66.79 ms, which meets the real-time demand of autonomous vehicles; (3) The average identification accuracies of our method for cars and pedestrians at a moderate level of difficulty are 89.04% and 78.18%, respectively, which is better than those of most previous methods.

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WOS 号： 000534483900039

第 39 篇

标　　题： Efficient Ridesharing Framework For Ride-Matching Via Heterogeneous Network Embedding

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期　　刊： ACM TRANSACTIONS ON KNOWLEDGE DISCOVERY FROM DATA

摘　　要： Ridesharing has attracted increasing attention in recent years, and combines the flexibility and speed of private cars with the reduced cost of fixed-line systems to benefit alleviating traffic pressure. A major issue in ridesharing is the accurate assignment of passengers to drivers, and how to maximize the number of rides shared between people being assigned to different drivers has become an increasingly popular research topic. There are two major challenges facing ride-matching: scalability and sparsity. Here, we show that network embedding drives the optimal matches between drivers and riders. Contrary to existing approaches that merely depend on the proximity between passengers and drivers, we employ a heterogeneous network to learn the latent semantics from different choices in two types of ridesharing, and extract features in terms of user trajectories and sentiment. A novel framework for ridesharing, RShareForm, which encodes not only the objects but also a variety of semantic relationships between them, is proposed. This article extends the existing skip-gram model to incorporate meta-paths over a proposed heterogeneous network. It allows diverse features to be used to search for similar participants and then ranks them to improve the quality of ride-matching. Extensive experiments on a large-scale dataset from DiDi in Chengdu, China show that by leveraging heterogeneous network embedding with meta paths, RShareForm can significantly improve the accuracy of identifying the participants for ridesharing over existing methods, including both meta-path guided similarity search methods and variants of embedding methods.

DOI： 10.1145/3373839

WOS 号： 000583626000003

第 40 篇

标　　题： An Effective Co-Evolutionary Algorithm Based On Artificial Bee Colony And Differential Evolution For Time Series Predicting Optimization

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期　　刊： COMPLEX & INTELLIGENT SYSTEMS

摘　　要： Non-linear model optimization for predicting time series is a challenge problem. In Intelligent Transportation Systems (ITS) application, the indispensable short-term traffic flow prediction with big data makes the problem worst. To improve the prediction accuracy and ensure real-time performance in the big data environment, we propose a novel co-evolutionary artificial bee colony (ABC) improved by differential evolution (DE) optimization algorithm combined with a traffic flow predicting model trained by extreme learning machine (ELM) neural network. The proposed model can inherit the better generalization performance and the less training time consumption of the standard ELM, and can achieve a more balanced search strategy with the optimized weights and biases to overcome the random initialization deficiency of the typical ELM, and successfully obtain higher prediction accuracy compared with state-of-the-art methods. To verify the efficiency of the proposed model, we apply it to Lozi and Tent chaotic time series simulations and measured traffic flow time series experiments. Simulation and experimental results demonstrate that the proposed model has superior performance and competitive computational efficiency.

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WOS 号： 000533802600001

第 41 篇

标　　题： Traffic Parameter Estimation And Control System Based On Machine Vision

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通讯作者： Song, HS (corresponding author), Changan Univ, Xian, Peoples R China.

期　　刊： JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING

摘　　要： With the rapid development of urbanization in the world, it has brought enormous pressure on urban traffic management and control such as traffic congestion. An excellent urban traffic management and control system consists of three critical aspects: obtaining traffic parameters, developing traffic control scheme, and evaluating traffic control scheme. Intersection signal timing is one of the most important parts in urban traffic control. This paper proposed an intersection signal timing system based on traffic video which consists of three parts: acquisition of video-based traffic parameters, calculation of traffic flow-based signal timing scheme, and evaluation of intersection signal timing scheme. In the first part, we used advanced techniques such as deep learning and image processing to obtain traffic parameters such as traffic flow, vehicle type, composition of different vehicle types, and speed of vehicles passing through a scene in a traffic video. In the second part, we calculated the signal timing scheme of the video at the traffic scene through the obtained traffic flow information with Webster method. In the third part, the detailed traffic parameters and signal timing scheme were input into the VISSIM software for traffic microscopic simulation, which was used to evaluate the signal timing scheme. The experimental results show that the accuracy of

the detailed traffic flow information obtained by the proposed system can reach more than 90%, the accuracy of composition of different vehicle types can be achieved more than 98%, and the vehicle speed accuracy can reach more than 95%. Therefore, the system improves the reliability and adaptability of the whole signal timing network. At the same time, the simulation results show that the proposed system integrates the acquisition of traffic parameters and the calculation and evaluation of signal timing schemes, and provides a good solution for solving research problems and actual needs such as signal timing optimization.

DOI： 10.1007/s12652-020-02052-5

WOS 号： 000535412200004

第 42 篇

标　　题： Gpu Accelerated Parallel Algorithm Of Sliding-Window Belief Propagation For Ldpc Codes

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期　　刊： INTERNATIONAL JOURNAL OF PARALLEL PROGRAMMING

摘　　要： Low-Density Parity-Check (LDPC) codes are widely used from hard-disk systems to satellite communications. Sliding-Window Belief Propagation (SWBP) is an effective decoding algorithm of LDPC codes for time-varying channels and demonstrates near-optimal performance in many experiments. However, to adaptively find the best window size, SWBP may need very long computing time. Inspired by Graphics Processing Unit and Compute Unified Device Architecture, in this paper we propose a novel method to address the issue of SWBP's computing complexity. Different from sequential SWBP, we simultaneously compute the metrics of different window sizes in parallel, which enables us to quickly find the best window size. We use coalesced memory access to accelerate reading and writing processes. Registers and shared memory are also considered in our program to reduce memory latency. On the GTX 1080Ti platform, experimental results show that parallel SWBP can achieve about 14 x speedup ratio for different regular LDPC codes, and about 8 x\documentclass[12pt]{minimal}speedup ratio for different irregular LDPC codes, respectively. According to the trend of our experiments, we strongly believe that, as the length of LDPC codes increases, a higher speedup ratio can be obtained.

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WOS 号： 000528215000010

第 43 篇

标　　题： Spatial Variability Of Electric Field Implied By Common Dielectric Effective Medium Models

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期　　刊： IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING

摘　　要： Remote sensing measurements of Earth materials are always made at scales much larger than individual grains and cavities, yielding only upscaled effective properties. An & x201C;effective medium & x201D; is an idealized uniform material that has the same measured properties as the real mixture. A uniform electric field applied to the ideal effective medium remains uniform within the sample; however, the same electric field applied to the composite results in fine-scale spatial variations of field strength within the sample, which depend on the properties of the constituents, their volume fractions, and their microgeometries. We derived analytic expressions for the electric field strength heterogeneity implicit in commonly used dielectric effective medium models. Only two-phase, statistically isotropic, low-loss materials, e.g., ice, snow, minerals, and freshwater in the microwave UHF band are considered. The method applies to singly or biconnected phases. The results confirm the uniform field in the isolated phase of material lying on the Hashin & x2013;Shtrikman (HS) bounds; the continuous phase field variance increases with a decreasing volume fraction, approaching a well-defined limit as the fraction becomes vanishingly small. Expressions are found for field variance in higher-order composites of coated spheres, providing realizations of composites lying between the HS bounds, and illustrating field nonuniqueness when microstructure is unknown. The mean and variance of the field strength in popular effective medium models are also examined. Not only do the effective properties predicted by these models differ so do the electric field strength spatial variability, especially when the volume fraction of inclusions increases.

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第 44 篇

标　　题： The Effectiveness Of Distortion-Type Papr And Total Degradation Reduction In Ofdm Systems

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期　　刊： IEEE TRANSACTIONS ON BROADCASTING

摘　　要： Conventional peak-to-average power ratio (PAPR) reduction metrics including bit error rate (BER) and complementary cumulative distribution function (CCDF) can hardly reveal the overall effectiveness of a distortion-type PAPR technique. To remedy this drawback, a new overall performance index, BER at various power consumption of a given HPA and channel noise level, is proposed. Furthermore, a novel triangular companding (TC) technique is also introduced to improve the system performance. Simulations demonstrate that the TC scheme outperforms other schemes in case of the proposed overall performance index and the conventional performance metrics for PAPR reduction.

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第 45 篇
标　　题： Description Method Of Illumination Invariant Image Features
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期　　刊： SIGNAL PROCESSING-IMAGE COMMUNICATION
摘　　要： Image feature extraction technology is one of main topics in the field of computer vision, which has been widely applied in biological recognition, image retrieval, target detection and other fields. To overcome the drawbacks of WLD under complex illumination condition, we propose a novel illumination-insensitive feature descriptor named as anisotropic Weber synergy gradient descriptor (AWSGD). The proposed algorithm contains two parts:differential excitation component and gradient direction component. Firstly, by introducing the differential synergy excitation pattern (DSEP) and anisotropic LOG operator with variable scales and angles, we propose the anisotropic differential synergy excitation pattern (ADSEP) as the differential excitation component. Next, focused on the shortage that local gradient pattern (LGP) lacks detailed description of local features with single-layer model, we propose weighted local synergy gradient pattern (WLSGP) as the gradient direction component based on two-layer structure model and weight coefficient distribution model. Finally, ADSEP and WLSGP are fused to form AWSGD histogram. Meanwhile, we adopt XGBoost classifier to conduct related experiments on face databases CMUPIE, Yale B and texture databases PhoTex, RawFooT. The experimental results indicate that the proposed algorithm has stronger robustness to illumination variation and achieves the best performance compared with state-of-the-art methods, which has a certain theoretical significance and practical value in image recognition field under complex illumination condition.
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WOS 号： 000534587400013

第 46 篇
标　　题： Local Difference Ternary Sequences Descriptor Based On Unsupervised Min Redundancy Mutual Information Feature Selection
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期　　刊： MULTIDIMENSIONAL SYSTEMS AND SIGNAL PROCESSING
摘　　要： Texture feature description research have received significant attention in recent years.

It is widely known that the local texture feature descriptor can achieve good performance under various image conditions, such as geometric size variation, different poses, complex illumination and partial occlusion. Although Local Difference Binary is an acknowledged excellent feature descriptor, it only computes the intensity and gradient difference on pairwise grid cells and ignores the image grid texture intensity and gradient. This paper proposes a novel local texture descriptor, named as Local Difference Ternary (LDT), which can not only represent difference and texture information of the grid cells intensity and gradient simultaneously, but also capture richer detailed texture information. In addition, the Unsupervised Min Redundancy Mutual Information (UMRMI) for feature selection is proposed to select the optimal subset of LDT features for achieving more powerfully discriminative ability. For the purpose of further improving the efficiency and effectiveness of UMRMI, we extend UMRMI to k-means space, namely k-UMRMI. Furthermore, a multi-degree scheme is adopted to achieve richer texture description. Finally, Radial Function Neural Network is employed for classification, which is an excellent classifier, especially for larger samples. Several experimental results on certain benchmark face databases demonstrate that our proposed method is remarkably superior to some other state-of-the-art approaches under various image conditions.

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WOS 号： 000536473300001

第 47 篇

标　　题： Deep Learning Method For Detection Of Structural Microcracks By Brillouin Scattering Based Distributed Optical Fiber Sensors

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期　　刊： SMART MATERIALS AND STRUCTURES

摘　　要： Brillouin scattering (BS)-based distributed optical fiber sensors (DOFS) provide distributed sensing capabilities by monitoring the strain along entire segments of structures. Large cracks, such as those with large crack opening displacements (COD) can be detected by strain peaks or singularities along the measurement length of distributed sensors. Microcracks do not provide visible pronounced local peaks along the length of measured distributed strains. The peaks corresponding to microcracks are submerged within the measurement noise due to low signal-to-noise ratio (SNR) of BS systems. Deep learning (DL) methods have the potential to automatically extract feature representations from data exhibiting lower SNRs, and improve classification accuracy. Accordingly, a novel DL method is proposed in this study to improve the crack detection sensitivity of the BS-based DOFS. Development of the proposed DL method includes construction of model architecture, design of a training algorithm and the

detection process. A 15 m-long wide-flange steel beam with artificial defects is built and employed in this study. A comprehensive experimental program is undertaken in order to train, validate and test the generality of the proposed DL method. Experimental results demonstrate that the DL method is capable of extracting highly discernable microcrack features from the distributed strains, and distinguish the crack-induced local peaks from the noise. Microcracks with CODs as small as 23 microns are accurately detected in the present work.

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第 48 篇

标　　题： Joint Vehicle Detection And Distance Prediction Via Monocular Depth Estimation

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期　　刊： IET INTELLIGENT TRANSPORT SYSTEMS

摘　　要： Vehicle detection and distance estimation are critical components of driver assistance system and self-driving system, and considerable different frameworks have been investigated such as radar, laser and camera-based. Among them, camera-based vehicle detection and distance estimation have an obvious advantage over other systems in that it needs lower cost. However, existing camera-based methods are not robust enough under complex driving scenes. In this work, an end-to-end deep convolutional neural network framework is proposed to jointly detect vehicles and estimate vehicle distance efficiently. Specifically, a monocular depth estimation method is designed to transform the RGB appearance information into depth modality information. Then the vehicle detection module takes the RGB and depth image as inputs to improve the detection performance. Finally, the distance estimation module employs the detection results and the estimated depth information to predict the distance more precisely. The whole network can be trained in an end-to-end manner with the multi-task loss function. The proposed framework is evaluated on the public vehicle detection benchmark KITTI to show the effectiveness of the proposed framework. Moreover, the performance of three proposed sub-modules are also analysed separately to give a more comprehensive evaluation of the designed framework.

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WOS 号： 000545971300014

第 49 篇

标　　题：Multitask Learning And Gcn-Based Taxi Demand Prediction For A Traffic Road Network

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期　　刊：SENSORS

摘　　要：The accurate forecasting of urban taxi demands, which is a hot topic in intelligent transportation research, is challenging due to the complicated spatial-temporal dependencies, the dynamic nature, and the uncertainty of traffic. To make full use of the global and local correlations between traffic flows on road sections, this paper presents a deep learning model based on a graph convolutional network, long short-term memory (LSTM), and multitask learning. First, an undirected graph model was formed by considering the spatial pattern distribution of taxi trips on road networks. Then, LSTMs were used to extract the temporal features of traffic flows. Finally, the model was trained using a multitask learning strategy to improve the model's generalizability. In the experiments, the efficiency and accuracy were verified with real-world taxi trajectory data. The experimental results showed that the model could effectively forecast the short-term taxi demands on the traffic network level and outperform state-of-the-art traffic prediction methods.

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WOS 号：000553193800001

第 50 篇

标　　题：Micro-Crack Detection Method Of Steel Beam Surface Using Stacked Autoencoders On Massive Full-Scale Sensing Strains

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期　　刊：STRUCTURAL HEALTH MONITORING-AN INTERNATIONAL JOURNAL

摘　　要：Accurate micro-crack detections on the whole surface of civil structures have great significance. Distributed optical fiber sensor based on Brillouin optical time-domain analysis technology exhibits great facility to measure strain distributions along the whole surface of structures with a high spatial resolution, thus providing a potential and competitive solution to the detection problem. However, mainly due to low signal-to-noise ratio in measurements, such sensor system is still limited in crack detection-based structural health monitoring applications. How to extract high-quality micro-crack feature representations from the low signal-to-noise ratio-distributed strain

measurements is crucial to solve the problem. It has been demonstrated in field of pattern recognition that deep learning can automatically extract high-quality noise-robust feature representations from mass chaos data. Therefore, a micro-crack detection method is proposed herein based on deep learning to analyze the full-scale strain measurements. Each measurement is normalized and segmented into a set of equal-length subsequences. Autoencoders, a typical kind of building block of deep neural network, are stacked layer-wise into a deep network and then exploited to automatically extract feature representations from the subsequences. Each extracted feature representation is labeled as one of the two categories by a Softmax regression. One category originates in the subsequences acquired from structure sections with crack defects and another from sections without any cracks. The micro-crack detections are achieved by solving such a crack/non-crack binary classification problem. A 15-m-long steel I-beam with artifact crack defects is built up in laboratory to verify the proposed method. Experimental results demonstrate that the minimum size of detectable crack opening width reaches to 23 mu m, and besides, the proposed method is significantly better than traditional Fisher linear discriminant analysis method and classical support vector machine on the detection accuracy.

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WOS 号： 000560785100015

第 51 篇

标　　题： A Novel On-Ramp Merging Strategy For Connected And Automated Vehicles Based On Game Theory

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Connected and automated vehicles (CAVs) have attracted much attention of researchers because of its potential to improve both transportation network efficiency and safety through control algorithms and reduce fuel consumption. However, vehicle merging at intersection is one of the main factors that lead to congestion and extra fuel consumption. In this paper, we focused on the scenario of on-ramp merging of CAVs, proposed a centralized approach based on game theory to control the process of on-ramp merging for all agents without any collisions, and optimized the overall fuel consumption and total travel time. For the framework of the game, benefit, loss, and rules are three basic components, and in our model, benefit is the priority of passing the merging point, represented via the merging sequence (MS), loss is the cost of fuel consumption and the total travel time, and the game rules are designed in accordance

with traffic density, fairness, and wholeness. Each rule has a different degree of importance, and to get the optimal weight of each rule, we formulate the problem as a double-objective optimization problem and obtain the results by searching the feasible Pareto solutions. As to the assignment of merging sequence, we evaluate each competitor from three aspects by giving scores and multiplying the corresponding weight and the agent with the higher score gets comparatively smaller MS, i.e., the priority of passing the intersection. The simulations and comparisons are conducted to demonstrate the effectiveness of the proposed method. Moreover, the proposed method improved the fuel economy and saved the travel time.

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第 52 篇

标　　题： Dtfa-Net: Dynamic And Texture Features Fusion Attention Network For Face Antispoofing

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期　　刊： COMPLEXITY

摘　　要： For face recognition systems, liveness detection can effectively avoid illegal fraud and improve the safety of face recognition systems. Common face attacks include photo printing and video replay attacks. This paper studied the differences between photos, videos, and real faces in static texture and motion information and proposed a living detection structure based on feature fusion and attention mechanism, Dynamic and Texture Fusion Attention Network (DTFA-Net). We proposed a dynamic information fusion structure of an interchannel attention block to fuse the magnitude and direction of optical flow to extract facial motion features. In addition, for the face detection failure of HOG algorithm under complex illumination, we proposed an improved Gamma image preprocessing algorithm, which effectively improved the face detection ability. We conducted experiments on the CASIA-MFSD and Replay Attack Databases. According to experiments, the DTFA-Net proposed in this paper achieved 6.9% EER on CASIA and 2.2% HTER on Replay Attack that was comparable to other methods.

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第 53 篇

标　　题： An Uncertainty-Set-Shrinkage-Based Covariance Matrix Reconstruction Algorithm For Robust Adaptive Beamforming

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期　　刊： MULTIDIMENSIONAL SYSTEMS AND SIGNAL PROCESSING

摘　　要： This paper presents an uncertainty-set-shrinkage (USS) algorithm that aims to reconstruct a precise interference-plus-noise covariance matrix (INCM) and improve the performance of adaptive beamformers when steering vector (SV) mismatch exists. Both of the interference covariance matrix (ICM) and the desired signal covariance matrix (DSCM) can be divided into two parts, namely the nominal matrix reconstructed using the nominal SVs and the error matrix consisting of the residual component of the covariance matrix. By using a two-step uncertainty set shrinkage method, the proposed beamformer constructs the error matrices by integrating the estimated spatial spectrum over the shrinked uncertainty set at a cost of low computational complexity. After extracting the principal component of the reconstructed ICM and DSCM, the INCM and the SV of the source of interest (SOI) can be estimated without solving any optimization problem. Both of numerical simulations and experimental results demonstrate that the performance of the proposed algorithm is robust with several categories of SV mismatches.

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第 54 篇

标　　题： Privacy Preserving Search Services Against Online Attack

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期　　刊： COMPUTERS & SECURITY

摘　　要： Searchable functionality is provided in many online services such as mail services or outsourced data storage. To protect users privacy, data in these services is usually stored after being encrypted using searchable encryption. This enables the data user to securely search encrypted data from a remote server without leaking data and query information. Public key encryption with keyword search is one of the research branches of searchable encryption; this provides privacy-preserving searchable functionality for applications such as encrypted email systems. However, it has an inherent vulnerability in that the information of a query may be leaked using a keyword guessing attack. Most of existing works aim to make the system resistant to offline keyword guessing, but this does not protect against online attacks on real world services. In this paper, we move a step forward to present a generic framework able to resist online keyword guessing

attack using a server-assisted model. Specifically, we design a novel primitive C mirrored all-but-one lossy encryption, which can prevent a specific user from generating valid encryptions. This primitive can be seen as an access control on encryption ability. Combining searchable encryption technique with the new primitive makes online keyword guessing attack impossible for the specified user, even if the attack is launched online. We further give formal security analysis for the generic framework, and a concrete implementation with efficiency analysis to show that our design is practical. (C) 2020 Elsevier Ltd. All rights reserved.

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第 55 篇

标　　题： Extraction Of Tunnel Center Line And Cross-Sections On Fractional Calculus, 3D Invariant Moments And Best-Fit Ellipse

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期　　刊： OPTICS AND LASER TECHNOLOGY

摘　　要： In order to measure and analyze the tunnel 3D deformation accurately, effectively and conveniently, we use the 3D point clouds instead of Total station data. A 63.6 m long tunnel was scanned twice by using a Leica C10 laser scanner (max scanning range is 300 m), for each of the scans, to obtain the accurate data and to avoid to having tunnel bending part, we divide the tunnel into five sections for the measurements, and for each measurement, the data is scanned in one station. Since the original data includes some noise, to remove noise in the point clouds, we study a new Fractional calculus template for data smoothing. After that, we propose a new method to extract the tunnel central axis based on the 3D invariant moments, and then the tunnel posture is rotated to make the central axis parallel to the reference direction, which is rotational invariant and repeatable. Based on the central axis in each section, the cross-sections are detected, and the elliptic features of a cross-section are calculated for analyzing the tunnel convergence. To make cross-section measurement rotational invariant, we apply the zeroth, the first and the second moments to obtain major and minor axes through the cross-section center. The experiment results demonstrate that this method can meet the accuracy requirements, and it can be with an accuracy of 2 mm for cross-section measurement. It is useful for tunnel engineering applications both in the tunnel 3D point cloud analysis and 3D information extraction.

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WOS 号： 000550261800027

第 56 篇

标　　题：A Fault Detection And Diagnosis System For Autonomous Vehicles Based On Hybrid Approaches

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期　　刊：IEEE SENSORS JOURNAL

摘　　要：An accurate fault detection and diagnosis system is of great importance for autonomous vehicles to prevent the potential hazardous situations. In this paper, we propose a fault detection and diagnosis system based on hybrid approaches. First, to detect the state faults of the autonomous vehicle, One-Class Support Vector Machine (SVM) method is adopted to train the boundary curve which separates the safe domain and unsafe domain. Meanwhile, a Kalman filter observer is designed based on the linear kinematic vehicle bicycle model to predict the current position of the vehicle, and after obtaining the residuals between prediction and measurement, Jarque-Bera test is applied to check the normality of the residuals probability distribution to monitor whether the trajectory deviates. Furthermore, we design a fuzzy system to distinguish the types of the detected faults based on a modified neutral network, in which a membership function layer is added after the input layer. With the strong self-learning ability of neutral network, the initial membership function of the fuzzy system is updated through black box test and can indicate the probability of each fault type. Experiments on the real autonomous vehicle platform 'Xinda' and performance comparison with other fault detectors validate the effectiveness of these methods and the usability of the fault detection and diagnosis system.

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第 57 篇

标　　题：Crack And Fracture Central Line Delineation On Steger And Hydrodynamics With Improved Fractional Differential

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期　　刊：INTERNATIONAL JOURNAL OF WAVELETS MULTIRESOLUTION AND INFORMATION PROCESSING

摘　　要：The complex rock fracture and road pavement cracks are more difficult to extract than the other linear objects in an image. In rock engineering, the rock fracture is an important. factor that might cause tunnel and bridge collapse, or rock slope or dam damage. In road construction, the crack is one of the main pavement diseases. To avoid the difficultly of extracting fractures/cracks in an image, a new algorithm for tracking the central lines of fractures or cracks is studied to alleviate the problem for image segmentation. It includes four aspects: (1) a new fractional differential template is established to enhance the blurring and weak fractures/cracks in an image, compared with the traditional fractional differential template Tiansi, the new template has no zero coefficient and can enhance the micro-fractures/cracks; (2) in order to decrease the difficulty level of fracture/crack extraction, an algorithm for extracting the feature points of the fracture/crack central line is proposed based on the idea of Steger algorithm; (3) after linking short gaps based on distance, the long gap linking is made according to the principle of hydrodynamics, it first makes judgment if the two neighboring feature points are in one crack or not, in which, the feature points are regarded as two spring resources, then in light on the idea of water gushed out of the spring, when the two water flows meet together, the two points are recognized in one crack, otherwise they are not in one crack and cannot be connected together and (4) if the two neighboring feature points are in one crack, then the distance and the curvature between the two line segments are calculated, if they are less than the given thresholds, the linking path is searched and the gap is filled. Compared with the four traditional algorithms by testing hundred images, the new algorithm can accurately and quickly extract the central lines in complex rock fracture and rough road pavement cracks, which can increase the accuracy of crack/fracture image segmentation compared to the other algorithms.

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第 58 篇

标　　题：An Adaptive And Secure Traffic Information Forwarding Mechanism In Internet Of Vehicles

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期　　刊：INTERNATIONAL JOURNAL OF COMMUNICATION SYSTEMS

摘　　要：Traffic information of disparate types in Internet of Vehicles (IoV) is the basis for supporting various IoV applications. Since traffic flows vary in real time, it is challenging to carry out efficient and reliable transfer of such information. Moreover, IoV is vulnerable to security threats due to its inherent properties such as dynamically changing topology and high-speed motion of vehicles. Attacks, once launched successfully, would also disrupt message transmission between vehicles. We propose an adaptive traffic information forwarding mechanism, which divides traffic information in

two categories, that is, early warning information and service information. The former is handled by selecting a relay node based on node connection stability evaluation, while the latter is handled by adopting an appropriate forwarding method according to the identified traffic flow density. Specifically, in a low-density environment, we employ a broadcast method; while in a high-density environment, we evaluate the cognitive interaction values of vehicle nodes and employ a cognitive interaction-based method to select a relay node. Simulation results show that the proposed mechanism improves the forwarding efficiency of traffic information and yields satisfactory performance in mitigating black hole attacks.

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WOS 号： 000573011700001

第 59 篇

标　　题： Pavement Aggregate Shape Classification Based On Extreme Gradient Boosting

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： Aggregate plays the role of skeleton filling in asphalt pavements. The shape of the aggregate affects the embedded structure between the aggregates, thus affecting the performance of asphalt concrete. In this study, extreme gradient boosting (XGBoost) classification is used to study the automatic shape classification of aggregates. The expression of main and microscopic features of aggregate was improved by transforming aggregate images into data, and a feature importance analysis method based on method fusion is proposed to select the feature parameters of aggregate morphology. Based on cross-validation, the XGBoost classification model was trained by optimizing the super parameter combination to complete the classification of aggregate shapes. Compared with the random forest model, the results show that the proposed method can effectively classify aggregate shapes. It is also proved that the two-dimensional images can reflect the three-dimensional features of the aggregate to some extent. This method provides a certain theoretical basis for the automatic classification of aggregate, and simultaneously it has important practical significance to promote the intelligent production of asphalt mixtures. (C) 2020 Elsevier Ltd. All rights reserved.

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第 60 篇

标　　题： Landslide Multi-Attitude Data Measurement Of Bedding Rock Slope Model

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期　　刊：INTERNATIONAL JOURNAL OF PARALLEL PROGRAMMING

摘　　要：At present, commonly used measurement methods for landslide model pay much attention to the measurement of global displacement without a detailed description of individual components. However, the multi-attitude data concerning the model of bedding rock slope lay the data foundation for describing the mechanism of landslide. In an attempt to obtain the 3D multi-attitude displacement data, this paper, based on the binocular stereo vision as the measurement tool, adopts the cyclic coded targets to follow the unique track of rock block trajectory. Furthermore, a combination of circular coded targets and assisted location marks is designed to obtain the spatial displacement and rotation angle of rock mass center implicitly through the local coordinate system. Finally, the data such as speed, accelerated speed are acquired in accordance with the relationship of time domain and spatial domain. The experiment results show that this paper provides an effective method for the collection of elaborate and accurate landslide data of the bedding rock slope model.

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WOS 号：000563140300009

第 61 篇

标　　题：Codebook Cardinality Spectrum Of Distributed Arithmetic Coding For Independent And Identically-Distributed Binary Sources

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期　　刊：IEEE TRANSACTIONS ON INFORMATION THEORY

摘　　要：It was demonstrated that, as a nonlinear implementation of Slepian-Wolf Coding, Distributed Arithmetic Coding (DAC) outperforms traditional Low-Density Parity-Check (LPDC) codes for short code length and biased sources. This fact triggers research efforts into theoretical analysis of DAC. In our previous work, we proposed two analytical tools, Codebook Cardinality Spectrum (CCS) and Hamming Distance Spectrum, to analyze DAC for independent and identically-distributed (i.i.d.) binary sources with uniform distribution. This article extends our work on CCS from uniform i.i.d. binary sources to biased i.i.d. binary sources. We begin with the final CCS and then deduce each level of CCS backwards by recursion. The main finding of this article is that the final CCS of biased i.i.d. binary sources is not uniformly distributed over [0, 1). This article derives the final CCS of biased i.i.d. binary sources and proposes a numerical algorithm for calculating CCS effectively in practice. All theoretical analyses are well verified by experimental results.

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WOS 号：000572628800039

第 62 篇

标　　题：Privacy-Aware Smart Card Based Biometric Authentication Scheme For E-Health
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通讯作者：Chen, L (corresponding author), Changan Univ, Dept Informat Network, Xian, Peoples R China.
期　　刊：PEER-TO-PEER NETWORKING AND APPLICATIONS
摘　　要：Electronic health (E-health), which makes healthcare more convenient and flexible to practitioners, is envisioned to alleviate the contradiction between limited healthcare resources and growing healthcare requirements. However, it face various challenges, one of which is how to protect the sensitive health data. A mass of authentication schemes have been put forward to solve this issue, but most of them have security limitations in terms of security vulnerabilities and features. In this paper, we find that the scheme of Al-Saggaf et al. is vulnerable to the impersonation attack and lacks user anonymity. Furthermore, we put forth a privacy-aware smart card based biometric authentication (PSBA) scheme for e-health, which provides more desired security properties as well as defending various possible attacks. Finally, we applies ProVerif to prove mutual authentication and session key security of our scheme. The comprehensive analysis and comparison show the security and usability of our scheme.
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WOS 号：000585008400001

第 63 篇
标　　题：Incremental Matrix-Based Subspace Method For Matrix-Based Feature Extraction
作　　者：[Zhang, Zhaoyang; Sun, Shijie; Wang, Wei] Changan Univ, Sch Informat Engn, Xian 710068, Peoples R China
通讯作者：Sun, SJ (corresponding author), Changan Univ, Sch Informat Engn, Xian 710068, Peoples R China.
期　　刊：COMPLEXITY
摘　　要：The matrix-based features can provide valid and interpretable information for matrix-based data such as image. Matrix-based kernel principal component analysis (MKPCA) is a way for extracting matrix-based features. The extracted matrix-based feature is useful to both dimension reduction and spatial statistics analysis for an image. In contrast, the efficiency of MKPCA is highly restricted by the dimension of the given matrix data and the size of the training set. In this paper, an incremental method to extract features of a matrix-based dataset is proposed. The method is methodologically consistent with MKPCA and can improve efficiency through incrementally selecting the proper projection matrix of the MKPCA by rotating the current subspace. The performance of the proposed method is evaluated by performing several experiments on both point and image datasets.
DOI：10.1155/2020/8864594
WOS 号：000591010100001

第 64 篇
标　　题：Vehicle Spatial Distribution And 3D Trajectory Extraction Algorithm In A

Cross-Camera Traffic Scene

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通讯作者：Song, HS (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊：SENSORS

摘　　要：The three-dimensional trajectory data of vehicles have important practical meaning for traffic behavior analysis. To solve the problems of narrow visual angle in single-camera scenes and lack of continuous trajectories in 3D space by current cross-camera trajectory extraction methods, we propose an algorithm of vehicle spatial distribution and 3D trajectory extraction in this paper. First, a panoramic image of a road with spatial information is generated based on camera calibration, which is used to convert cross-camera perspectives into 3D physical space. Then, we choose YOLOv4 to obtain 2D bounding boxes of vehicles in cross-camera scenes. Based on the above information, 3D bounding boxes around vehicles are built with geometric constraints which are used to obtain projection centroids of vehicles. Finally, by calculating the spatial distribution of projection centroids in the panoramic image, 3D trajectories of vehicles are extracted. The experimental results indicate that our algorithm can effectively complete vehicle spatial distribution and 3D trajectory extraction in various traffic scenes, which outperforms other comparison algorithms.

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第 65 篇

标　　题：A Network Selection Strategy Based On Joint Optimization Of User Satisfaction And Transmission Efficiency In Internet Of Vehicle

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Network selection in the Internet of Vehicles has become a popular topic of research. Unlike existing algorithms for heterogeneous network environments that rarely consider user satisfaction, in this paper, we propose a network selection strategy that takes into account both user satisfaction and transmission efficiency. We employ the effective capacity concept, which describes the maximum throughput a system can achieve under a speci?c statistical Quality-of-Service (QoS) delay violation probability constraint. This strategy first analyzes the influence of different utility function weight coefficients, transmission power, and time delay on each network utility satisfaction function. It is evident that the weight coefficient is proportional to the value of the utility function.

Within a constrained transmission power range, the rate of increase of the function gradually slows down until it approaches a fixed value. When the delay factor value is larger, the function value is smaller, which indicates that the pursuit of lower delay will sacrifice other network performance aspects. In order to determine the maximum value of each network utility satisfaction function, a convex optimization theory is introduced for the joint optimization of user satisfaction and transmission efficiency. Finally, simulation experiments carried out under three representative network environments show that the proposed strategy is efficient and reliable.

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第 66 篇

标　　题： Quantitative Evaluation For Shape Characteristics Of Aggregate Particles Based On 3D Point Cloud Data

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： The aggregate with good shape characteristics are conducive to the formation of the internal structure of asphalt pavement and have an important impact on the pavement performance. In order to quantify the aggregate shape characteristics more comprehensively, the quantitative evaluation method for the shape of aggregate particles based on 3D point cloud data was proposed. Basalt, granite and limestone aggregates with size of 9.5 mm, 13.2 mm and 16 mm were obtained by screening. Each type of aggregates was divided into five different shapes of the tetrahedron, pentahedron, hexahedron, elongate and flake. The image acquisition system based on Gocator 3D intelligent sensor was used to collect 3D point cloud data of the aggregates. The noise in the 3D point cloud data collected was removed by the cascade filtering method and then the greedy triangulation algorithm was used to reconstruct the 3D aggregate digitized surface. Finally, the characteristic parameters such as length, width, height, volume and the maximum diameter of the 3D convex hull were extracted from the reconstructed aggregate particles, and the shape indexes of the aggregate, such as the isometric ratio, flakiness ratio, sphericity and roundness indexes, were calculated based on the extracted characteristics. The experimental results show that the 3D shape index of road aggregates proposed in this paper can be used for the comprehensive quantitative evaluation of the morphological characteristics of aggregates with different lithology, particle sizes and shapes. It is instructive to improve the performance of the asphalt mixture and study the aggregate gradation.

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第 67 篇

标　　题：Pavement Crack Detection And Segmentation Method Based On Improved Deep Learning Fusion Model

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期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：Pavement damage is the main factor affecting road performance. Pavement cracking, a common type of road damage, is a key challenge in road maintenance. In order to achieve an accurate crack classification, segmentation, and geometric parameter calculation, this paper proposes a method based on a deep convolutional neural network fusion model for pavement crack identification, which combines the advantages of the multitarget single-shot multibox detector (SSD) convolutional neural network model and the U-Net model. First, the crack classification and detection model is applied to classify the cracks and obtain the detection confidence. Next, the crack segmentation network is applied to accurately segment the pavement cracks. By improving the feature extraction structure and optimizing the hyperparameters of the model, pavement crack classification and segmentation accuracy were improved. Finally, the length and width (for linear cracks) and the area (for alligator cracks) are calculated according to the segmentation results. Test results show that the recognition accuracy of the pavement crack identification method for transverse, longitudinal, and alligator cracks is 86.8%, 87.6%, and 85.5%, respectively. It is demonstrated that the proposed method can provide the category information for pavement cracks as well as the accurate positioning and geometric parameter information, which can be used directly for evaluating the pavement condition.

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第 68 篇

标　　题：A Prediction Model Of Structural Settlement Based On Emd-Svr-Wnn

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期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：Timely and accurate prediction of structural settlement is of great significance to eliminate the hidden danger of structural and prevent structural safety accidents. Since the deformation monitoring data usually is nonstationary and nonlinear, the deformation prediction is a difficult problem in the structural monitoring research. Aiming at the

problems in the structural deformation prediction model and considering the internal characteristics of deformation monitoring data and the influence of different components in the data on the prediction accuracy, a combined prediction model based on the Empirical Mode Decomposition, Support Vector Regression, and Wavelet Neural Network (EMD-SVR-WNN) is proposed. EMD model is used to decompose the structure settlement monitoring data, and the settlement data can be effectively divided into relatively stable trend terms and residual components of random fluctuation by energy matrix. According to the different characteristics of random items and trend items, WNN and SVR methods are, respectively, used for prediction, and the final settlement prediction is obtained by integrating the prediction results. The measured ground settlement data of foundation pit in subway construction is used to test the performance of the model, and the test results show that the prediction accuracy of the combined prediction model proposed in this paper reaches 99.19%, which is 77.30% higher than the traditional SVR, WNN, and DBN-SVR models. The experimental results show that the proposed prediction model is an effective model of structural settlement.

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第 69 篇

标　　题： A Novel Timing And Frequency Offset Estimation Algorithm For Filtered Ofdm System

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通讯作者： Feng, XL (corresponding author), Changan Univ, Xian 710064, Peoples R China.

期　　刊： EURASIP JOURNAL ON ADVANCES IN SIGNAL PROCESSING

摘　　要： As a critical technology of 5G air interface waveform, filtered orthogonal frequency division multiplexing (F-OFDM) not only inherits the technical advantages of OFDM, but also has outstanding advantages in system flexibility and spectrum efficiency. However, as a multi-carrier technology, it is still extremely sensitive to sample timing offset (STO) and carrier frequency offset (CFO). In this letter, an improved Park frequency domain training sequence (FS-Park) is proposed to complete STO and CFO estimation of F-OFDM system. Firstly, a real-value pseudorandom number (PN) sequence is sent to each subcarrier as training sequence in frequency domain, the corresponding time domain training symbol has a conjugate symmetry structure. Secondly, the training symbol is utilized for timing synchronization, then the fractional frequency offset is estimated based on the cyclic prefix in time domain. Finally, the integer frequency offset is estimated in frequency domain based on the auto-correlation of PN sequence. The simulation results illustrate that the FS-Park algorithm not only has a single pulse timing metric curve and great STO estimation accuracy, but also has better performance of CFO estimation than classical Park algorithm and Liang Xiao's method.

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WOS 号： 000565199100001

电子与控制工程学院

第 1 篇

标　　题： Application Of Deep Canonically Correlated Sparse Autoencoder For The Classification Of Schizophrenia

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期　　刊： COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE

摘　　要： Background and objective: Imaging genetics has been widely used to help diagnose and treat mental illness, e.g., schizophrenia, by combining magnetic resonance imaging of the brain and genomic information for comprehensive and systematic analysis. As a result, utilizing the correlation between magnetic resonance imaging of the brain and genomic information is becoming an important challenge. Methods: In this paper, the joint analysis of single nucleotide polymorphisms and functional magnetic resonance imaging is conducted for comprehensive study of schizophrenia. We developed a deep canonically correlated sparse autoencoder to classify schizophrenia patients from healthy controls, which can address the limitation of many existing methods such as canonical correlation analysis, deep canonical correlation analysis and sparse autoencoder. Results: The proposed deep canonically correlated sparse autoencoder can not only use complex nonlinear transformation and dimension reduction, but also achieve more accurate classifications. Our experiments showed the proposed method achieved an accuracy of 95.65% for SNP data sets and an accuracy of 80.53% for fMRI data sets. Conclusions: Experiments demonstrated higher accuracy of using the proposed method over other conventional models when classifying schizophrenia patients and healthy controls.

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第 2 篇

标　　题： Cooccurrence Interference Graph (Cig) Based Hybrid Scheduling Scheme Combining Interference Alignment In Dense Femtocell Networks

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期　　刊：FRESENIUS ENVIRONMENTAL BULLETIN

摘　　要：To satisfy the requirement of enormous wireless data services, it has been proposed to improve the network throughput by the dense deployment of femtocells with frequency reuse. However, the interference poses big challenges. The scheduling problem combing interference alignment (IA) is fundamentally different from traditional scheduling problems. On the one hand, it needs to select users to perform IA due to the feasible constraint of IA and the diversity of the interference strength. On the other hand, IA can decrease the interference in the selected IA group, while all the participant users have to be scheduled simultaneously, termed as the consistency of scheduling among participant users of the IA group. Therefore, the hybrid scheduling scheme combining IA in the dense femtocells network is studied in this paper. First, to represent the diversity of interference and the consistency of scheduling among participant users of the IA group, the combination representation model of the IA and interference named the multi-scheme cooccurrence interference graph (CIG) is constructed. Second, the available rate of each user is acquired considering the aggregate interference and asymmetry of interference, which are based on the decomposition in chordal graph and the analysis of the characteristic network topology. At last, the hybrid scheduling scheme is proposed based on the maximum weight independent set (MWIS) problem. Simulation results shows that the proposed scheme can approach the optimum solution in a small-sized network, and effectively improve the sum rate in dense networks.

WOS 号：000517349200011

第 3 篇

标　　题：Adaptive Collaborative Graph For Discriminant Analysis Of Hyperspectral Imagery

作　　者：[Ye, Zhen; Dong, Rui; Bai, Lin] Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China; [Nian, Yongjian] Third Mil Med Univ, Army Med Univ, Coll Biomed Engn & Imaging Med, Chongqing, Peoples R China

通讯作者：Ye, Z (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China.

期　　刊：EUROPEAN JOURNAL OF REMOTE SENSING

摘　　要：Recently, sparse graph-based discriminant analysis (SGDA) and collaborative graph-based discriminant analysis (CGDA) have been developed for dimensionality reduction of hyperspectral imagery. In SGDA or CGDA, a graph is constructed by l(1)-norm minimization-based representation or l(2)-norm minimization-based representation, respectively, based on labeled samples. These two methods have shown success over traditional methods by reinforcing discriminative power, but are limited in within-class representation and distribution of representation coefficients. In order to preserve intrinsic geometrical structure of original data and improve the interpretability of the underlying graph, we propose an adaptive collaborative graph for discriminant analysis (ACGDA), which explicitly models the internal relationship among within-class pixels during graph construction. The proposed method couples distance-weighted Tikhonov regularization with l(2)-norm minimization-based representation, of which the coefficients are solutions to a closed-form expression. The

graph adaptively adjusts the collaborative representation by using distance-weighted measurement, which produces stronger ability of discrimination. In addition, the graph weight matrix is designed in the form of a block-diagonal structure, reducing the computational cost and further improving discriminative power. The proposed approach is compared with several traditional and state-of-the-art methods on two benchmark datasets. Experimental results demonstrate that the proposed approach can yield superior classification performance.

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第 4 篇

标　　题： Low Power And Ultrafast Multi-Stat Switching In Nc-Al Induced Al < Sub > 2 </Sub > O < Sub > 3 </Sub >/Al < Sub > X </Sub > O < Sub > Y </Sub > Bilayer Thin Film Rram Device

作　　者： [Zhu, Wei; Li, Jie; Xu, Xiaobo; Zhang, Lin; Zhao, Yi] Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China
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期　　刊： IEEE ACCESS

摘　　要： Low power and ultrafast multi-state storage resistive switching memory (RRAM) device had been developed based on Al/Al₂O₃/Al_xO_y/Al structure. Both of Al₂O₃ and Al nanocrystal (nc-Al) induced Al_xO_y thin films were deposited by RF sputtering. The nc-Al Al_xO_y based RRAM device showed typical unipolar switching behavior which was due to conductive filaments (CFs) connected and broke in Al₂O₃/Al_xO_y layers. An additional 30 nm Al₂O₃ thin film would deposit on Al_xO_y film to form bi-layer structure, in which the multi-state switching could be observed by applying different voltage pulses on it. In this study, a 15 V pulse with 600 ps width could trigger RRAM device switch from high resistance state(HRS)to next intermediate resistance state (IRS), the device could finally switch to LRS after continuous pulse simulation. Such switching from HRS to LRS was called & x201C;writing & x201D; process as data would be stored in RRAM device after this process. A longer but lower amplitude voltage pulse was required to make device switch from LRS to HRS which was called & x201C;erasing & x201D; process, as data would be eliminated after this process. The multi-state switching was corresponding internal switching between these IRSs during & x201C;writing & x201D; and & x201C;erasing & x201D; process. The multi-level resistances might be caused by partially formed CFs in Al₂O₃/Al_xO_y layers. The distribution of CFs could be controlled by controlling the shape of pulse voltage to achieve this multi-state storage. This bilayer structured RRAM device had good endurance and retention performances at both room and high temperatures.

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第 5 篇
标　　题： Compressed Sensing For Energy Conservation Pavement Temperature Compression On Epave
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期　　刊： IEEE ACCESS
摘　　要： Monitoring the road condition has gain significant importance in last few years. Among existing road monitoring technologies, wireless sensor network (WSN) is favored by researchers because of its low cost and flexibility in deployment. Specifically, it can collect road condition data spontaneously and transmit the information to a fusion center that can determine the damage level or status of the road surface. However, there is a big challenge preventing the wide deployment of WSN that the sensor nodes can only survive for a limited time in practice. It is because majority of the power has been spent on the continuous wireless transmission of the extensive road data to the fusion center. In this study, we propose a low-power temperature data transmission scheme based on compressed sensing in combination with selfpowered road surface wireless monitoring sensor system to realize data sparseness and compression and reduce system power consumption. Experimental results show that the compressed data can reduce the power consumption requirement by 50.78% under the allowable reconstruction error by comparison with the existing approaches.
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第 6 篇
标　　题： P-Lpn: Towards Real Time Pedestrian Location Perception In Complex Driving Scenes
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期　　刊： IEEE ACCESS
摘　　要： Semantic segmentation is one of the most critical modules in road scene understanding. In this paper, we focus on the challenging task of pedestrian & x2019;s relative location perception in the semantic graph of complex driving scenes. Prevalent research on semantic segmentation mainly concentrate on improving the segmentation accuracy with less attention paid to computational efficiency. Furthermore, little effort has been made in pedestrian location perception in complex driving scenes. For example, current

semantic segmentation methods classify all pedestrians as a mono category, regardless of whether the pedestrians are penetrating into the vehicular lane or standing still in the safe sidewalk area. We propose a pedestrian location perception network (P-LPN). P-LPN can produce real-time semantic segmentation while simultaneously providing location inference for each pedestrian in semantic maps. This enables autonomous driving system to categorize pedestrians into different safety levels. We comprehensively evaluated P-LPN on CityScapes benchmark through comparative studies. Our proposal achieved competitive performance in both accuracy and efficiency. It yields quality inference with real-time speed at & x007E;22 fps.

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WOS 号： 000524750000006

第 7 篇

标　　题： Semi-Supervised Semantic Segmentation Using Adversarial Learning For Pavement Crack Detection

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期　　刊： IEEE ACCESS

摘　　要： Regular inspection of pavement conditions is important to guarantee the safety of transportation. However, current approaches are time-consuming and subjective, which requires the technician to annotate each training image exactly pixel by pixel. To ease the workload of the inspector and lower the cost of acquiring the high-quality training dataset, a semi-supervised method for the pavement crack detection is proposed. Firstly, unlabeled pavement images can be used for the model training in our proposed algorithm, our model can generate a supervisory signal for unlabeled pavement images, which makes up for the deficiency of image annotation. Secondly, an adversarial learning method and a full convolution discriminator are adopted, which can learn to distinguish the ground truth from segmentation predictions. To improve the accuracy of pavement crack detection, the adversarial loss is coupled with the cross-entropy loss in discriminator. Thus, the quality of the training model is no longer dependent on the quantity of the labeled dataset and the accuracy of the labeled. Compared with existing methods that can only employ labeled images, our method utilizes unlabeled images to improve the pavement crack detection accuracy. Moreover, our model is validated on the CFD dataset and AigleRN dataset, the experimental results show that the proposed algorithm is effective. Compared with existing methods, not only can our method detect different types of cracks, but also be particularly effective when only a few labeled are available: when using 118 crack images with a resolution of 480 x 320, using only 50% of the labeled data, the detection accuracy of our model can reach 95.91%.

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第 8 篇
标　　题： Research On Inception Module Incorporated Siamese Convolutional Neural Networks To Realize Face Recognition
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期　　刊： IEEE ACCESS
摘　　要： Face recognition is an active research subject of biometrics due to its significant research and application prospects. The performance of face recognition can be affected by a series of uncontrollable factors, such as illumination, expression, posture and occlusion, which restricts its real-world applications. Therefore, improving the robustness of face recognition to environmental changes became an urgent problem. In this paper, a simplified deep convolutional neural network structure having high robustness under unlimited conditions is designed for face recognition. This structure can improve training speed and face recognition accuracy, and be suitable for small-scale data sets. Inception Module Incorporated Siamese Convolutional Neural Networks (IMISCNN) is developed based on effective reduction of external interference and better features extraction by adopting the Siamese network structure. A cyclical learning rate strategy is also introduced in IMISCNN for better model convergence. Compared to classical face recognition algorithms, such as PCA, PCA and SVM, CNN, PCANet, and the original SNN et al. The accuracy of IMISCNN in CASIA-webface and Extended Yale B standard face database is 99.36% and 99.21%, respectively. Its feasibility and effectiveness have been verified in our experiments.
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第 9 篇
标　　题： Deep Principal Correlated Auto-Encoders With Application To Imaging And Genomics Data Integration
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期　　刊： IEEE ACCESS
摘　　要： In terms of complex diseases like schizophrenia, more and more studies are beginning to treat genetic variants and brain imaging phenotypes as an important factor. In this paper, a competent optimization model is exploited to overcome the weakness of deep canonical correlation analysis (DCCA). The model consists of principal component

analysis (PCA) on the multi-modality linear features learning and multi-layer belief networks on multi-modality nonlinear features learning. In order to complete a better result of correlation analysis and classification, the output nodes of multi-layer belief network are used for back propagation (BP) network training. Previous works on solving canonical correlation analysis (CCA) had proposed several models based on deep neural network or regularization, typically involving either some form of norm or auto-encoders with a reconstruction objective. Many existing advanced models had been developed to find the maximal correlation in multi-modality data. However, these multi-modality data tend to have the number of feature dimensions which more than that of samples. Differ from these advanced models, our proposed model is applied to analyze the real set of multi-modality data and test several previous models, then comparing them experimentally on fMRI imaging and SNPs genomics. In experiments, the results show that our model, deep principal correlated auto-encoders (DPCAE), learns features with effectively higher correlation and better performance of classification than those previous models. In terms of classification accuracy, the classification accuracy of the datasets exceeds 90;, but that of the CCA-based model are about 65;, and that of the DNN-based model are about 80;, the classification accuracy of the DPCAE is significantly improved obviously. In the experiment of clustering performance evaluation, the DPCAE further verified its superior classification performance with an average normalized mutual information index of 93.75; and an average classification error rate index of 3.8;. In terms of maximal correlation analysis, the model outperforms other advanced models with a maximal correlation of 0.926, showing excellent performance in high-dimensional data analysis.

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第 10 篇

标　　题： Pinning Synchronization Via Intermittent Control For Memristive Cohen-Grossberg Neural Networks With Mixed Delays

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期　　刊： IEEE ACCESS

摘　　要： This paper presents the exponential synchronization for a class of memristive Cohen-Grossberg neural networks (MCGNNs) with mixed delays via a new hybrid control strategy. This new hybrid control strategy combines pinning control and periodic intermittent control. According to the feature of memristor, the memristive terms of the MCGNNs with mixed delays are normalized by a simple linear transformation. Then the designed periodic intermittent control is added to selected partial network nodes. Based on the stability theory of memristive neural networks and the exponential synchronization rule, the new synchronization conditions are given. Finally, numerical simulations are provided to show the effectiveness of the theoretical

method.

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第 11 篇

标　　题： Detection And Evaluation Method Of Transmission Line Defects Based On Deep Learning

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期　　刊： IEEE ACCESS

摘　　要： The issues of existing research on transmission line detection include the following three: only detects a few categories, no open transmission line component dataset, and no unified, comprehensive evaluation index. In this paper, we propose a detection and evaluation method of defect for transmission line inspection based on deep learning. The transmission line contains various pivotal components, while previous research has mostly focused on a few categories. In the proposed approach, the following study is performed by establishing a transmission line dataset named Wire& x005F;10, which considers defects as a category. Wire& x005F;10 contains 8 defects in transmission line components, such as insulator defect, triple-plate defect, damper defect, grading ring defect, and et al., as well as nest and foreign body that attached to the transmission line. The object detection of aerial images taken during the actual inspection is susceptible to background and lighting. These two factors are used as variables to define the background-dataset and the lighting-dataset. Faster R-CNN, an end-to-end and high recognition accuracy deep learning algorithm, is used to build detection models with transfer learning and fine-tuning. The results show that the detection method can accurately identify the defect categories in the Wire& x005F;10 dataset and is robust to aerial images with complex backgrounds and different lighting. The proposed method can effectively and accurately identify defects in the automatic inspection of transmission lines.

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第 12 篇

标　　题： Svnd Enhanced Metaheuristic For Plug-In Hybrid Electric Vehicle Routing Problem

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Plug-in Hybrid Electric Vehicles (PHEVs), as a new type of environmental-friendly low cost transportation, have attracted growing interests for logistics. The path-planning optimization for PHEV has become a major challenge. In fact, PHEV-based routing

optimization is a type of hybrid vehicle routing problem (HVRP). Compared with the traditional Traveling Salesman Problem (TSP) and Vehicle Routing Problem (VRP), the PHEV routing problem should consider more constraints, such as time limits, capacity constraints (including fuel tank capacity and battery capacity), electric stations, fuel stations and so forth. In this paper, a Mixed Integer Linear Programming formulation is presented and a novel hybrid metaheuristic approach (HMA_SVND) is proposed. Our method is a combination of memetic algorithm (MA), sequential variable neighborhood descent (SVND) and a revised 2_opt method. Comparative studies show that our proposed method outperformed previous works.

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第 13 篇

标　　题： Automated Pavement Distress Detection And Deterioration Analysis Using Street View Map

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摘　　要： Automated pavement distress detection benefits road maintenance and operation by providing the condition and location of various distress rapidly. Existing work generally relies on manual labor or specific algorithms trained by dedicated datasets, which hinders the efficiency and applicable scenarios of methods. Street view map provides interactive panoramas of a large scale of urban roadway network, and is updated in a recurrent manner by the provider. This paper proposed a deep learning method based on a pre-trained neural network architecture to identify and locate different distress in real-time. About 20,000 street view images were collected and labeled as the training dataset using the Baidu e-map. Eight types of distress are notated using Yolov3 deep learning architecture. The scale-invariant feature transform (SIFT) descriptors combined with GPS and bounding boxes were applied to judge the deterioration of the distress. A decision tree was designed to evaluate the change of the distress over some time. A typical road in Shanghai was selected to verify the effectiveness of the proposed model. The images of the road from 2015 to 2017 were collected from the street view map. The results showed that the mean average precision of the proposed algorithm is 88.37%, demonstrating the vast potential of applying this method to detect pavement distress. 43 distress were newly generated, and 49 previous distress were patched in the two years. The proposed method can assist the authorities to schedule the maintenance activities more effectively.

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第 14 篇

标　　题：Finite-Time Synchronization Of Memristor-Based Fractional Order Cohen-Grossberg Neural Networks

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期　　刊：IEEE ACCESS

摘　　要：This paper is concerned with the finite-time synchronization (FTS) of memristor-based fractional order Cohen-Grossberg neural networks (MFCGNNs) with time-varying delays. Under the frame of fractional order differential inclusion and set-valued map, some new sufficient conditions to guarantee the FTS of MFCGNNs are established by means of constructing two different Lyapunov functions based on L1-norm in Theorem 1 and Lp-norm in Theorem 2. Via applying the asymptotic expansion property of Mittag-Leffler function, we propose a new estimation method of the settling time for synchronization which is less conservative than previous researches. Meanwhile, we deeply discuss the influence factor of settling time for synchronization. Finally, two numerical examples are given to demonstrate the effectiveness of obtained results.

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第 15 篇

标　　题：Image Precise Matching With Illumination Robust In Vehicle Visual Navigation

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期　　刊：IEEE ACCESS

摘　　要：In vehicle visual navigation, image matching algorithm is highly critical to positioning accuracy and processing efficiency. One single matching algorithm cannot satisfy all types of image features accurate acquisition, so Harris, SUSAN, FAST, SIFT, and SURF are respectively adopted to process various road images under normal lighting condition. During practical application, the appropriate algorithm can be selected based on detection rate and running time of the above algorithms. Aiming at the illumination change interference of the collected images in vehicle visual navigation, many traditional matching algorithms for illumination change are not optimal, so an image precise matching algorithm with illumination change robustness is proposed. Because image edges and detail information have lower sensitivity for illumination change, SURF feature points are optimized by image gradient based on the idea of Canny, and the bidirectional search is used to obtain precise matching points. The experimental results show that feature point detection of the algorithm remains good stability for

illumination change in images, and the matching accuracy can reach more than 94 & x0025;. The algorithm is not only robust to illumination change, but also ensures higher matching speed and meanwhile improves the matching accuracy significantly.

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WOS 号： 000539041600020

第 16 篇

标　　题： Modelling And Analysis Of Mutually Adaptive Vehicle Maneuvers During The Inserting Process Of Lane Changing Vehicle In Urban Driving Context

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期　　刊： IEEE ACCESS

摘　　要： This study developed a pair of lane changing (LC) model and car following (CF) model. They are used to investigate mutually adaptive maneuver of LC vehicle (LCV) and its immediate CF vehicle during the LCV's inserting process. The two models are developed based on a multianticipative CF model to simulate both of the LC and LC-adaptive CF maneuvers. A group of pairwise parameters are applied in the models to reflect the stimuli perceived by the two vehicle drivers simultaneously. Based on the united model framework, the features of the two vehicle maneuvers which are mutually and intensively influenced can be compared and analyzed. Vehicle trajectories collected on the urban arterial are applied to calibrating and validating the two models. Results show that the developed models can fit the trajectories in a higher accuracy than the previous models. The estimates of the model parameters revealed that dynamics of lateral moving vehicle influence the LC and CV maneuvers in different ways. It is found that the lateral influence has the heaviest influence on the vehicle maneuvers than other stimuli. The vehicles also adjust their maneuvers along with the change of traffic signal or LC target.

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第 17 篇

标　　题： Sparse Representation And Dictionary Learning Model Incorporating Group Sparsity And Incoherence To Extract Abnormal Brain Regions Associated With Schizophrenia

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期　　刊：IEEE ACCESS

摘　　要：Schizophrenia is a complex mental illness, the mechanism of which is currently unclear. Using sparse representation and dictionary learning (SDL) model to analyze functional magnetic resonance imaging (fMRI) dataset of schizophrenia is currently a popular method for exploring the mechanism of the disease. The SDL method decomposed the fMRI data into a sparse coding matrix X and a dictionary matrix D. However, these traditional methods overlooked group structure information in X and the coherence between the atoms in D. To address this problem, we propose a new SDL model incorporating group sparsity and incoherence, namely GS2ISDL to detect abnormal brain regions. Specifically, GS2ISDL uses the group structure information that defined by AAL anatomical template from fMRI dataset as priori to achieve inter-group sparsity in X. At the same time, L-1 - norm is enforced on X to achieve intra-group sparsity. In addition, our algorithm also imposes incoherent constraint on the dictionary matrix D to reduce the coherence between the atoms in D, which can ensure the uniqueness of X and the discriminability of the atoms. To validate our proposed model GS2ISDL, we compared it with both IK-SVD and SDL algorithm for analyzing fMRI dataset collected by Mind Clinical Imaging Consortium (MCIC). The results show that the accuracy, sensitivity, recall and MCC values of GS2ISDL are 93.75%, 95.23%, 80.50% and 88.19%, respectively, which outperforms both IK-SVD and SDL. The ROIs extracted by GS2ISDL model (such as Precentral gyrus, Hippocampus and Caudate nucleus, etc.) are further verified by the literature review on schizophrenia studies, which have significant biological significance.

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第 18 篇

标　　题：Leader-Following Formation Control And Collision Avoidance Of Second-Order Multi-Agent Systems With Time Delay

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期　　刊：IEEE ACCESS

摘　　要：In this article, the formation control problem has been considered for second-order multi-agent system with time delay. The involved controller is divided into two parts. The first part is to design the leader-following and adaptive control strategies that are utilized to achieve the specified formation shape. Based on a potential field function, the second part is applied to realizing the collision avoidance of the agents communicating with each other. By using the Lyapunov theory, some sufficient criteria are derived to ensure the specified formation shape of all agents and collision avoidance of any pair of agents. The derived criteria are formulated in terms of algebraic

conditions, in which the control gains play an important role. Finally, a numerical simulation is given to illustrate the effectiveness of the derived results.

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第 19 篇

标　　题： Metaheuristic For Solving Multi-Objective Job Shop Scheduling Problem In A Robotic Cell

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期　　刊： IEEE ACCESS

摘　　要： This paper deals with the multi-objective job shop scheduling problem in a robotic cell (MOJRCSP). All the jobs are processed according to their operations order on workstations. Different from classical job shop scheduling problem, the studied problem considers that jobs' transportation is handled by a robot. Also, the jobs are expected to be finished in a time window, instead of a constant due date. A mixed Integer Programming (MIP) model is proposed to formulate this problem. Due to the special characteristics of the studied problem and its NP-hard computational complexity, a metaheuristic based on Teaching Learning Based Optimization (TLBO) algorithm has been proposed. The proposed algorithm determines simultaneously the operations' assignments on workstations, the robot assignments for transportation operations, and the robot moving sequence. The objective is to minimize the makespan and the total earliness and tardiness. Computational results further validated the effectiveness and robustness of our proposed algorithm.

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第 20 篇

标　　题： Feature Selection Based On Random Forest For Partial Discharges Characteristic Set

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期　　刊： IEEE ACCESS

摘　　要： Since the dimension of combined feature set for partial discharge (PD) pattern recognition is higher, the corresponding sample size increases, as does the required amount of storage space and calculation, and there are features with less category-related characteristics in the feature parameters, which may contain redundant information between them. To solve the problem of higher feature dimension and complicated classification model required for the identification of partial discharge

insulation defect type in this paper. Random forest sequential forward selection method based on variance analysis (RF-VA) is proposed for the optimal subset selection. This method is improved in two aspects. Firstly, a method based on variance analysis is proposed, which measures feature differences between categories, and obtains a modified arrangement displacement scheme to guide rearrangement of the order of values taken on data sample out of bag. Secondly, the sequence forward search method used to do feature selection could get iteration evaluation results, which solves randomness to determine the size of feature subset and instability of the results existing in the original algorithm. The results show RF-VA can obtain a better subset of features. It is feasible to reduce the dimension of partial discharge characteristic set, and effectively improve the identification rate of partial discharge defect type.

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WOS 号： 000570102300001

第 21 篇

标　　题： Dual-Vector Model Predictive Current Control Of Permanent Magnet Synchronous Motor Drives With The Segment Golden Search Method

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期　　刊： IEEE ACCESS

摘　　要： Dual vector model predictive current control (DVMPCC) has been receiving plenty of concern due to its excellent static and dynamic performance. However, the application time of the selected voltage vector may be a wrong value because the calculation of duty cycle for each voltage vector is independent of the cost function. Here, to overcome the drawbacks of the current calculation methods, the paper introduces a novel approach to calculate the duty cycles for the two voltage vectors in one sampling time by combining the duty cycle calculation into the cost function. In this algorithm, the segment golden search method is used to find the optimal duty cycles for any pair of two voltage vectors. The cost function compares the available pairs of voltage vectors based on the obtained optimal duty cycles of each pair of voltage vectors to select the optimal pair of voltage vectors and duty cycles. In addition, to reduce the complexity of the algorithm, the redundant pairs of voltage vectors are eliminated and the available pairs of the voltage vectors is limit to five. Furthermore, a novel switching pattern is introduced to reduce the average switching frequency. When the inverter adopts the proposed MPCC, the optimal switching time and optimal voltage vector pair are both obtained at the same time, and the result duty cycle is always a reasonable number within the sampling interval. Comparative studies between the proposed method and a recently introduced duty cycle-based MPCC are carried out. The performance of a permanent magnet synchronous motor drive under the proposed MPCC confirms superiority in terms of average switching frequency, better quality currents, and electromagnetic torque ripple.

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第 22 篇
标　　题： The Influence Of Electric Field Inhomogeneity On Repetitive Performance Of A Corona-Stabilized Switch
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期　　刊： IEEE ACCESS
摘　　要： The corona-stabilized switch has a great potential in pulsed power systems where high pulse repetition frequencies are required. Corona discharge in SF6 in highly inhomogeneous electric field is utilized to improve repetitive performance of this kind of switch. To clarify how the repetitive performance (insulation recovery and repetitive breakdown stability) of the switch depends on the field inhomogeneity, the insulation recovery and repetitive breakdown stability of a corona-stabilized switch are experimentally investigated and theoretically analyzed. An innovative double-pulse method combining breakdown voltage and discharge channel images is used to measure the insulation recovery of the switch. For different electrodes, their voltage jitters at pulse repetition frequencies of 1-2000 Hz are measured to illustrate the stability of repetitive breakdown. The experimental results are theoretically analyzed from the memory effect and behavior characteristics of the residual plasma, the critical volume and its dynamic characteristics. The results reveal the corona stabilization enhancement effect during the repetitive breakdown in SF6 in extremely inhomogeneous field. The influence of electrode profile on the propagation of discharge channel shock wave, the decay of residual plasma and the recovery of neutral gas density are clarified. Effect of the electrostatic conditions, including the critical volume and its dynamic characteristics, and the intensity of corona discharge, on the repetitive performance of the switch are also clarified.
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WOS 号： 000587828000001

第 23 篇
标　　题： Reducing The Standstill Spacing And Duration Of Safe Braking Control In Vehicle Platoons With Delays
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期　　刊：IEEE ACCESS

摘　　要：Braking control, especially in an emergency, is a key technology that is needed to ensure safety in vehicle platoons. However, delays in vehicle platoons can severely affect braking control. This paper proposes an optimized braking control to reduce the standstill spacing and braking duration during delays so that a platoon will stop within a short time frame with a reduced length, thus improving road utilization while ensuring both inter-vehicle and in-vehicle safety. However, two challenges need to be addressed. First, due to the delay in car-following interactions and the nonlinearity of the control law, an analysis model is needed to quantize the duration and distance during an emergency braking with delays. Second, the optimization of these control parameters is an NP-hard problem. Therefore, delay differential equations are introduced to model the braking process, and a crossing criterion is introduced to establish the relationship between the control law and the braking process. The propositions of standstill spacing and braking duration are then derived based on the Runge-Kutta method. According to these criteria, a particle swarm optimization (PSO) based on a lexicographic method with a penalty function is introduced to provide a solution framework with polynomial complexity. Simulation results verify the accuracy of the braking modeling process. Moreover, the results verify the performance of the proposed algorithm and provide a reference for platoon control.

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第 24 篇

标　　题：On Ion Transport Regulation With Field-Effect Nonlinear Electroosmosis Control In Microfluidics Embedding An Ion-Selective Medium

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期　　刊：ELECTROPHORESIS

摘　　要：We study herein numerically the use of induced-charge electrokinetic phenomena to enable a flexible control of ion transport of dilute electrolyte in a straight ion concentration polarization system. The effect of three convection modes of induced-charge electrokinetic phenomena, including induced-charge electroosmosis, flow-field effect transistor, and alternating-current electroosmosis (ACEO), on convective arrestment of diffusive wave-front propagation is investigated by developing a cross-scale and fully coupled transient numerical simulation model, wherein multiple frequency electrochemical polarization and nonlinear diffuse charge dynamics in spatiotemporally varying solution conductivity are taken into account. We demonstrate by detailed comparative simulation studies that ACEO vortex flow field above a metal strip array arranged along the anodic chamber's bottom surface serves as the most efficient way for adjusting the salt density distribution at micrometer and even millimeter dimension, due to its high flexibility in controlling the stirring flow state

with the introduction of two extra electrical parameters. The specific operating status is determined by whether the electrode array is floating in potential (induced-charge electroosmosis) or biased to ground (flow-field effect transistor) or forced to oscillate at another Fourier mode (ACEO). These results prove useful for on-chip electric current control with electroconvective stirring.

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WOS 号： 000509504800001

第 25 篇

标　　题： On Shortened 3D Local Binary Descriptors

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期　　刊： INFORMATION SCIENCES

摘　　要： The wide-spread mobile systems nowadays desire ultra lightweight local geometric features to accomplish tasks relying on correspondences. Nonetheless, most existing 3D local feature descriptors, though shown to be distinctive and robust, still are real-valued and/or high-dimensional. Accordingly, this paper conducts a comparative study on current bit-selection methods with a focus on shortening 3D local binary descriptors. By analyzing several bit-selection techniques, we develop and evaluate various approaches to obtain a shortened version of a state-of-the-art feature remaining discriminative and robust. Through extensive experiments on four standard datasets with different data modalities (e.g., LiDAR and Kinect) and application scenarios (e.g., 3D object retrieval, 3D object recognition, and point cloud registration), we show that a small subset of representative bits are sufficient to achieve promising feature matching results as the initial descriptor. Moreover, the shortened binary descriptors still hold competitive or better distinctiveness and robustness compared to several state-of-the-art real-valued descriptors, e.g., spin image, SHOT, and RoPS, albeit being dramatically more efficient to match and store. Key to the foreseen research trend of local geometric feature description is dealing with compact binary descriptors; thus, our work may pave the way for this new research direction.

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第 26 篇

标　　题： Characteristics Of Plasma Activated Medium Produced By Atmospheric Pressure Helium Plasma Jet And Its Selective Effect On Malignant Melanoma And Normal Fibroblast Cells

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期　　刊： IEEE TRANSACTIONS ON PLASMA SCIENCE

摘　　要： The characteristics of plasma activated medium (PAM) and its different effects on cancer and normal cells are a relevant topic of study in the field of plasma medicine. In this study, an atmospheric pressure plasma jet (APPJ) with helium was applied for generating PAM, which was utilized for malignant melanoma (B16) and normal fibroblast (3T3) cell treatment. With the applied peak-peak voltages of 8, 10, and 12 kV, together with the gas flow rates of 1, 2, and 3 L/min, the characteristics of He APPJ and PAM were investigated, respectively. The results showed that compared with the free-standing jet, both the total power that was dissipated into the APPJ device and the emission intensities of reactive oxygen species (ROS) and reactive nitrogen species (RNS) in the gas phase increased when it interacted with the medium. There were obvious increases of H2O2 and NO2- in PAM with different APPJ activation time of 5, 10, 15, 30, 45, and 60 s. The gas flow rate did not yield significant differences in the concentration of species generated, the applied voltage being a more relevant parameter. Finally, the results of cell viability and cell apoptosis assay indicated that the identical dose PAM had a selective effect on two kinds of nonhomologous cells.

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第 27 篇

标　　题： Simulation And Optimization Design Of Sic-Based Pn Betavoltaic Microbattery Using Tritium Source

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期　　刊： CRYSTALS

摘　　要： In this paper, the Monte Carlo method and numerical model are used to build the electrical model of a SiC-based betavoltaic microbattery using a H-3 source, and the influences of structural parameters and the surface recombination effect on the output characteristics of the SiC PN battery are simulated. According to Monte Carlo calculations based on the energy spectrum of the H-3 source, the ionization energy deposition approaches the exponential distribution along the depth direction, and most of the 22rs are concentrated near the material surface. The ionization energy deposition data is converted into non-equilibrium carrier information for the numerical simulation of the battery's output characteristics. The simulation results show that the conversion efficiency of the battery rises first, and then decreases with the increase of the doping concentration of the N region. This is because the N region-doping affects the depletion region width and the built-in electrical potential at the same time. After considering the

surface recombination effect, the conversion efficiency decreased significantly. Thinning the thickness of or moderately reducing the doping concentration of the P region will weaken the surface recombination effect.

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WOS 号： 000519704700043

第 28 篇

标　　题： Automatic Tunnel Crack Detection Based On U-Net And A Convolutional Neural Network With Alternately Updated Clique

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期　　刊： SENSORS

摘　　要： Regular crack inspection of tunnels is essential to guarantee their safe operation. At present, the manual detection method is time-consuming, subjective and even dangerous, while the automatic detection method is relatively inaccurate. Detecting tunnel cracks is a challenging task since cracks are tiny, and there are many noise patterns in the tunnel images. This study proposes a deep learning algorithm based on U-Net and a convolutional neural network with alternately updated clique (CliqueNet), called U-CliqueNet, to separate cracks from background in the tunnel images. A consumer-grade DSC-WX700 camera (SONY, Wuxi, China) was used to collect 200 original images, then cracks are manually marked and divided into sub-images with a resolution of 496 x 496 pixels. A total of 60,000 sub-images were obtained in the dataset of tunnel cracks, among which 50,000 were used for training and 10,000 were used for testing. The proposed framework conducted training and testing on this dataset, the mean pixel accuracy (MPA), mean intersection over union (MIoU), precision and F1-score are 92.25%, 86.96%, 86.32% and 83.40%, respectively. We compared the U-CliqueNet with fully convolutional networks (FCN), U-net, Encoder-decoder network (SegNet) and the multi-scale fusion crack detection (MFCD) algorithm using hypothesis testing, and it's proved that the MIoU predicted by U-CliqueNet was significantly higher than that of the other four algorithms. The area, length and mean width of cracks can be calculated, and the relative error between the detected mean crack width and the actual mean crack width ranges from -11.20% to 18.57%. The results show that this framework can be used for fast and accurate crack semantic segmentation of tunnel images.

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第 29 篇

标　　题：Research On The Sustainable Development Of Urban Housing Price Based On Transport Accessibility: A Case Study Of Xi'An, China

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期　　刊：SUSTAINABILITY

摘　　要：The development of a real estate economy is beneficial to urban stability. A method of real estate price prediction based on transport accessibility is proposed. The method adds bus accessibility and metro accessibility into the model, which has higher prediction accuracy than the traditional model. Firstly, bus accessibility and metro accessibility are calculated according to the space syntax theory. Then, four models, the traditional hedonic price model (HPM) with transport accessibility, the traditional hedonic price model without transport accessibility, the random forest (RF) model with transport accessibility, and the random forest model without transport accessibility, are introduced. Finally, the four models are compared and analyzed in terms of precision and importance of index contributions. Taking Xi 'an, China, as an example, the experimental results show that the transport accessibility calculated based on space syntax can accurately represent the transport convenience in an urban space structure. Furthermore, it has a great influence on the contribution of indexes in the model. With the introduction of bus accessibility and metro accessibility, the accuracy of the real estate price prediction model is greatly improved.

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第 30 篇

标　　题：Deep Convolutional Bilstm Fusion Network For Facial Expression Recognition

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期　　刊：VISUAL COMPUTER

摘　　要：Deep learning algorithms have shown significant performance improvements for facial expression recognition (FER). Most deep learning-based methods, however, focus more attention on spatial appearance features for classification, discarding much useful temporal information. In this work, we present a novel framework that jointly learns spatial features and temporal dynamics for FER. Given the image sequence of an expression, spatial features are extracted from each frame using a deep network, while the temporal dynamics are modeled by a convolutional network, which takes a pair of consecutive frames as input. Finally, the framework accumulates clues from fused features by a BiLSTM network. In addition, the framework is end-to-end learnable, and

thus temporal information can be adapted to complement spatial features. Experimental results on three benchmark databases, CK+, Oulu-CASIA and MMI, show that the proposed framework outperforms state-of-the-art methods.

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WOS 号： 000513378500005

第 31 篇

标　　题： Real-Time Vehicle Detection Framework Based On The Fusion Of Lidar And Camera

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通讯作者： Wang, GP (corresponding author), Changan Univ, Sch Elect & Control Engn, Middle Sect, Naner Huan Rd, Xian 710064, Peoples R China.

期　　刊： ELECTRONICS

摘　　要： Vehicle detection is essential for driverless systems. However, the current single sensor detection mode is no longer sufficient in complex and changing traffic environments. Therefore, this paper combines camera and light detection and ranging (LiDAR) to build a vehicle-detection framework that has the characteristics of multi adaptability, high real-time capacity, and robustness. First, a multi-adaptive high-precision depth-completion method was proposed to convert the 2D LiDAR sparse depth map into a dense depth map, so that the two sensors are aligned with each other at the data level. Then, the You Only Look Once Version 3 (YOLOv3) real-time object detection model was used to detect the color image and the dense depth map. Finally, a decision-level fusion method based on bounding box fusion and improved Dempster-Shafer (D-S) evidence theory was proposed to merge the two results of the previous step and obtain the final vehicle position and distance information, which not only improves the detection accuracy but also improves the robustness of the whole framework. We evaluated our method using the KITTI dataset and the Waymo Open Dataset, and the results show the effectiveness of the proposed depth completion method and multi-sensor fusion strategy.

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第 32 篇

标　　题： Buoyancy-Free Janus Microcylinders As Mobile Microelectrode Arrays For Continuous Microfluidic Biomolecule Collection Within A Wide Frequency Range: A Numerical Simulation Study

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期　　刊：MICROMACHINES

摘　　要：We numerically study herein the AC electrokinetic motion of Janus mobile microelectrode (ME) arrays in electrolyte solution in a wide field frequency, which holds great potential for biomedical applications. A fully coupled physical model, which incorporates the fluid-structure interaction under the synergy of induced-charge electroosmotic (ICEO) slipping and interfacial Maxwell stress, is developed for this purpose. A freely suspended Janus cylinder free from buoyancy, whose main body is made of polystyrene, while half of the particle surface is coated with a thin conducting film of negligible thickness, will react actively on application of an AC signal. In the low-frequency limit, induced-charge electrophoretic (ICEP) translation occurs due to symmetric breaking in ICEO slipping, which renders the insulating end to move ahead. At higher field frequencies, a brand-new electrokinetic transport phenomenon called ego-dielectrophoresis (e-DEP) arises due to the action of the localized uneven field on the inhomogeneous particle dipole moment. In stark contrast with the low-frequency ICEP translation, the high-frequency e-DEP force tends to drive the asymmetric dipole moment to move in the direction of the conducting end. The bidirectional transport feature of Janus microspheres in a wide AC frequency range can be vividly interpreted as an array of ME for continuous loading of secondary bioparticles from the surrounding liquid medium along its direction-controllable path by long-range electroconvection. These results pave the way for achieving flexible and high-throughput on-chip extraction of nanoscale biological contents for subsequent on-site bioassay based upon AC electrokinetics of Janus ME arrays.

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第 33 篇

标　　题：Vehicle Re-Identification In Tunnel Scenes Via Synergistically Cascade Forests

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期　　刊：NEUROCOMPUTING

摘　　要：Nowadays, numerous cameras have been equipped in tunnels for monitoring the tunnel safety, such as detecting fire, vehicle stopping, crashes, and so forth. Nevertheless, safety events in tunnels may occur in the blind zones not covered by the multi-camera monitoring systems. Therefore, this paper opens the challenging problem, tunnel vehicle re-identification (abbr. tunnel vehicle Re-ID), to make a between-camera

speculation. Different from the open road scenes focused by existing vehicle Re-ID methods, tunnel vehicle Re-ID is more challenging because of poor light condition, low resolution, frequent occlusion, severe motion blur, high between-vehicle similarity, and so on. To be specific, we propose a synergistically cascade forests (SCF) model which aims to gradually construct the linking relation between vehicle samples with an increasing of alternative layers of random forest and extremely randomized forest. Through the modeling of SCF, we can restrict the influence of little inter-variation of different vehicle identities and large intra-variation of the same identities. This paper constructs a new and challenging tunnel vehicle dataset (Tunnel-VReID), consisting of 1000 pairs of tunnel vehicle images. Extensive experiments on our Tunnel-VReID demonstrate that the proposed method can outperform current state-of-the-art methods. Besides, in order to prove the adaptation ability of SCF, we also verify the superiority of SCF on a large-scale vehicle Re-ID dataset, named as VehiclelD, collected in open road scenes.

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WOS 号： 000509741100020

第 34 篇

标　　题： Prediction Of I-V Characteristic Curve For Photovoltaic Modules Based On Convolutional Neural Network

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期　　刊： SENSORS

摘　　要： Photovoltaic (PV) modules are exposed to the outside, which is affected by radiation, the temperature of the PV module back-surface, relative humidity, atmospheric pressure and other factors, which makes it difficult to test and analyze the performance of photovoltaic modules. Traditionally, the equivalent circuit method is used to analyze the performance of PV modules, but there are large errors. In this paper-based on machine learning methods and large amounts of photovoltaic test data-convolutional neural network (CNN) and multilayer perceptron (MLP) neural network models are established to predict the I-V curve of photovoltaic modules. Furthermore, the accuracy and the fitting degree of these methods for current-voltage (I-V) curve prediction are compared in detail. The results show that the prediction accuracy of the CNN and MLP neural network model is significantly better than that of the traditional equivalent circuit models. Compared with MLP models, the CNN model has better accuracy and fitting degree. In addition, the error distribution concentration of CNN has better robustness and the pre-test curve is smoother and has better nonlinear segment fitting effects. Thus, the CNN is superior to MLP model and the traditional equivalent circuit model in complex climate conditions. CNN is a high-confidence method to predict the performance of PV modules.

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第 35 篇

标　　题：A Novel Fastslam Framework Based On 2D Lidar For Autonomous Mobile Robot

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期　　刊：ELECTRONICS

摘　　要：The autonomous navigation and environment exploration of mobile robots are carried out on the premise of the ability of environment sensing. Simultaneous localisation and mapping (SLAM) is the key algorithm in perceiving and mapping an environment in real time. FastSLAMhas played an increasingly significant role in the SLAM problem. In order to enhance the performance of FastSLAM, a novel framework called IFastSLAM is proposed, based on particle swarm optimisation (PSO). In this framework, an adaptive resampling strategy is proposed that uses the genetic algorithm to increase the diversity of particles, and the principles of fractional differential theory and chaotic optimisation are combined into the algorithm to improve the conventional PSO approach. We observe that the fractional differential approach speeds up the iteration of the algorithm and chaotic optimisation prevents premature convergence. A new idea of a virtual particle is put forward as the global optimisation target for the improved PSO scheme. This approach is more accurate in terms of determining the optimisation target based on the geometric position of the particle, compared to an approach based on the maximum weight value of the particle. The proposed IFastSLAM method is compared with conventional FastSLAM, PSO-FastSLAM, and an adaptive generic FastSLAM algorithm (AGA-FastSLAM). The superiority of IFastSLAM is verified by simulations, experiments with a real-world dataset, and field experiments.

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第 36 篇

标　　题：Active Disturbance Rejection Control Of A Longitudinal Tunnel Ventilation System

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期　　刊：ENERGIES

摘　　要：This paper proposes an innovative approach for controlling pollutant release in a

long-distance tunnel via longitudinal ventilation. Enhanced by an active disturbance rejection control (ADRC) method, a ventilation controller is developed to regulate the forced air ventilation in a road tunnel. As a result, the pollutants (particulate matter and carbon monoxide) are reduced by actively regulating the air flow rate through the tunnel. The key contribution of this study lies in the development of an extended state observer that can track the system disturbance and provide the system with compensation via a nonlinear state feedback controller equipped by the ADRC. The proposed method enhances the disturbance attenuation capability in the ventilation system and keeps the pollutant concentration within the legitimate limit in the tunnel. In addition to providing a safe and clean environment for passengers, the improved tunnel ventilation can also achieve better energy saving as the air flow rate is optimized.

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第 37 篇

标　　题： Multiple Frequency Electrothermal Induced Flow: Theory And Microfluidic Applications

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期　　刊： JOURNAL OF PHYSICS D-APPLIED PHYSICS

摘　　要： We put forward herein a unique physical mechanism of multifrequency electrothennal (MET) induced flow, in the context of a brand-new manipulation tool for liquid and colloid mixtures of microfluidic systems. Since the characteristic operating frequencies of standing-wave electrothermal (SWET) and traveling-wave electrothennal (TWET) convection are far from each other, the cross product of induced charge wave with local electrical field of another oscillation frequency always time-averages to zero. For this reason, we make use of a paradigmatic dual-frequency standing-wave/traveling-wave signal to engender the phenomenon of MET streaming, which subtly combines the respective feature of transversal SWET whirlpool and longitudinal TWET pump fluid motion under suitable excitation frequencies. The synthetic flow pattern in regards to MET is mathematically analyzed under the approximation of small temperature gradient, and it is discovered that the flow velocity of out-of-phase electrothermal pump and in-phase vortex shedding are in effect cross-influenced by the dual-frequency sinusoidal voltage waves, when taking into consideration the coaction of double-component thermal-electric coupling of electric heat generation in the liquid bulk. Meanwhile, we demonstrate MET can be fully exploited for dealing with solid particle samples suspended in buffer medium. By carrying out direct numerical simulation in full-scale 3D computational geometry, it is proved that MET can induce simultaneous transport and chaotic stirring of nanoscale objects, as well as spawn spontaneous dynamic separation of binary mixtures of microscale entities assisted by

active dielectrophoretic effects in a straight fluidic channel even without external moving elements. Our physical demonstration with multifrequency signal control on electrothermal induced convection provides invaluable guidelines for innovative designs of multifunctional on-chip analytical platforms in the broad context of microfluidics, nanofluidics, and lab-on-a-chip technology.

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第 38 篇

标　　题： Laser Stripe Center Detection Under The Condition Of Uneven Scattering Metal Surface For Geometric Measurement

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期　　刊： IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT

摘　　要： The uneven reflective metal surface has great influence on the high-precision measurement of the structured light 3-D shape. By analyzing the laser scattering and reflection models, a set of light stripe center's subpixel extraction methods which has strong robustness is proposed. The method first cuts off the influence of the uneven fixed background by using the difference image method to process the bright field and the dark field. Then, the regional growth statistics method is used to eliminate the influence of random laser speckle noise, and then the gray-gravity method is used to obtain the coarse center of the laser stripe. The Sobel operator is used to obtain the gradient vector of the stripe pixel point, and then the normal direction field of the light stripe is obtained. The normal direction field vector is taken as the direction to find the 5 x 5 neighborhood of the coarse light stripe's center, and then the gray-gravity method is reused to determine the center position of the laser stripe in the normal line direction; the pixel coordinates of the subpixel level are obtained by using bilinear interpolation. The experimental results show that the method can effectively eliminate the interference of flash point noise and has strong robustness. The detection error of the stripe is less than 0.1 pixels, which ensures the system measurement accuracy. Compared with other methods, the system's resolution can reach 0.02 mm.

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第 39 篇

标　　题： Influences Of Low Intensity On Diode Parameters Of Cdte Solar Cells

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期　　刊： MATERIALS

摘　　要： This study deals with the CdS/CdTe solar cells under low illumination intensity, with

cell #1 for the shunt resistance exceeding 100,000 Omega cm(2) and cell #2 for the shunt resistance above 1000 Omega cm(2). The diode parameter variations with the decline of the irradiance intensity are illustrated by dividing 0-100 mW/cm(-2) into a number of small intensity ranges for J-V measurements and assuming the diode parameters to be constant within each range, the diode parameters of each range including the series resistance, the shunt resistance, the reverse saturation current density and the ideality factor are then extracted by employing an analytical approach. The mechanism of the cell performance deviations are also investigated by basic theories, reports and experiments. For cell #1 with higher R-sh corresponding to less traps, R-sh shows a upward tendency as the irradiance declines, n and J(0) exhibit a rise with the irradiance and keep nearly unchanged at the low irradiance values mainly due to recombination and carrier contributions, R-s shows a slight increase when the irradiance intensity goes down because of the resistance of CdTe absorption layer. For cell #2 with lower R-sh corresponding to more traps, with the decrease of the illumination intensity, R-sh increases sharply only for captured carrier reduction, R-s goes steadily up similarly, n and J(0) exhibit a decline with the irradiance due to recombination shift. It should be pointed out that R-s varies much smoother than the traditional approximation of a reciprocal of differential at short circuit, and the distribution of R-sh is diverse, and an average R-sh of for each intensity range can reflect the variation trend.

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WOS 号： 000535941100188

第 40 篇

标　　题： Automatic Detection And Classification Of Road, Car, And Pedestrian Using Binocular Cameras In Traffic Scenes With A Common Framework

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通讯作者： Ju, YF (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian, Peoples R China.

期　　刊： COMPLEXITY

摘　　要： In order to solve the problems of traffic object detection, fuzzification, and simplification in real traffic environment, an automatic detection and classification algorithm for roads, vehicles, and pedestrians with multiple traffic objects under the same framework is proposed. We construct the final V view through a considerate U-V view method, which determines the location of the horizon and the initial contour of the road. Road detection results are obtained through error label reclassification, omitting point reassignment, and so an. We propose a peripheral envelope algorithm to determine sources of vehicles and pedestrians on the road. The initial segmentation results are determined by the regional growth of the source point through the minimum neighbor similarity algorithm. Vehicle detection results on the road are confirmed by combining disparity and color energy minimum algorithms with the object window

aspect ratio threshold method. A method of multifeature fusion is presented to obtain the pedestrian target area, and the pedestrian detection results on the road are accurately segmented by combining the disparity neighbor similarity and the minimum energy algorithm. The algorithm is tested in three datasets of Enpeda, KITTI, and Daimler; then, the corresponding results prove the efficiency and accuracy of the proposed approach. Meanwhile, the real-time analysis of the algorithm is performed, and the average time efficiency is 13 pfs, which can realize the real-time performance of the detection process.

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第 41 篇

标　　题： Efficiency Enhanced Grating Coupler For Perfectly Vertical Fiber-To-Chip Coupling

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期　　刊： MATERIALS

摘　　要： In this work, a bidirectional grating coupler for perfectly vertical coupling is proposed. The coupling efficiency is enhanced using a silicon nitride (Si3N4) layer above a uniform grating. In the presence of Si(3)N(4)layer, the back-reflected optical power into the fiber is diminished and coupling into the waveguide is increased. Genetic algorithm (GA) is used to optimize the grating and Si(3)N(4)layer simultaneously. The optimal design obtained from GA shows that the average in-plane coupling efficiency is enhanced from about 57.5% (-2.5 dB) to 68.5% (-1.65 dB), meanwhile the average back-reflection in the C band is reduced from 17.6% (-7.5 dB) to 7.4% (-11.3 dB). With the help of a backside metal mirror, the average coupling efficiency and peak coupling efficiency are further increased to 87% (-0.6 dB) and 89.4% (-0.49 dB). The minimum feature size of the designed device is 266 nm, which makes our design easy to fabricate through 193 nm deep-UV lithography and lowers the fabrication cost. In addition, the coupler proposed here shows a wide-band character with a 1-dB bandwidth of 64 nm and 3-dB bandwidth of 96 nm. Such a grating coupler design can provide an efficient and cost-effective solution for vertical fiber-to-chip optical coupling of a Wavelength Division Multiplexing (WDM) application.

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WOS 号： 000550190900001

第 42 篇

标　　题： A Simulation Analysis Of Nanofluidic Ion Current Rectification Using A Metal-Dielectric Janus Nanopore Driven By Induced-Charge Electrokinetic Phenomena

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期　　刊： MICROMACHINES

摘　　要： We propose herein a unique mechanism of generating tunable surface charges in a metal-dielectric Janus nanopore for the development of nanofluidic ion diode, wherein an uncharged metallic nanochannel is in serial connection with a dielectric nanopore of fixed surface charge. In response to an external electric field supplied by two probes located on both sides of the asymmetric Janus nanopore, the metallic portion of the nanochannel is electrochemically polarized, so that a critical junction is formed between regions with an enriched concentration of positive and negative ions in the bulk electrolyte adjacent to the conducting wall. The combined action of the field-induced bipolar induced double layer and the native unipolar double layer full of cations within the negatively-charged dielectric nanopore leads to a voltage-controllable heterogenous volumetric charge distribution. The electrochemical transport of field-induced counterions along the nanopore length direction creates an internal zone of ion enrichment/depletion, and thereby enhancement/suppression of the resulting electric current inside the Janus nanopore for reverse working status of the nanofluidic ion diode. A mathematical model based upon continuum mechanics is established to study the feasibility of the Janus nanochannel in causing sufficient ion current rectification, and we find that only a good matching between pore diameter and Debye length is able to result in a reliable rectifying functionality for practical applications. This rectification effect is reminiscent of the typical bipolar membrane, but much more flexible on account of the nature of a voltage-based control due to induced-charge electrokinetic polarization of the conducting end, which may hold promise for osmotic energy conversion wherein an electric current appears due to a difference in salt concentration. Our theoretical demonstration of a composite metal-dielectric ion-selective medium provides useful guidelines for construction of flexible on-chip platforms utilizing induced-charge electrokinetic phenomena for a high degree of freedom ion current control.

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WOS 号： 000554973200001

第 43 篇

标　　题： Distributed Model Predictive Control For Platooning Of Heterogeneous Vehicles With Multiple Constraints And Communication Delays

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：In this paper, the vehicle platoon control problems for a group of heterogeneous vehicles are investigated, where the multiple constraints of the vehicles and the communication delays among the vehicles are taken into consideration. A distributed model predictive control (DMPC) scheme is proposed to drive the heterogeneous vehicles into the desired platoon. In this DMPC framework, the multiple constraints, including the control constraints, state constraints, and jerk constraints, are employed to describe the practical characteristics of vehicles and the communication delays are time-varying and bounded. In this framework, a group of platoon control schemes is proposed based on the DMPC techniques. Furthermore, the feasibility and stability of the proposed vehicle platoon control system are strictly analyzed. Finally, numerical simulation and experiment with TurtleBot3 mobile robots are provided to validate the effectiveness of proposed approaches.

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第 44 篇

标　　题：A Multiscale And High-Precision Lstm-Gasvr Short-Term Traffic Flow Prediction Model

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期　　刊：COMPLEXITY

摘　　要：Short-term traffic flow has the characteristics of complex, changeable, strong timeliness, and so on. So the traditional prediction algorithm is difficult to meet its high real-time and accuracy requirements. In this paper, a multiscale and high-precision LSTM-GASVR short-term traffic flow prediction algorithm is proposed. This method uses 15 min traffic flow data of the first 16 sections as input and completes the data preprocessing operation through reconstruction, normalization, and rising dimension by working day factor; establishing the prediction model based on the long- and short-term memory network (LSTM) and inverse normalization; and proposing the GA-SVR model to optimize the prediction results, so as to realize the real-time high-precision prediction of traffic flow. The prediction experiment is carried out according to the charge data of a toll station in Xi'an, Shaanxi Province, from May 2018 to May 2019. The comparison and analysis of various algorithms show that the prediction algorithm proposed in this paper is 20% higher than the LSTM, GRU, CNN, SAE, ARIMA, and SVR, and theR(2)can reach 0.982, theexplanatory varianceis 0.982, and the MAPE is 0.118. The proposed traffic flow prediction algorithm provides strong support for traffic managers to judge the state of the road network to control traffic and guide traffic flow.

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第 45 篇

标　　题： Finite-Time Projective Synchronization Of Fractional-Order Memristive Neural Networks With Mixed Time-Varying Delays

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期　　刊： COMPLEXITY

摘　　要： This paper is concerned with the finite-time projective synchronization problem of fractional-order memristive neural networks (FMNNs) with mixed time-varying delays. Firstly, under the frame of fractional-order differential inclusion and the set-valued map, several criteria are derived to ensure finite-time projective synchronization of FMNNs. Meanwhile, three properties are established to deal with different forms of the finite-time fractional differential inequation, which greatly extend some results on estimation of settling time of FMNNs. In addition to the traditional Lyapunov function with 1-norm form in Theorem 1, a more general and flexible Lyapunov function based on p-norm is constructed in Theorem 2 to analyze the finite-time projective synchronization problem, and the estimation of settling time has been verified less conservative than previous results. Finally, numerical examples are provided to demonstrate the effectiveness of the derived theoretical results.

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WOS 号： 000550012200001

第 46 篇

标　　题： Automatic Crack Recognition For Concrete Bridges Using A Fully Convolutional Neural Network And Naive Bayes Data Fusion Based On A Visual Detection System

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期　　刊： MEASUREMENT SCIENCE AND TECHNOLOGY

摘　　要： Regular inspections of bridge substructures are very important for evaluating bridge health, since early detection and assessment offer the best chances of bridge repair. However, the traditional inspection methods of checking defects with visual features cannot meet engineering needs sufficiently. Although deep-learning methods have

recently demonstrated a remarkable improvement in image classification and recognition, there are still difficulties, such as the countless parameters and large model training sets needed by these methods. In this paper, we propose a novel crack extraction algorithm for automatic segmentation of cracks and noise using multi-layer features extracted from a fully convolutional network and a naive Bayes data fusion (NB-FCN) model. The bridge images in both the training and testing datasets are taken using an in-house designed high-precision image acquisition device, called Bridge Substructure Detection 10 (BSD-10). BSD-10 is applied to collect 7200 images from ten existing bridges under different illuminants and distances. After gathering the crack datasets, the crack and noise models of the NB-FCN are trained, respectively, with multiple iterations. Next, the skeleton and continuous boundary of a crack are recognized. Then the crack length and width are calculated using electronic distance measurement to verify the error rate of the proposed method. Compared to up-to-date machine-learning-based algorithms, i.e. the crack tree algorithm, the random structured forests algorithm, the relatively competitive convolutional neural networks algorithm, and the fusion convolutional neural network algorithm, the significant superiority of the NB-FCN algorithm in terms of recognition accuracy, computation time, and error rates is illustrated based on different types of crack images of handwriting, peel off, water stains and repair traces. The NB-FCN algorithm is verified with 7200 datasets of bridge substructures collected from 20 in-service bridges under various circumstances. In general, the recognition results show that the proposed algorithm demonstrates a remarkable performance compared to other recent algorithms.

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WOS 号： 000532330500001

第 47 篇

标　　题： Distributed Adaptive Sliding Mode Control For Vehicle Platoon With Uncertain Driving Resistance And Actuator Saturation

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期　　刊： COMPLEXITY

摘　　要： Vehicle platoon has been demonstrated to be a promising driving pattern for its prominent advantages in enhancing traffic safety, improving highway capacity, and increasing fuel economy as well as reducing carbon emissions. However, the uncertain driving resistance and saturated actuator output decay the control performance and may even lead to the instability of a vehicle platoon. Therefore, a distributed adaptive sliding mode control algorithm for vehicle platoon with uncertain driving resistance and actuator saturation is proposed in this paper. First of all, sliding mode control technique, together with the coupled sliding surface (CSS) method, is adopted to design the vehicle platoon control algorithm and an adaptive updating law is proposed to estimate the unknown driving resistance coefficients. Then, for the problem of actuator saturation, an antiwindup compensation-based approach is utilized to attenuate the

integral windup of the adaptive platoon control laws in the case of actuator saturation. In addition, considering the chattering problem inherent in sliding mode control, a sigmoid-like function sgn(.) is deployed to weaken the influence of chattering, which is expected to enhance the driving comfortableness. Both theoretical analysis and numerical simulation verify the feasibility and effectiveness of the proposed vehicle platoon algorithm.

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第 48 篇

标　　题： Bonding Performance And Evaluation Of Basalt Fiber Asphalt Macadam Seal

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： To broaden the application of the basalt fiber in the preventive maintenance of asphalt pavement, this study investigated the bonding performance and evaluated the comprehensive performance of the basalt fiber asphalt macadam seal. Firstly, different types of basalt fiber asphalt macadam seal were prepared. The influences of content and length of the basalt fiber and dosage of emulsified asphalt on the bonding performance of the asphalt macadam seal were analyzed and compared. Next, by using the efficacy coefficient method, comprehensive performance considering both mechanical and economic characteristics of the basalt fiber asphalt macadam seal was evaluated. After that, reasonable content of each material was determined. Finally, the strengthening mechanism of the fiber on the bonding performance of macadam seals was revealed from a microscopic view. The results showed that compared with the ordinary asphalt macadam seal, the loss aggregate rate of the basalt fiber asphalt macadam seal was 11.0-30.5% lower, and the pull-out strength, shear strength, and torsional shear strength were 11.7-16.3%, 9.7-22.4%, and 4.2-20.6% higher, respectively. Considering the bonding performance and economic benefits, the optimal amount of emulsified asphalt and basalt fiber was 1.6 kg/m(2) and 70 g/m(2), respectively. Basalt fiber increased the cohesion of the asphalt material and improved the bonding performance of asphalt macadam seals through formation of the three-dimensional network structure. This study can provide reference to the application of basalt fibers in asphalt pavement maintenance.

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第 49 篇

标　　题： Automatic Bridge Crack Identification From Concrete Surface Using Resnext With Postprocessing

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期　　刊：STRUCTURAL CONTROL & HEALTH MONITORING

摘　　要：In this study, the bridge concrete structure is taken as the research object, and the real image is used for crack identification. In structural engineering, surface cracks are the main indexes of durability and service performance of structures. Artificial visual inspection is often considered ineffective in terms of cost, safety, evaluation accuracy, and reliability. In this article, a simple, high-classification framework based on ResNeXt with postprocessing (ResNeXt+PP) model is provided to effectively identify concrete cracks. During the training phase of the method, image binarization approach is used to extract the candidate crack regions. It is difficult to automatic identify cracks from images containing actual cracks and noises, especially, shadows, stains, masses, and holesoften occur in concrete surfaces. Thereafter, classification models are constructed based on ResNeXt+PP module. Based on the new concrete surface images including cracks and noncracks, the obtained methods for crack identification are compared quantitatively and qualitatively. Besides, the five complete raw images are used to study the robustness and practicability of the method. The binary transformation process based on a binarization method of adaptive crack width is adopted to identify crack pixels in subimages. Results show that the trained improved ResNeXt+PP can automatically detect cracks and noncracks in the raw image. The obtained results that the method is superior to multiple methods and the application prospect of autonomous concrete structure driver for bridge detection robot are presented.

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WOS 号：000556051000001

第 50 篇

标　　题：Research On Accurate House Price Analysis By Using Gis Technology And Transport Accessibility: A Case Study Of Xi'An, China

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期　　刊：SYMMETRY-BASEL

摘　　要：Based on the symmetrical public transportation network data of Xi'an, China obtained by geographic information system (GIS) technology in 2019, three urban public

transportation indexes of walking accessibility, bus accessibility, and metro accessibility were established, and a real estate price prediction model was built by using several machine learning algorithms to predict and analysis the housing price in Xi'an, China. Firstly, the symmetrical road network data and real estate property data of Xi'an were collected and preprocessed, secondly, the spatial syntax theory and distance calculation method were applied to establish three indexes of traffic accessibility; finally, taking the house property data and the calculated traffic accessibility indexes as the characteristic index, the real estate price prediction model of Xi'an was constructed by using the random forest algorithm (RF), lightweight gradient lift algorithm (LGBM), and gradient lifting regression tree algorithm (GBDT). The prediction accuracy of the final model is 89.2% and the root-mean-square error is 1761.84. The results show that the accessibility of bus and metro to some extent represent the convenience of public transportation in different areas of urban space. The higher the accessibility index is, the more convenient the traffic is. The real estate price model has high prediction accuracy and can reflect the real situation of urban real estate price. The importance of the three accessibility features to the real estate price prediction model are nearly more than 20%, which indicates that the accessibility of urban public transportation has an important impact on the change of urban real estate price, and the development of urban public transportation plays an important role in the real estate economy.

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WOS 号： 000568059300001

第 51 篇

标　　题： Metal-Semiconductor-Metal Thin-Film X-Ray Detector Based On Halide Perovskites

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期　　刊： PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE

摘　　要： Halide perovskite materials as emerging optoelectronic materials are very appealing for the X-ray detection due to their superior charge transport, high-absorption cross section for X-rays and solution processability. Herein, thin-film X-ray detectors are demonstrated using methylammonium lead iodide perovskite (MAPbI(3)) thin films. Controlled nucleation of halide perovskites is realized using patterned Au dots as nucleation promoters, resulting in uniform thin films with large grains. A metal-semiconductor-metal (MSM) device architecture with coplanar electrodes is used, and the thin-film detectors with an active layer thickness of 700 nm exhibit a sensitivity of 2.48 x 10(-2) mu C Gy(air)(-1) cm(-2)under a bias of 10 V. The device is relatively stable in air without encapsulation, showing no degradation after 15 min continuous biasing at 5 V. Such solution-based perovskite detector can enable X-ray detecting and imaging with low-cost, high efficiency, and high sensitivity.

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第 52 篇

标　　题：Continuous-Flow Nanoparticle Trapping Driven By Hybrid Electrokinetics In Microfluidics

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期　　刊：ELECTROPHORESIS

摘　　要：We introduce herein an efficient microfluidic approach for continuous transport and localized collection of nanoparticles via hybrid electrokinetics, which delicately combines linear and nonlinear electrokinetics driven by a composite DC-biased AC voltage signal. The proposed technique utilizes a simple geometrical structure, in which one or a series of metal strips serving as floating electrode (FE) are attached to the substrate surface and arranged in parallel between a pair of coplanar driving electrodes (DE) in a straight microchannel. On application of a DC-biased AC electric field across the channel, nanoparticles can be transported continuously by DC bulk electroosmotic flow, and then trapped selectively onto the metal strips due to AC-field induced-charge electrokinetic (ICEK) phenomenon, which behaves as counter-rotating micro-vortices around the ideally polarizable surfaces of FE. Finite-element simulation is carried out by coupling the dual-frequency electric field, flow field and sample mass transfer in sequence, for guiding a practical design of the microfluidic nanoparticle concentrator. With the optimal device geometry, the actual performance of the technique is investigated with respect to DC bias, AC voltage amplitude, and field frequency by using both latex nanospheres (similar to 500 nm) and BSA molecules (similar to 10 nm). Our experimental observation indicates nanoparticles are always enriched into a narrow bright band on the surface of each FE, and a horizontal concentration gradient even emerges in the presence of multiple metal strips, which therefore permits localized analyte enrichment. The proposed trapping method is supposed to guide an elaborate design of flexible electrokinetic frameworks embedding FE for continuous-flow analyte manipulation in modern microfluidic systems.

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WOS 号：000556327500001

第 53 篇

标　　题：An Improved Algorithm For Ac Impedance Extraction

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期　　刊：JOURNAL OF ELECTRICAL ENGINEERING & TECHNOLOGY

摘　　要：The overall system stability of interconnected electrical and electronic systems is associated with the input and output impedances of each individual system, therefore, accurate AC impedance measurement for a linear and nonlinear systems are imperative. These impedances are normally measured using small-signal frequency injection techniques. However, the harmonic transfers from the output side to the input side and vice versa deteriorates the measured results, making them ambiguous. These harmonic transfers cause the problems of frequency aliasing as well as spectral leakages leading to inaccurate measurements of results. In order to achieve the precise and accurate results, there is a need to adopt such an impedance measuring technique which is the best among the available techniques. A new algorithm is proposed to modify the range of frequencies of interest and inject such small-signal frequencies which do not interfere with the system harmonics. The measurement of the AC impedance of the three-phase RL circuit utilizing three different small-signal injection techniques is performed. From the results displayed, it is clear that all the techniques perform well, therefore, the most simple, single phase line-current injection was selected for the AC impedance measurement of the nonlinear switching circuit such as six-pulse rectifier. The issues discussed above are more serious in nonlinear switching circuit because of the presence of higher order switching harmonics in the circuit. The proposed algorithm is applied to measure the output-impedance of the three-phase AC power supply as well as the AC input-impedance of the six-pulse rectifier. These results of the switch vs average model and that of average model vs. experimental prototype are displayed for comparison, and it is clear that the proposed algorithm offers much-improved results.

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WOS 号：000565010900005

第 54 篇

标　　题：The Lyapunov Optimization For Two-Tier Hierarchical-Based Mac In Cloud Robotics

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期　　刊：WIRELESS COMMUNICATIONS & MOBILE COMPUTING

摘　　要：Cloud robotics can largely enhance the robot intelligence by offloading tasks to the cloud dynamically. However, the robots differ in their own hardware configuration such as battery and processing capacity, while the transmission frames are also a mixture of different quality of service (QoS) requirements. As the competition for limited channel resource is inevitable, how to optimize the system performance by effective resource allocation is a key problem. The paper proposes a two-tier hierarchical-based MAC

(Two-Tier MAC) which means the classification exists not only in frames but also in robots. The Lyapunov optimization technique is used to maximize the time-averaged quality satisfaction. The experiments show the superior performance of the Two-Tier MAC compared with other MAC protocols especially in overloaded networks. Meanwhile, the system also presents a longer lifetime because the Two-Tier MAC takes energy balance into consideration.

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第 55 篇

标　　题： Low Complexity Dual-Vector Model Predictive Current Control For Surface-Mounted Permanent Magnet Synchronous Motor Drives

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期　　刊： IEEE JOURNAL OF EMERGING AND SELECTED TOPICS IN POWER ELECTRONICS

摘　　要： In dual-vector model predictive current control (MPCC), an active voltage vector followed by either a zero or an active voltage vector is applied in one control period. Due to a high number of possible combinations of voltage vector pairs, determining the optimal pair becomes computationally expensive. A novel approach is proposed for reducing the number of candidate active voltage vectors. The concept is to use the projection of the current error vector onto the active voltage vector which minimizes the cost function. The proposed dual-vector MPCC is implemented in the rotor reference frame and does not need additional coordinate transformations and associated trigonometric calculations. Thus, it is simple to be digitally implemented. Furthermore, a novel method, which relies less on the system model, is proposed for determining the duty cycle of the active voltage vectors. Therefore, sensitivity to the erroneous assumption of motor parameters, particularly at low speeds, is alleviated. The performance of a permanent magnet synchronous motor drive under the proposed MPCC is compared with a most recently introduced dual-vector MPCC based on deadbeat control. Experimental results with the accurate and erroneous assumption of motor parameters verify the superiority of the proposed method in terms of computation simplicity, stator current and torque quality, and dynamic response.

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第 56 篇

标　　题： Canonical Correlation Analysis Of Imaging Genetics Data Based On Statistical Independence And Structural Sparsity

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期　　刊： IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS

摘　　要： Current developments of neuroimaging and genetics promote an integrative and compressive study of schizophrenia. However, it is still difficult to explore how gene mutations are related to brain abnormalities due to the high dimension but low sample size of these data. Conventional approaches reduce the dimension of dataset separately and then calculate the correlation, but ignore the effects of the response variables and the structure of data. To improve the identification of risk genes and abnormal brain regions on schizophrenia, in this paper, we propose a novel method called Independence and Structural sparsity Canonical Correlation Analysis (ISCCA). ISCCA combines independent component analysis (ICA) and Canonical Correlation Analysis (CCA) to reduce the collinear effects, which also incorporate graph structure of the data into the model to improve the accuracy of feature selection. The results from simulation studies demonstrate its higher accuracy in discovering correlations compared with other competing methods. Moreover, applying ISCCA to a real imaging genetics dataset collected by Mind Clinical Imaging Consortium (MCIC), a set of distinct gene-ROI interactions are identified, which are verified to be both statistically and biologically significant.

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第 57 篇

标　　题： Broadband High-Efficiency Grating Couplers For Perfectly Vertical Fiber-To-Chip Coupling Enhanced By Fabry-Perot-Like Cavity

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通讯作者： Zhang, Z (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China.

期　　刊： MICROMACHINES

摘　　要： We propose a broadband high-efficiency grating coupler for perfectly vertical fiber-to-chip coupling. The up-reflection is reduced, hence enhanced coupling efficiency is achieved with the help of a Fabry-Perot-like cavity composed of a silicon nitride reflector and the grating itself. With the theory of the Fabry-Perot cavity, the dimensional parameters of the coupler are investigated. With the optimized parameters, up-reflection in the C-band is reduced from 10.6% to 5%, resulting in an enhanced coupling efficiency of 80.3%, with a 1-dB bandwidth of 58 nm, which covers the entire

C-band. The minimum feature size of the proposed structure is over 219 nm, which makes our design easy to fabricate through 248 nm deep-UV lithography, and lowers the fabrication cost. The proposed design has potential in efficient and fabrication-tolerant interfacing applications, between off-chip light sources and integrated chips that can be mass-produced.

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WOS 号： 000580330100001

第 58 篇

标　　题： Dynamic Combined-Mode Traffic Network Model Considering Transfer Behaviors

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： We propose a dynamic combined-mode traffic network model considering transfer behaviors. We assume that travelers can be classified into two classes: one class is pure-mode travelers who complete a trip by single transportation mode, and another is combined-mode travelers who cover a journey by car, bus, and so forth. The multimode point queue model is used to model the interaction of cars and buses on the network. We present an integrated variational inequality formulation to capture the complex traveler choice behaviors such as departure time choices, transfer point, and route choices. Finally, a numerical example is given to illustrate the effectiveness of the proposed heuristic algorithm and model.

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WOS 号： 000578372600001

第 59 篇

标　　题： A Robust Meaningful Image Encryption Scheme Based On Block Compressive Sensing And Svd Embedding

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通讯作者： Song, HS (corresponding author), Changan Univ, Sch Informat Engn, Xian 710064, Peoples R China.

期　　刊： SIGNAL PROCESSING

摘　　要： In this paper, an efficient and robust meaningful image encryption (MIE) scheme is developed by combining block compressive sensing (BCS) and singular value decomposition (SVD) embedding. This work devotes to the balanced performance of security, compression, robustness and running efficiency. First, the plain image is divided equally and sparsely represented in discrete cosine transform (DCT) domain, and the coefficient vectors are confused using the coefficient random permutation

(CRP) strategy and encrypted into a secret image by compressive sensing. Next, SVD embedding is employed to embed the secret image into a carrier image to create the final meaningful cipher image. In pursuit of superior security, the hyper-chaotic Lorenz system is utilized to generate the updated secret code streams for encryption and embedding with assistance from the counter mode. This scheme is suitable for processing the medium and large images in parallel. Additionally, it exhibits superior robustness and efficiency compared with existing related schemes. Simulation results and comprehensive performance analyses are presented to demonstrate the effectiveness, secrecy and robustness of the proposed scheme. (C) 2020 Elsevier B.V. All rights reserved.

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第 60 篇

标　　题： Neural Adaptive Dynamic Surface Asymptotic Tracking Control For A Class Of Uncertain Nonlinear System

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通讯作者： Yan, MD (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian, Peoples R China.

期　　刊： CIRCUITS SYSTEMS AND SIGNAL PROCESSING

摘　　要： In this paper, by incorporating the neural network into an adaptive dynamic surface control (DSC) framework, a neural adaptive DSC algorithm is developed for a class of uncertain nonlinear system to ensure the asymptotic output tracking. Neural network is used to approximate the unknown nonlinear term in the system such that the requirements for known nonlinear term in control laws design procedure are released. In order to eliminate the boundary layer effects, which are caused by the linear filters at each step in the DSC procedure, the nonlinear filters with the compensation term are designed skillfully. The proposed neural adaptive DSC algorithm not only avoids the inherent problem of explosion of complexity in the backstepping procedure, but also has its own advantages: (1) releasing the requirements for known nonlinear term in control laws design procedure; (2) holding the asymptotic output tracking performance. Some simulations are shown to demonstrate the effectiveness and advantages of the proposed controller.

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第 61 篇

标　　题： Compatibility-Guided Sampling Consensus For 3-D Point Cloud Registration

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期　　刊：IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING

摘　　要：This article presents an efficient and robust estimator called compatibility-guided sampling consensus (CG-SAC) to achieve accurate 3-D point cloud registration. For correspondence-based registration methods, the random sample consensus (RANSAC) is served as a <italic>de facto</italic> solution for rigid transformation estimation from a number of feature correspondences. Unfortunately, RANSAC still suffers from two major limitations. First, it generates a hypothesis with at least three samples and desires a very large number of iterations to attain reasonable results, making it relatively time consuming. Second, the randomness during sampling can result in inaccurate results as it is highly potential to miss the optimal hypothesis. To solve these problems, we propose a compatibility-guided sampling strategy to eliminate randomness during sampling. In particular, only two correspondences are required by our method for hypothesis generation. We then rank correspondence pairs according to their compatibility scores because compatible correspondences are more likely to be correct and can yield more reasonable hypotheses. In addition, we propose a new geometric constraint named the distance between salient points (DSP) to measure the compatibility of two correspondences. Experiments on a set of real-world point cloud data with different application contexts and data modalities confirm the effectiveness of the proposed method. Comparison with several state-of-the-art estimators demonstrates the overall superiority of our CG-SAC estimator with regards to precision and time efficiency.

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WOS 号：000573923100046

第 62 篇

标　　题：Measurement For Cracks At The Bottom Of Bridges Based On Tethered Creeping Unmanned Aerial Vehicle

作　　者：[Wang, Hui-Feng; Zhai, Lei; Huang, He; Guan, Li-Min; Mu, Ke-Nan; Wang, Gui-ping] Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China; [Wang, Hui-Feng; Zhai, Lei; Mu, Ke-Nan; Wang, Gui-ping] Rd Traff Intelligent Detect & Equipment Technol R, Xian 710064, Peoples R China

通讯作者：Wang, HF (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China.

期　　刊：AUTOMATION IN CONSTRUCTION

摘　　要：The detection of bridge bottom cracks is required for bridge maintenance. In order to realise the requirement of automatic real-time detection of a bridge structure, an image detection method for cracks in the bottom of the bridge structure using a tethered creeping unmanned aerial vehicle (UAV) is proposed. A high-precision un-limited endurance detection plan based on the tethered creeping UAV is designed to use for the bottom cracks of the bridge structure. The detection scheme applies a high-precision image stitching measurement algorithm for cracks at the bottom of the beam body, which is able to restore a panoramic image. All mainstream filtering methods were evaluated, and it turned out that they are practicable/applicable in various crack images of different shapes. The method is applied to the crack detection in the bottom of bridge

structures to ensure the accuracy and efficiency of the system measurement. According to the actual measurement by the laboratory platform, the measurement error using this method is less than 0.1 mm, which meets the requirements of measurement automation. The results of the research represent an initial step towards developing an automatic bridge health monitoring and evaluating system.

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WOS 号： 000579046500012

第 63 篇

标　　题： Pumping Of Electrolyte With Mobile Liquid Metal Droplets Driven By Continuous Electrowetting: A Full-Scaled Simulation Study Considering Surface-Coupled Electrocapillary Two-Phase Flow

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期　　刊： ELECTROPHORESIS

摘　　要： With the excellent merits of both solid conductors and rheological fluids, liquid metal (LM) provides new opportunities to serve as flexible building blocks of miniaturized electronic and fluidic devices. The phenomenon of continuous electrowetting (CEW) has been long utilized for actuating LM contents in buffer medium, wherein an externally imposed voltage difference is responsible of manipulating the interfacial tension of deformable LM droplets. CEW effectively lowers the surface tension at the LM/electrolyte interface by driving bipolar counterions to the surface of conducting droplet. Since surface tension coefficient relies sensitively on the local voltage drop across the induced double layer, an electric-analogy Marangoni effect occurs even under a rather weak electric field in the presence of a surface gradient of the interfacial tension. CEW of LM routinely induces unidirectional pumping of electrolyte in the direction of applied electric field, with LM droplet translating oppositely within the device channel. Although this subject has received great attention from the microfluidic society in the past decade, previous reports concerned either the individual delivery of the suspension medium or the transport of LM droplet. Starting from this point, we offer herein a fully coupled physical description of two-phase flow dynamics occurring in CEW. The proposed simulation model successfully incorporates the synergy of the interfacial electrokinetic momentum transfer, surface tension on a curved surface, contact angle at the three-phase contact line as well as the gravity force density. The spatial-temporal motion of the contact interface is traced instantly with a moving mesh approach. By direct numerical simulation, the importance of the direct-current bias,

additional alternating-current forcing, droplet size, initial ion adsorption in the process of CEW is addressed. Additionally, it is discovered that increasing the number of LM droplet is more cost-effective than enhancing the volume of a single drop in terms of achieving an improvement of the resulted electrocapillary pump performance, while the translational speed of the discrete droplet carrier does not make an observable change in response to a variation in the drop number. These results prove invaluable in terms of an elaborate design of smart on-chip electrokinetic frameworks embedding flexible LM contents in modern micro-total-analytical systems.

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WOS 号： 000591395200001

第 64 篇

标　　题： Estimating Dynamic Distribution Condition Of Pedestrian Concentration On An Urban Scale

作　　者： [Li, Shuguang; Song, Dong; Zhou, Qilong] Changan Univ, Dept Elect & Control Engn, Xian, Peoples R China

通讯作者： Li, SG (corresponding author), Changan Univ, Dept Elect & Control Engn, Xian, Peoples R China.

期　　刊： JOURNAL OF URBAN PLANNING AND DEVELOPMENT

摘　　要： The distribution of pedestrians in urban space reflects the status of urban spatial planning to some extent. The reasonable prediction of pedestrian concentration is of great significance to the evaluation of urban vitality, urban comfort, and urban spatial layout planning. In this paper, a method for predicting pedestrian concentration is proposed, which can estimate pedestrian concentration in a whole city without being limited to a specific intersection or city node. According to the characteristics of three kinds of transportation accessibility based on space syntax and commercial vitality index, a dynamic distribution estimation model of pedestrian concentration is proposed. Taking Xi'an city of China as a case study, through multiple linear regression (MLR), a support vector regression (SVR) algorithm, and random forest (RF) algorithm, the pedestrian concentration in five periods of a day was predicted and analyzed, and the spatial and temporal characteristics of crowd distribution are comprehensively described. The results show that the dynamic distribution model of pedestrian concentration constructed by RF is superior to the MLR and SVR, and its average prediction accuracy can reach 93.86%.

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第 65 篇

标　　题： Monte Carlo Simulation Of Secondary Electron Emission From An N-2-Adsorbed Layer On A Cu Surface

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期　　刊：RESULTS IN PHYSICS

摘　　要：Surface adsorption of N-2 molecules is a critical factor to limit the reduction of secondary electron (SE) yield (SEY) in many fields of applied physics. On the basis of the Polanyi potential theory, we describe a multi-layer N-2 physical adsorption model to arrange the distribution of N-2 molecules adsorbed on a Cu (110) surface. Considering six scattering types, we used a Monte Carlo method to develop a three-dimensional numerical model that simulated the scattering processes between electrons and adsorbed molecules. Thus, the SEY of a surface covered by an adsorbed layer could be obtained by statistical analysis of the final SE states. We found that the maximum of total SEY decreased exponentially with increasing N-2 pressure between 0 and 0.1 Torr and decreased linearly with increased adsorbed layer thickness between 0 and 10 nm. The reduction in SEY was due mainly to the elastic scattering of large scattering angle and ionization of energy consumption in the scattering processes of electrons and adsorbed molecules. Accordingly, our model and results provide a powerful tool to fully understand the microcosmic mechanism of the SE emission of a metal surface with adsorbed layer.

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WOS 号：000604223300001

第 66 篇

标　　题：Data-Driven Predictive Control Of Building Energy Consumption Under The Iot Architecture

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通讯作者：Wang, B (corresponding author), Changan Univ, Coll Elect & Control Engn, Xian 710061, Peoples R China.

期　　刊：WIRELESS COMMUNICATIONS & MOBILE COMPUTING

摘　　要：Model predictive control is theoretically suitable for optimal control of the building, which provides a framework for optimizing a given cost function (e.g., energy consumption) subject to constraints (e.g., thermal comfort violations and HVAC system limitations) over the prediction horizon. However, due to the buildings' heterogeneous nature, control-oriented physical models' development may be cost and time prohibitive. Data-driven predictive control, integration of the Internet of Things, provides an attempt to bypass the need for physical modeling. This work presents an innovative study on a data-driven predictive control (DPC) for building energy management under the four-tier building energy Internet of Things architecture. Here, we develop a cloud-based SCADA building energy management system framework for the standardization of communication protocols and data formats, which is favorable for advanced control strategies implementation. Two DPC strategies based on building predictive models using the regression tree (RT) and the least-squares boosting (LSBoost) algorithms are presented, which are highly interpretable and easy for different stakeholders (end-user, building energy manager, and/or operator) to operate.

The predictive model's complexity is reduced by efficient feature selection to decrease the variables' dimensionality and further alleviate the DPC optimization problem's complexity. The selection is dependent on the principal component analysis (PCA) and the importance of disturbance variables (IoD). The proposed strategies are demonstrated both in residential and office buildings. The results show that the DPC-LSBoost has outperformed the DPC-RT and other existing control strategies (MPC, TDNN) in performance, scalability, and robustness.

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WOS 号： 000603571900007

第 67 篇

标　　题： Distributed Integrated Sliding Mode-Based Nonlinear Vehicle Platoon Control With Quadratic Spacing Policy

作　　者： [Zuo, Lei; Zhang, Ye; Yan, Maode; Ma, Wenrui] Changan Univ, Dept Elect & Control Engn, Xian 710064, Peoples R China

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期　　刊： COMPLEXITY

摘　　要： This paper investigates the nonlinear vehicle platoon control problems with external disturbances. The quadratic spacing policy (QSP) is applied into the platoon control, in which the desired intervehicle distance is a quadratic function in terms of the vehicle's velocities. Comparing with the general constant time headway policy (CTHP), the QSP is more suitable to the human driving behaviors (HDB) and can improve the traffic capacity. Then, a novel platoon control scheme is proposed based on the distributed integrated sliding mode (DISM). Since the external disturbances are taken into consideration, the sliding mode method is employed to handle the disturbances. Moreover, the stability and string stability of the proposed platoon control system are strictly analyzed. In final, numerical simulations are provided to verify the proposed approaches.

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WOS 号： 000609500100004

地球科学与资源学院

第 1 篇

标　　题： A Fourteen-Faced Hexangulaconulariid From The Early Cambrian (Stage 2) Yanjiahe Formation, South China

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期　　刊： JOURNAL OF PALEONTOLOGY

摘　　要： Extant medusozoans (phylum Cnidaria) are dominated by forms showing tetraradial symmetry, but stem-group medusozoans of early Cambrian age collectively exhibit tetra-, bi-, penta-, and hexaradial symmetry. Moreover, the developmental and evolutionary relationships between four-fold and other types of radial symmetry in medusozoans remain poorly understood. Here we describe a new hexangulaconulariid, Septuconularia yanjiaheensis new genus new species, from Bed 5 of the Yanjiahe Formation (Cambrian Stage 2) in the Three Gorges area of Hupei Province, China. The laterally compressed, biradially symmetrical periderm of this species possesses 14 gently tapered faces, the most of any hexangulaconulariid described thus far. The faces are bordered by longitudinal ridges and crossed by short, irregularly spaced transverse ribs. Longitudinally, the periderm consists of three regions that probably correspond, respectively, to an embryonic stage, a transient juvenile stage, and a long adult stage. Septuconularia yanjiaheensis may have been derived from six-faced Hexaconularia (Fortunian Stage), which is morphologically intermediate between Septuconularia yanjiaheensis and Arthrochites. Furthermore, conulariids sensu stricto, carinachitids, and hexangulaconulariids may constitute a monophyletic group united by possession of an organic or organophosphatic periderm exhibiting longitudinal (corner) sulci, a facial midline, and offset of transverse ribs along the facial midline. UUID: http://zoobank.org/01a972aa-aef3-4eef-a9a5-c2d8c3dda615

DOI： 10.1017/jpa.2019.56

WOS 号： 000503820500005

第 2 篇

标　　题： Petrogenesis And Geochemical Characteristics Of Early Carboniferous Sanukitic High-Mg Andesite From Atengtao Mountain, Yili Block: Implications For The Tectonic Setting During Late Palaeozoic In Chinese West Tianshan

作　　者： [Wang, Zuopeng; Li, Yongjun; Yang, Gaoxue; Tong, Lili; Li, Hai; Luo, Yaoqing] Changan Univ, Sch Earth Sci & Resources, Xian 710054, Peoples R China; [Li, Yongjun; Yang, Gaoxue; Tong, Lili] MLR, Key Lab Study Focused Magmatism & Giant Ore Depos, Xian, Peoples R China

通讯作者： Li, YJ (corresponding author), Changan Univ, Sch Earth Sci & Resources, Xian 710054, Peoples R China.

期　　刊： GEOLOGICAL JOURNAL

摘　　要： As an important part of the Central Asian Orogenic Belt (CAOB), Chinese western Tianshan contains voluminous Late Palaeozoic volcanic rocks. Here, we present geochronological, geochemical, and in situ Lu-Hf isotopic data from the Atengtao sanukitic high-Mg andesites (HMAs) of the western Yili Block. LA-ICP-MS zircon

U-Pb analyses indicate that the Atengtao high-Mg andesites were generated in the Early Carboniferous (346 +/- 2 Ma). All the studied rock samples are characterized by high MgO (3.30-5.45 wt.%), SiO2 (53.25-60.10 wt.%), Cr (90.3-157 ppm), and Ni (31.0-46.7 ppm) contents, with geochemical characteristics analogous to those of sanukitoids of the Setouchi Volcanic Belt (SVB), SW Japan, and Bieluagaxi area, West Junggar. The Atengtao sanukitic HMAs are enriched in LILE and LREE but depleted in HFSE, similar to those of typical arc-related magmatic rocks. They are also characterized by high Nb (11.4-15.8 ppm) concentrations, high Th/La (0.3) and Th/Yb (2.6-4.0) ratios, and varying zircon epsilon Hf(t) values (-2.3 to +4.3). These features are suggested to result from the partial melting of a relatively enriched mantle wedge metasomatized by subducting oceanic slab-derived sediments. Considering the occurrence of sanukitic HMAs, combined with the contemporaneous special rock assemblages (such as slab-derived adakite, Nb-enrich basalt, A-type granite/rhyolite, and bimodal volcanic rocks) found in the western part of Yili Block, we propose that the generation of the Carboniferous sanukitic HMAs in Atengtao Mountain were most likely related to the slab break-off following the southern Tianshan Ocean slab northward subduction beneath the Yili-Central Tianshan Block. This mechanism not only produces intense magmatism with compositional diversity but also gives rise to a local extension in the western part of Yili Block. The slab break-off model may play an important role in the crustal growth of the CAOB in Phanerozoic time.

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第 3 篇

标　　题： Early Carboniferous Mafic Dike-Syenitic Granite Association In The Atengtao Mountain, Yili Block (Nw China): Geochronology, Petrogenesis, And Tectonic Significance

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： The Carboniferous is an important period for understanding tectonic evolutionary history and subduction processes of Chinese western Tianshan orogen. Here, we present results of petrologic, geochemical, and in situ LA-ICP-MS zircon U-Pb and Hf isotope data from an Early Carboniferous mafic dike-syenitic granite association in Atengtao Mountain, Yili Block, aiming to constrain their ages and petrogenesis and tectonic significance. Zircon U-Pb dating results reveal that the mafic dikes and syenitic granites were coevally emplaced at ca. 345-349 Ma. Geochemically, the mafic dikes contain high MgO, Nb, TiO2, and Ta contents, low SiO2 contents, and high Na2O/K2O ratios,

showing Nb-enriched affinities. Additionally, they are enriched in LILEs, relatively depleted in HFSEs, and positive epsilon Hf-(t) values (+1.2 to +8.7), likely representing melts derived from partial melting of a depleted mantle wedge metasomatized by subducted slab-derived fluids, with minor involvement of asthenospheric components. Compared with mafic dikes, the coeval syenitic granites display calc-alkaline I-type features and have high SiO2, Al2O3, and low MgO, Mg-# (<40), Ni, and Cr contents, considered to have been derived from the reworking of the Precambrian basement with an input of mantle-derived components. These mafic dike-syenitic granite associations likely formed in an arc-related setting rather than postcollision or mantle plume setting. In addition, pronouncedly higher zircon saturation temperature of the syenitic granites, compared with the coeval I-type granitoids from western Tianshan, imply the occurrence of a thermal anomaly in this period (ca. 345 Ma). With these studied results, together with previously published data, we argue that a slab break-off model was likely responsible for the mafic dike-syenitic granite association, and related rocks, in the western Yili Block during Early Carboniferous.

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第 4 篇

标　　题： Investigation Of Variation In Shale Gas Adsorption Capacity With Burial Depth: Insights From The Adsorption Potential Theory

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期　　刊： JOURNAL OF NATURAL GAS SCIENCE AND ENGINEERING

摘　　要： In this study, the Polanyi theory was applied to investigate variation in shale gas adsorption capacity with burial depth. Analyses were implemented on background data of two shale samples with respective TOC contents of 4.00% and 4.51% TOC, accompanied by combination of the Polanyi theory and isothermal adsorption parameters. Shale gas adsorption capacity was found to first increase and then decrease as the burial depth grew, and the burial depth corresponding to the maximum adsorption capacity was basically constant within the study area. Specifically, pressure coefficient had the largest impact on the minimum adsorption potential, reaching 1.721 mol/kJ, while the ground temperature gradient was the most influential factor on the burial depth corresponding to the maximum adsorption capacity, reaching 1080 m. When the burial depth was shallower than 3200 m, the pressure coefficient dominated, whereas in deeper parts, the ground temperature gradient became dominant.

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第 5 篇
标　　题： Effect Of Sulfidization On The Stability Of Adsorption Of Isoamyl Xanthate On Malachite
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通讯作者： Wen, SM (corresponding author), Kunming Univ Sci & Technol, Fac Land Resource Engn, State Key Lab Complex Nonferrous Met Resources Cl, Kunming 650093, Yunnan, Peoples R China.; Deng, JS (corresponding author), China Univ Min & Technol Beijing, Sch Chem & Environm Engn, Beijing 100083, Peoples R China.
期　　刊： PHYSICOCHEMICAL PROBLEMS OF MINERAL PROCESSING
摘　　要： The activity and stability of adsorbed isoamyl xanthate (IX) on a malachite surface before and after sulfidization were studied by calculating the malachite dissolved component and adsorption energy and performing experiments the zeta potential measurements, adsorption and desorption, and flotation experiments. In the malachite slurry solution, the main components of copper are Cu2+, CuCO3, HCuO2-, CuO2-, and Cu(CO3)(2)(2-), and the concentration distribution of these components was related to the slurry pH value. Between pH 5 to 9, the main copper component in the slurry was CuCO3. The malachite surface was negatively charged; however, the sulfur ions or hydrosulfide ions could still adsorb on the surface at a pH of more than 8.2, which indicated that the sulfidization of malachite corresponds to the chemical adsorption, and the surface electrical properties of the malachite were not obvious to the sulfidization. The adsorption activity of malachite on IX was stronger than that of the sulfide malachite; however, the desorption ratio of IX concerning the malachite was higher than that of the sulfide malachite. The adsorption energy of IX on the malachite and sulfide malachite surface was -449.6 kJ/mol and -1134.7 kJ/mol, respectively, and the IX adsorbed on the sulfide malachite surface was more stable. The flotation experiments indicated that the sulfidization of malachite reduced the consumption of IX; however, the recovery of malachite was improved.
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第 6 篇
标　　题： Division Of Tectonic Units In Yining Block: Evidence From Volcano-Magmatism
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期　　刊： ACTA PETROLOGICA SINICA

摘　　要： The Yining Block is not a uniformity terrane or a uniform terrane that is distinctly different from the previous persistent view, but was formed by the superposition and collage of the southern and northern secondary structural belts (two arc-basin systems) bounded by the Wusunshan-Talde regional large-scale fault. This papper set up a new division and re-establishment about its tectonic units by using the widespread volcano-magmatism in this block. The southern structural belt is composed of the Kalajun island arc belt to the south and the Atengtao back-arc basin to the north, which mainly developed from the Late Devonian to early stage of Early Carboniferous. The peak isotopic age of volcanic rocks in this belt ranges from 355 Ma to 350Ma, with an average age of 351Ma (n =17). While the northern structural belt can be subdivided into, namely from north to south, the Qingshuihe-Subutai back-arc basin, the Awulale superimposed island arc belt and the Tekesi-Xinyuan fore-arc basin, which was mainly developed in the middle-late stage of Early Carboniferous. The peak isotopic age in this belt concentrates in 345 similar to 329Ma with an average age of 340Ma (n = 18). The two arc-basin systems are dominated by calc-alkaline volcanic rocks of the Dahalajunshan Formation, and they coexist with the fore-arc and back-arc basin sedimentary associations in the Early Carboniferous Akeshake Formation. The Dahalajunshan Formation is dominated by island arc volcanic rocks, including Nb-enriched basalts, high-magnesium andesites, symbiotic adakites and highly differentiated I-type granites, and some alkaline volcanic rocks, alkaline bimodal rhyolites and symbiotic bimodal volcanic rocks that predominantly cropped out in the back-arc basin. Studies show that not only the volcanic rocks of the Dahalajunshan Formation show significant differences in each tectonic facies, but also the symbiotic sedimentary rocks of the Akeshake Formation are obviously different in each tectonic facies. The above two structural belts have experienced independent histories of the basement formation, the basin sedimentation, and the volcanic magmatic and tectonic evolution. The Shanshan Movement indicates that the southern and northern structural belts were superimposed and collaged together at the end of Early Carboniferous, forming the unified Yining Block. During the Late Carboniferous, the block entered into a unified intracontinental tectonic development and evolution stage, and during this period of time, a series of rift-related volcanic constructions as represented by the alkaline bimodal volcanic rocks of the Late Carboniferous Yishijilike Formation were formed.

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第 7 篇

标　　题：Geochemistry, Petrogenesis And Geological Significance Of Early Carboniferous Adakite In Sawuer Region, West Junggar, Xinjiang

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期　　刊：ACTA PETROLOGICA SINICA

摘　　要：The Aketamu Formation, as a new defined lithostratigraphic unit in Sawuer region, West Junggar, is composed of intermediate volcanic lavas and pyroclastic rocks, with minor of acidic volcanic lavas. The LA-ICP-MS zircon U-Pb age of rhyolite from the Aketamu Formation is 337. 9 +/- 0. 77Ma. Therefore, the rhyolite is formed in Early Carboniferous. Geochemically, the andesites in the Aketamu Formation are characterized by high SiO2 (53. 42%similar to 64. 74%), Al2O3 (16. 05%similar to 19. 23%) and Na2O (4. 05% similar to 8. 13%), and low K2O (0. 36%similar to 3. 65%). They have high Sr (448. 1 x 10(-6)similar to 1507 x 10(-6)) contents, high Sr/Y (36.6 similar to 89. 0) ratios, and slightly positive Eu anomalies. Moreover, the andesites are enriched in large-ion-lithophile elements (such as K, Rb, Ba, Th and U) and light rare earth elements, and are depleted in high-field-strength elements (such as Nb, Ta and Ti) and heavy rare earth element, especially Y and Yb, showing the characters of a typical adakite. The studied results show that the andesites from Aketamu Formation were the products resulting from slab melting, with the residual minerals (eg. amphibole + garnet) in the source of garnet amphibolite. In combination with the regional geological background, the authors hold that the subducted oceanic slab edges were heated by the asthenospheric mantle rise through slab window, which is the result of the southward subduction of the Irtysh-Zaysan Ocean between Kazakhstan in the south and Altai in the north. The reaction of upward migrating adakitic magmas with mantle peridotite gave rise to the adakite and Nb-enriched arc basalt suites, and led to the Cu-Au mineralization at the same time. The discovery of Early Carboniferous adakite in Aketamu Formation provides evidence for further understanding of the Late Paleozoic tectonic evolution, magmatism and metallogenic of ore deposits in West Junggar.

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第 8 篇

标　　题：Metallogenic Process In Xishanwanyangchang Silver Polymetallic Deposit, Inner Mongolia, China: Constraints From Occurrence Of Silver

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期　　刊： ACTA PETROLOGICA SINICA
摘　　要： The Xishanwanyangchang silver polymetallic deposit is located in the mid-western segment of the northern margin of North China Craton. There are large-area outcrops of Paleozoic adamellite and tonalite in the ore district. The Early Cretaceous Bainvyangpan Formation acidic volcanic rocks, erupting along the near-N-E-trending tensile fractures in the contact zone between adamellite and tonalite. Silver orebodies are lentiform or stratiform occurring in the Lower Cretaceous Bainvyangpan Formation as well as contact zone between the volcanic rocks and intrusive rocks, and lead-zinc orebodies are mainly occurring in intrusive rocks and their contact zone with volcanic rocks, and the faulted structure is obvious in ore control. In this paper, the occurrence and distribution of silver were studied based on detail field work, petrography and electron probe micro-analyzer (EPMA) researches. At the same time, the geochemical migration pattern, precipitation mechanism and metallogenic process of silver, lead and zinc were discussed. The results show that the occurrence of silver in this deposit is mainly visible silver, followed by invisible silver. Visible silver is mainly microencapsulated silver (1 similar to 10 mu m) and independent silver minerals (>50 mu m), and invisible silver is mainly isomorphic silver and super-microencapsulated silver (<1 mu m). Microencapsulated silver is mostly wrapped by pyrite, quartz, potash feldspar, barite, etc. Independent silver minerals mainly embedded between quartzes and in those fissures, mainly argentite, followed by naumannite, and a small amount of natural silver, akanthite and pyrargyrite (proustite), etc. Isomorphic silver occurs in the crystal lattice of binary copper sulfides, such as digenite, yarrowit. Super-microencapsulated silver is mainly contained in galena, sphalerite and pyrite related to silver mineralization. The process of mineralization is divided into hydrothermal period and hypergene period based on the crosscutting relationship between mineralized veins, ore textures and mineral assemblages. The hydrothermal period is the main metallogenic period, which can be divided into quartz-pyrite stage, quartz-polymetallic sulfides stage, and quartz-carbonate stage. Quartz-polymetallic sulfides stage is the mainly mineralization stage, and lead-zinc mineralization was formed early in this stage, silver mineralization was formed late in this stage. The ore-forming hydrothermal fluids are rich in various elements such as Fe, Cu, Zn, Pb, Ag, S, and Se in the deposit, and metal ions of which are transported in the form of chloride complexes at the early high-temperature stage. With the decreasing of temperature of the ore-forming hydrothermal fluids and the changes of physical and chemical environments, the chloride complexes are unstable and start to decompose, and the metal ions that have not precipitated are converted into form of HS- complexes and continue to migrate. The continuous decreasing of temperature of the ore-forming hydrothermal fluids leads to the separation of Fe2+, Zn2+, Cu+ and Pb2+ with HS to form metal sulfides such as pyrite, sphalerite, chalcopyrite and galena. And at this time, Ag+ partially replaces Cu+ in the form of isomorph, which occurs in binary copper sulfides, and at the same time, part of silver is captured by sulfide minerals such as pyrite, sphalerite and galena in the form of super-microencapsulated silver. The

precipitation of large quantities of Fe2+, Zn2+, Cu+ and Pb2+ causes instability of [Ag(HS)(2)](-) and the complete disintegration of silver from its HS- complex and combination with Se2- to form some independent silver minerals (such as argentite and naumannite), while the oversaturated silver in the solution is settled in the form of native silver. Under supergene conditions, the silver in the original carrier mineral and the discrete silver can be enriched again with the limonite mineralization of the pyrite after leaching.

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第 9 篇

标　　题： Geometric Morphometric Analysis Of Protoconites Minor From The Cambrian (Terreneuvian) Yanjiahe Formation In Three Gorges, South China

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期　　刊： PALAEONTOLOGIA ELECTRONICA

摘　　要： The Ediacaran to Cambrian transition is a critical interval of time during which major evolutionary changes occurred. Recently, abundant Protoconites minor have been recovered from the silty shales of the lower Cambrian Yanjiahe Formation (Terreneuvian, Fortunian - Stage 2) in the Three Gorges area of South China. These fossils represent an important ecological diversification of macroscopic organisms at the onset of the Cambrian. Protoconites minor is a probable cnidarian-grade organism preserved by carbon compression. Herein, geometric morphometric analyses are applied to crack out specimens of P. minor to reveal any cryptic morphological details that may have implications for their morphological diversity, ontogenetic processes, and taxonomic identification. These statistical analyses reveal a strong relationship between size and shape, which indicates that the overall shape of P. minor was mainly controlled by allometric growth. The smaller specimens are generally wider at the anterior and more commonly have straight-sides. Larger individuals tend to be narrower at the anterior, with bending more common. Our analyses demonstrate that there are transitional forms between larger, strongly bent specimens and smaller, straight specimens, suggesting that the assemblage likely consists of a single species.

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第 10 篇
标　　题： Petrogenesis And Tectonic Setting Of Late Devonian I-Type Granitic Plutons In The Kekesala Area, Chinese Western Tianshan: Implication For Tectonic Evolution Of The North Tianshan Ocean
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期　　刊： INTERNATIONAL GEOLOGY REVIEW
摘　　要： Massive Late Palaeozoic magmatic rocks are well developed along the northern margin of the Chinese western Tianshan. Previous studies mainly focused on the Carboniferous to Permian magmatism, and the Devonian magmatic rocks were rarely reported. Thus, this study presents new zircon U-Pb dating, whole-rock geochemistry and Lu-Hf isotopic data for the Late Devonian granitic plutons from the Kekesala area of the Chinese western Tianshan, aiming to elucidate their ages, petrogenesis, and tectonic settings. The Kekesala granitic plutons comprise granodiorites, monzogranites and syenitic granites. Zircon U-Pb dating results show they were emplaced in Late Devonian (ca. 372 Ma). Geochemically, the granodiorites and monzogranites are characterized by high-K calc-alkaline I-type series, and have low Ni and Cr, and weakly positive epsilon(Hf)(t) values, interpreted to be predominantly derived from partial melting of a lower crust with minor addition of mantle-derived materials; The syenitic granites with medium-K calc-alkaline features, exhibit high Sr and low Y and Yb, likely originated from partial melting of a subducted slab involving some mantle peridotites. The Kekesala I-type granitic plutons provide robust evidence for the existence of a subduction regime for the northern part of the Chinese western Tianshan in the Late Devonian. Based on the studied results, together with available data, we conclude that initial subduction of the North Tianshan Ocean began at least in the Middle Ordovician and terminated at the beginning of the Late Carboniferous rather than in the Middle Silurian.
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WOS 号： 000511777400001

第 11 篇
标　　题： Geochronology, Isotopic Chemistry, And Gold Mineralization Of The Black Slate-Hosted Haoyaoerhudong Gold Deposit, Northern North China Craton
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期　　刊： ORE GEOLOGY REVIEWS

摘　　要： The Haoyaoerhudong gold deposit is the largest gold deposit in the north margin of the North China Craton gold province, and contains over 7 Moz of gold at an average grade of 0.62 g/t. The deposit is hosted in the carbonaceous and pyritic slate, phyllite, and schist and is controlled by a tight syncline and shear zones. The high-grade orebodles contains abundant pyrite veins and pyrite-quartz veins. Three stages of pyrite have been identified, including the diagenetic disseminated pyrite, pyrite veins caused by peak matamorphism, and pyrite-quartz veins forming during post-peak metamorphism. Native gold has been observed in pyrite veins and pyrite-quartz veins. The Ar-40/Ar-39 plateau age of a biotite separate from a tails of boudinaged pyrite-quartz veins is 260.1 +/- 2.9 Ma. Combined with previously published Ar-40/Ar-39 mica age data and low closure temperature of mica, these results suggest that pyrite veins and pyrite-quartz veins were formed during the peak, to post-peak metamorphism during 285-260 Ma, respectively. The lower limit of the formation age of sedimentary disseminated pyrites has constrained to 1670-1560 Ma by the intruded mafic-ultramafic dikes. Disseminated pyrite separates have delta S-34 values ranging from -39.40 parts per thousand to + 17.85 parts per thousand, (206)pb/(204)pb of 19.144-21.892, Pb-207/Pb-204 of 15.681-15.864, and Pb-208/Pb-204 of 37.502-38.925, suggesting they were formed from seawater sulfate and has experienced strong sulfur isotopic fractionation. In contrast, hydrothermal pyrites from pyrite veins and pyrite-quartz veins have delta S-34 values ranging from +6.8 parts per thousand to +16.47 parts per thousand, (206)pb/(204)pb of 18.566-18.922, Pb-207/Pb-204 of 15.645-15.684, and Pb-208/Pb-204 of 38.924-38.983, which may reflect dissolution-reprecipitation of disseminated sulfides from the pre-existing organic-rich sediments. The mineral paragenetic, geometric, and cross-cutting relationships of pyrite veins and pyrite-quartz veins at Haoyaoerhudong suggest that gold was most likely introduced into pyrite, accompanying sedimentation of the organic-rich shales, and then became enriched during diagenesis. Subsequently, the hydrothermal fluids following metamorphism and shear zone activity make dissolution of the gold in the diagenetic pyrite and precipitated in the intersection of shear zone and tight syncline.

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第 12 篇

标　　题： Spatial-Temporal Dynamics And Driving Forces Of Land Development Intensity In The Western China From 2000 To 2015

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期　　刊： CHINESE GEOGRAPHICAL SCIENCE

摘　　要： The change in land development intensity is an important perspective to reflect the variation in regional social and economic development and spatial differentiation. In this paper, spatial statistical analysis, Ordinary Least Squares (OLS), and Geographically weighted regression (GWR) methods are used to systematically analyse the spatial-temporal characteristics and driving forces of land development intensity for 131 spatial units in the western China from 2000 to 2015. The findings of the study are as follows: 1) The land development intensity in the western China has been increasing rapidly. From 2000 to 2015, land development intensity increased by 3.4 times on average. 2) The hotspot areas have shifted from central Inner Mongolia, northern Shaanxi and the Beibu Gulf of Guangxi to the Guanzhong Plain and the Chengdu-Chongqing urban agglomeration. The areas of cold spots were mainly concentrated in the Qinghai-Tibet Plateau, Yunnan, and Xinjiang. 3) Investment intensity and the natural environment have always been the main drivers of land development intensity in the western China. Investment played a powerful role in promoting land development intensity, while the natural and ecological environment distinctly constrained such development. The effect of the economic factors on land development intensity in the western China has changed, which is reflected in the driving factor of construction land development shifting from economic growth in 2000 to economic structure, especially industrial structure, in 2015.

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第 13 篇

标　　题： Trade-Offs And Synergies Of Ecosystem Services In Karst Area Of China Driven By Grain-For-Green Program

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期　　刊： CHINESE GEOGRAPHICAL SCIENCE

摘　　要： As an important means regulating the relationship between human and natural ecosystem, ecological restoration program plays a key role in restoring ecosystem functions. The Grain-for-Green Program (GFGP, One of the world's most ambitious ecosystem conservation set-aside programs aims to transfer farmland on steep slopes to forestland or grassland to increase vegetation coverage) has been widely implemented

from 1999 to 2015 and exerted significant influence on land use and ecosystem services (ESs). In this study, three ecological models (InVEST, RUSLE, and CASA) were used to accurately calculate the three key types of ESs, water yield (WY), soil conservation (SC), and net primary production (NPP) in Karst area of southwestern China from 1982 to 2015. The impact of GFGP on ESs and trade-offs was analyzed. It provides practical guidance in carrying out ecological regulation in Karst area of China under global climate change. Results showed that ESs and trade-offs had changed dramatically driven by GFGP. In detail, temporally, SC and NPP exhibited an increasing trend, while WY exhibited a decreasing trend. Spatially, SC basically decreased from west to east; NPP basically increased from north to south; WY basically increased from west to east; NPP and SC, SC and WY developed in the direction of trade-offs driven by the GFGP, while NPP and WY developed in the direction of synergy. Therefore, future ecosystem management and restoration policy-making should consider trade-offs of ESs so as to achieve sustainable provision of ESs.

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第 14 篇

标　　题： Geochronology, Geochemistry, And Petrogenesis Of The Kezijiaer Gabbros, Southern Chinese Altai: Evidence For Ridge Subduction

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： The Chinese Altai as a key part of the Central Asian Orogenic Belt is characterized by wide outcrops of Palaeozoic granitoids and minor mafic plutons. It is widely accepted that Devonian ridge subduction played an important role in the tectonic evolution of the Chinese Altai. However, Carboniferous magmatism related to ridge subduction has received little attention. Here, we report zircon U-Pb age and whole-rock geochemistry of the Kezijiaer gabbros in the southern Chinese Altai, aiming to elucidate their emplacement age and petrogenesis and tectonic setting. Laser ablation inductively coupled plasma mass spectrometry zircon U-Pb dating shows that the Kezijiaer gabbros were emplaced in the Early Carboniferous with a crystallization age of 348 +/- 3 Ma (mean square of weighted deviates = 0.46). Geochemically, the Kezijiaer gabbros exhibit low SiO2, high MgO, Fe2O3, Ni, and Cr concentrations, as well as enrichments of light rare earth elements and large- ion lithophile elements (e.g., Rb, Ba, Th, and U) relative to high-field-strength elements and heavy rare earth elements. Meanwhile, they have high TiO2, Nb/Ta, Zr/Hf, and Ti/V and low La/Yb values. These features show that the gabbros share geochemical signatures of both island arc basalt and mid-ocean

ridge basalt. Together with low La/Sm, Sm/Yb, and Dy/Yb ratios, it is suggested that the Kezijiaer gabbros mainly originated from partial melting of a spinel lherzolite mantle wedge metasomatized by subduction-related fluids and sediment melts with input of asthenospheric components, subsequently followed by fractional crystallization of olivine and clinopyroxene. Taking into account regional geology and published data, we argue that an Early Carboniferous ridge subduction regime responsible for the Kezijiaer gabbros might have also exerted a pivotal role in the tectonic evolution processes of the Chinese Altai in the Palaeozoic.

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第 15 篇

标　　题： Geochronology, Geochemistry, And Hf Isotopes Of Mafic Rocks From Dalabute Ophiolitic Melange In West Junggar, Xinjiang (Nw China): Implications For The Magmatic Source And Tectonic Setting

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： Several Palaeozoic ophiolitic melanges distributed in the West Junggar, Xinjiang, are remnants of the Paleo-Asian Ocean evolution. They are important keys for studying the component, tectonic evolution, and crust-mantle interaction of the Central Asian Orogenic Belt (CAOB). This paper presents petrology, zircon U-Pb chronology, geochemistry, and Hf isotope data of mafic rocks from the Dalabute ophiolitic melange, West Junggar. The zircon U-Pb chronology data of gabbro in the Dalabute ophiolitic melange can be divided into two groups. The first group magmatic zircons yield a weighted mean age of 389.7 +/- 7.7 Ma. It suggests that gabbros of the Dalabute ophiolitic melange were formed during the period of Early-middle Devonian, which represents the main period that the Dalabute back-arc ocean basin expanded. The second group inherited zircons with ages ranging from 910 to 975 Ma were interpreted as Neoproterozoic materials of basement entered its magmatic source. Geochemical characteristics show that the mafic rocks from the Dalabute ophiolitic melange can be subdivided into alkaline and tholeiite series. Whole-rock and Hf isotopic data indicate that alkaline basalts have the signatures of typical OIB and formed in the oceanic island or seamount settings related to mantle plume, which were most likely derived from an enriched mantle source. Besides, tholeiitic rocks exhibit the features of MORB and generated in an immature back-arc basin in the supra-subduction zone. Their magmas originated from a depleted mantle that had been metasomatized by subduction-related fluids and contaminated by materials with crustal nature. Therefore, Dalabute ophiolites are supposed to be generated from a back-arc oceanic basin, which is relate to intra-subduction and with mantle plumes developed within it. These results jointly

provide convincing evidence for the evolution and property of the Dalabute ophiolite in the West Junggar and further supply reference and base for reconstruct the evolutionary history of the CAOB.

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第 16 篇

标　　题： The Interaction Among Multiple Charged Particles Induced By Cations And Direct Force Measurements By Afm

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期　　刊： COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS

摘　　要： The interaction among multiple charged particles in flotation system was subjected to detailed analysis using different techniques. To limit the detrimental effect of serpentine on ascharite flotation, an innovative method was used through particles interaction. It stated that serpentine took priority to absorb on quartz surface to prevent from attaching to ascharite surface. Interaction forces among multiple charged particles were measured by AFM, the findings that attractive force between ascharite and serpentine could be prominently reduced by cations (Cu2+ > Ca2+> Mg2+) were unveiled, revealing cations could motivate the separation process, but it didn't work due to the presence of quartz. In this case, Zeta potential analysis and DLVO theory were used to study the inner factor affecting particles interaction. The result showed that cations was of benefit to the particles dispersion and the surface potential was confirmed to contribute most to the difference in forces.

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第 17 篇

标　　题： Geochemical Patterns Of Cu, Au, Pb And Zn In Stream Sediments From Tongling Of East China: Compositional And Geostatistical Insights

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期　　刊： JOURNAL OF GEOCHEMICAL EXPLORATION

摘　　要： Geochemical patterns of elements in surficial sediments are of significance in deciphering processes and locating mineral resources. Stream sediment geochemical

data of four ore-forming elements (Cu, Au, Pb and Zn) and fourteen associated elements (Ag, As, Bi, Cd, La, Mn, Mo, Nb, Sb, Th, U, W, Y and Zr) from the Tongling Ore Cluster District (TOCD), East China were analyzed by compositional multivariate and geostatistical approaches. It is shown that the median values of the four ore-forming and main associated elements including Ag, As, Bi, Cd and Sb are at least two times larger than those in stream sediments of China, indicating that there was a noteworthy addition of such ore minerals as (gold-rich) chalcopyrite and pyrite, galena and sphalerite into the sediments. The first three factors that explain 71.4% of the total variance could represent the dominant geology in the TOCD including the felsic intrusive rocks by F-1 (-) (Zr-Th-Nb-Y-La) and F-2 (-) (U-Y-Th-Nb-La), Pb and Zn-bearing strata and related mineralization by F-1 (+) (Pb-Cd-Ag-Mn-Sb-Zn), skarn Cu mineralization by F-2 (+) (Bi-Cu-Au-As) and porphyry Cu mineralization by F-3 (-) (MoeW). Simultaneously, regression analysis exhibited a closer relationship of Cu in the stream sediments with the skarn-type Cu mineralization than the porphyry counterpart. The geostatistical semivariogram modeling reflected that the greatest continuity of Cu, Au, Pb and Zn is at NE4 degrees, SE95 degrees, NE50 degrees and NE42 degrees, respectively. Moreover, the factor score and balance maps from factor analysis and sequential binary partition (SBP) illustrated the geochemical patterns of the elements. According to the modeling and spatial patterns, not only the possible sources (geogenic vs. anthropogenic), but also the controlling factors have determined. High levels of Cu, Bi, Mo and W are dominated by the felsic intrusives and related mineralization. That of Au, however, is governed by combined effect of the basement fault system and felsic intrusives. In contrast, high concentrations of Pb and Zn and such associated elements as Cd and Sb are controlled by the Permian and Triassic strata and associated Pb-Zn mineralization. Exploration suggestions and targets were proposed accordingly. It demonstrates that compositional and geostatistical analyses are effective to characterize geochemical patterns of elements.

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第 18 篇

标　　题： Petrography And Isotopic Geochemistry Of Bedding-Parallel Fibrous Gypsum Veins In The Neogene Qingshuiying Formation Of The Ningnan Basin, North China: Insights For Growth Model Of Antitaxial Fibrous Veins

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期　　刊： JOURNAL OF STRUCTURAL GEOLOGY

摘　　要： Bedding-parallel fibrous gypsum veins, which are widely developed in the Neogene Qingshuiying Formation of the Ningnan Basin, a Tertiary basin located in the northeastern margin of the Tibetan Plateau, provide valuable information on stress field,

fluid origin and host rock deformation during their formation. The systematic petrographic observation and isotope analysis of both of veins and wall rocks were carried out to investigate the formation mechanism of bedding-parallel fibrous gypsum veins. The distribution of fibrous gypsum veins shows vertical heterogeneity, and mainly occurs in the middle and lower part of the Qingshuiying Formation with relatively high gypsum content. Single fibrous gypsum veins consist of a median zone and two fibrous zones. The median zone is characterized by blocky gypsum crystals and multiple host rock fragments formed by crack-seal events. The fibrous zone is composed of parallel gypsum fibres a high angle to the vein walls, indicating shear component. Vein opening is considered to be the result of fluid overpressure caused by horizontal compression in low-permeability mudstone during basin inversion. Fibrous gypsum crystals grow continuously without obvious growth competition between adjacent crystals. This indicates that growth of gypsum fibres occurs in limited space, even without fractures. The main driving force for vein dilation is force of crystallization of gypsum fibre growth, and fluid pressure also has a certain contribution. The sulfur and strontium isotopes of gypsum veins exhibit a high degree of consistency with wall rocks, which indicates the material of the fibrous gypsum veins is derived from the wall rock. A suitable growth model of bedding-parallel fibrous gypsum veins in the Ningnan Basin is established, which explains the process of vein interaction, and the formation of V-shaped or U-shaped solid inclusions.

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第 19 篇

标　　题： Principal Component Analysis And Fisher Discriminant Analysis Of Environmental And Ecological Quality, And The Impacts Of Coal Mining In An Environmentally Sensitive Area

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期　　刊： ENVIRONMENTAL MONITORING AND ASSESSMENT

摘　　要： Most discriminant methods do not consider the problem of misjudgment related to the superposition of information from different discriminant indexes. Therefore, we used principal component and Fisher discriminant analysis to model, assess, and classify environmental and ecological quality, and the impacts of coal mining. The analysis uses the following input parameters as discrimination indexes: geomorphology, water depth, thickness of the phreatic water layer, bedrock thickness above the uppermost coal seam, and thickness of the uppermost coal seam. Twenty-three datasets from the Yushenfu coal mine area, Shaanxi Province, China, were used to train the model. The validity of the model was tested by the backward substitution method, and the misjudgment rate

was zero. Seven datasets were then used as test samples in a support vector machine model. Our results show that it is feasible to predict the environmental and ecological impacts of coal mining with principal component analysis and Fisher discriminant analysis, which can effectively eliminate the interaction between the sample variables. This results in a more accurate assessment of mine environmental quality and represents a new method for predicting the impacts of coal mining in environmentally sensitive areas.

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第 20 篇

标　　题： New Findings Regarding The Fen-Wei Graben On The Southeastern Margin Of The Ordos Block: Evidence From The Cenozoic Sedimentary Record From The Borehole

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： In the Cenozoic, fault-related basins, including the Wei River, Lingbao and Linfen basins, developed on the southeast margin of the Ordos Block. Based on the latest drilling data and previous research results, this article analysed the evolutionary processes, temporal and spatial relationships and tectonic background of these basins, and obtained the following results: (a) The Wei River Basin and the Lingbao Basin belong to a unified basin, which formed in the Palaeocene and developed gradually from east to west. (b) The Linfen Basin formed in the late Miocene and developed gradually from southwest to northeast. (c) The evolution of the basin systems was dominated by the westward subduction of the Pacific Plate in the Palaeogene and then by a combination effects of the subduction of the Pacific Plate and the uplift of the Tibetan Plateau. (d) The so-called Fen-Wei Graben is not supported by the different geological evolutionary histories of the Wei River Basin and the Linfen Basin.

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第 21 篇

标　　题： Determination Of Trace Metals In Garlic Bulbs (Allium Sativum L.): A Variety Discrimination By Inductively Coupled Plasma Mass Spectrometry

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期　　刊： JOURNAL OF APPLIED SPECTROSCOPY

摘　　要：Thirteen trace metals (Li, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Rb, Sr, Nb, and Mo) and two toxic metals (Cd and Pb) in two kinds of garlic bulbs have been quantified. Following the dehydration process, the garlic residues are digested using 10.0 mL of an acid mixture of HNO3:H2O2:HCl (3:1:1, v/v/v). The trace metal assay is accomplished by inductively coupled plasma mass spectrometry (ICP-MS). Results reveal that the metal levels for the garlic bulbs with purple skin in dry weight are 14.5, 1.32, 3.03, 3.88, 13.0, 2.50, 1.00, 64.1, 139.6, 13.6, 18.4, 0.29, 0.11, 1.60, and 0.52 mg/kg for Li, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Rb, Sr, Nb, Mo, Cd, and Pb, respectively, while the corresponding metal concentrations in the garlics with white skin are 22.9, 2.70, 3.95, 6.60, 19.7, 3.72, 1.16, 79.9, 149.8, 19.7, 24.0, 0.33, 0.43, 0.84, and 0.30 mg/kg, respectively. In general, the trace metals in both varieties are clearly under the FAO/WHO maximum permissible limits. However, it is observed that the garlics with white skin show higher quantities of essential/possible essential metals and lower levels of toxic metals, demonstrating the garlics with white skin exhibit a higher nutrition quality and are a better source of essential minerals.

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第 22 篇

标　　题：The First Precambrian Gold Deposit In North Xinjiang, Nw China: Geochronology, Metallogenic Character, And Ore Genesis Of The Dajingou Gold Deposit

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期　　刊：ORE GEOLOGY REVIEWS

摘　　要：The Dajingou gold deposit is one of the typical gold deposits in the Quruqtagh metamorphic terrane, north of the Tarim Craton. The deposit mainly comprises gold-bearing quartz veins hosted in Precambrian metamorphic rocks and structurally controlled by the subsidiary faults and ductile shear zone. To determine the age of gold mineralization in the Dajingou deposit, a single sericite Ar-40/Ar-39 age of 829.4 +/- 4.8 Ma (MSWD=0.57) and hydrothermal zircon weighted average U-Pb ages (812 +/- 15 Ma, MSWD=3.2) from auriferous quartz veins were obtained in this study, indicating that mineralization occurred in the mid-Neoproterozoic (ca. 0.83 Ga), corresponding to regional metamorphism of the Tarim Craton, termed the Tarim

orogeny. The Dajingou deposit is the first Precambrian gold deposit identified in North Xinjiang, NW China. The delta O-18 and dD of quartz ranges from 14.7 parts per thousand to 15.9 parts per thousand and -104 parts per thousand to -75 parts per thousand, respectively; the calculated delta(OH2O)-O-18 of the fluids ranges from 0.9 parts per thousand to 5.0 parts per thousand. This suggests that the ore-forming fluids in the Dajingou gold deposit were derived from dehydration of metamorphic rocks during regional metamorphism, with a subsequent input of meteoric water. Based on its similarities with typical orogenic gold deposits, the Dajingou deposit is proposed to be an orogenic gold deposit formed during the mid-Neoproterozoic Tarim orogeny in the Tarim Craton.

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第 23 篇

标　　题： Polymer-Enhanced Foam Flooding For Improving Heavy Oil Recovery In Thin Reservoirs

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期　　刊： ENERGY & FUELS

摘　　要： Oil reserves of the thin heavy oil reservoirs are estimated to be over 400 billion barrels. The recovery factor of water-flooding in these reservoirs is as low as 10-20% due to the high oil viscosity and correspondingly unfavorable mobility ratio. In addition, the commonly used thermal recovery methods are also unsuitable in such formations due to the significant heat loss to the adjacent formations. Thus, it is urgent to find an efficient and economic enhanced oil recovery (EOR) method to maximize the recovery factors in the thin heavy oil reservoirs. In this study, the feasibility of polymer-enhanced foam (PEF) flooding for the thin heavy oil reservoirs is investigated using the micromodel and core-flood experiments. The micromodel experiments show that foam quality has significant effects on the resistance factor and heavy oil recovery of the PEF flooding, where the displacement front of a low-quality foam case is more even than that of a high-quality foam case and surfactant-polymer (SP) flooding case. Core-flood tests further reveal that there is an optimal slug size under the experimental conditions, and the heavy oil recovery of PEF flooding is 23.9% higher than that of SP flooding when using the same slug size. Finally, a field-scale reservoir simulation is conducted, and the

results show that after initial water-flooding in thin heavy oil reservoirs, the recovery factor achieved by the PEF flooding is 11.7% higher than that of the SP flooding and 21.4% higher than that of the continuous water-flooding process.

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第 24 篇

标　　题： Superpixel-Based Imaging For Residential Area Detection Of High Spatial Resolution Remote Sensing Imagery

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期　　刊： JOURNAL OF APPLIED REMOTE SENSING

摘　　要： The precise and efficient location of residential areas using high spatial resolution remote sensing imagery is a popular research area in the field of Earth observation. Most of the existing approaches are supervised or semisupervised and use data training. Among the unsupervised approaches, corner density-based mapping using kernel density estimate has been widely employed to predict the presence of built-up areas. However, it is computationally time-consuming and the statistical threshold segmentation makes it difficult to obtain a stable and accurate output. To overcome this deficiency, a new two-stage object-oriented residential area extraction scheme was designed. First, a set of corners was extracted using the Gabor filter bank with structural tensor analysis to indicate candidate buildings. Then, instead of pixel units, our method takes superpixel-based image partitions as the primary calculation elements, and an object-oriented weighted sparse spatial voting technique was proposed to accelerate the generation of a residential area presence index. It was demonstrated that the superpixel-based voting strategy was not only efficient in accelerating the calculation process, but it also reduced the false negative rate in the final detection result. Second, a graph-cut method was employed to address the residential area segmentation by integrating a density map as a prior cue that preserves the boundary accuracy better than traditional statistical threshold methods. The effectiveness of the proposed method was evaluated using a series of experiments on the sets of high-resolution Google Earth, IKONOS, and GaoFen-2 (GF2) satellite imagery. The results showed that the proposed approach outperforms the existing algorithms in terms of computational speed and accuracy. (C) 2020 Society of Photo-Optical Instrumentation Engineers (SPIE)

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第 25 篇

标　　题： Petrogenesis Of The Late Triassic Sanshilipu Monzogranites In North Qinling Orogenic

Belt

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期　　刊：GEOLOGICAL JOURNAL

摘　　要：The Sanshilipu monzogranites is located in the northern margin of the South Qinling Block, with an outcrop of about 10 km(2), and as an intrusion into Palaeozoic Danfeng ophiolitic melange. The samples consist mainly of plagioclase, K-feldspar, quartz, biotite, and minor titanite, apatite, magnetite, with contents of SiO2(61.73-68.49%), Al2O3(14.58-16.61%), K2O + Na2O (5.79-8.87%), MgO (1.07-2.91%), and low TiO2(0.55-0.83%), similar to those of I-type granite. They also show high concentrations of LREE, Pb, and Sr, slightly negative Eu, but low HREE, Nb, Ta, and Y. High Sr and Sr/Y, low Y characteristics are similar to those of adakite. High precision LA-ICP-MS U-Pb dating and trace element analysis of zircon in the Sanshilipu granite yielded a concordant age of 205 +/- 1 Ma. This age is apparently younger than the closure age of the Mian-Lue Ocean (242-221 Ma). We propose that the Sanshilipu monzogranites formed by magma mixing of thickened lower crust and limited mantle-derived mafic magma during post-collision of the South China and North China blocks.

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第 26 篇

标　　题：A New Tetraradial Olivooid (Medusozoa) From The Lower Cambrian (Stage 2) Yanjiahe Formation, South China

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期　　刊：JOURNAL OF PALEONTOLOGY

摘　　要：Octapyrgites elongatus n. gen. n. sp., a relatively rare, tetraradial olivooid (Cnidaria, Medusozoa), is described from Bed 5 of the Yanjiahe Formation (Cambrian Stage 2) near Yichang, China. Although similar to Olivooides and Quadrapyrgites from the Fortunian Stage in consisting of a partially corrugated (longitudinal) periderm with a quadrate (transverse) apical portion and V-shaped apertural lobes, O. elongatus is substantially larger than other olivooids. The elongate apical region of O. elongatus is similar to four-sided Anaconularia anomala (Barrande, 1867), though with a flat tip that may have been an adaption for a sessile mode of life. As in other olivooids, embryonic development in O. elongatus may have been direct. Last, the paucity of olivooids and the absence of pentaradial cnidarians and carinachitids in Cambrian Stage 2 indicate a marked decline in the disparity of cnidarians near the Fortunian-Cambrian Age 2 boundary, when by contrast bilaterians underwent rapid diversification. UUID: http://zoobank.org/60acc2f9-44f8-4a97-9449-960ad76f8fff

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第 27 篇

标　　题：Geochemistry, Geochronology, And Geodynamic Implications Of Mafic-Felsic Dykes From The Hadamengou Area, North-Western North China Craton

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期　　刊：GEOLOGICAL JOURNAL

摘　　要：Occurrences of multistage dykes provide a critical opportunity to constrain the nature of geological setting in the Daqingshan region during the Late Neoarchean to Middle Palaeoproterozoic. In this article, we present the results of zircon U-Pb ages and whole-rock geochemical data from mafic-felsic dykes in the Hadamengou area in order to constrain their ages and tectonic significance. Based on their zircon U-Pb ages, these dykes can be divided into four types: 2.52 Ga metadiabase, 2.45 Ga K-feldspar granite, 2.44 Ga granitic pegmatite, and 1.99 Ga metagabbro. Geochemically, the 2.52 Ga metadiabase rocks have low SiO2, high MgO, and Na2O/K2O ratios, with enrichment in LILE and depletion in HFSE, which suggests these rocks originated from melting of the lithosphere mantle components metasomatised by subducted slab-derived fluids. The 2.45 Ga K-feldspar granite and the 2.44 Ga granitic pegmatite are characterised by high SiO2 and Na2O + K2O contents, low MgO, Ni and Cr contents, and high A/CNK ratios, similar to typical features of strongly peraluminous granites. Additionally, these rocks show a variation of Eu anomalies and strong depletion of Th, U, Nb, and Ta elements, which characteristics are considered as a feature of anatectic origin. The 1.99 Ga metagabbro rocks belong to calc-alkaline rock series, and contain low SiO2 contents, high MgO, Cr and Ni contents, negative Nb, Ta, and Ti anomalies, and high LILE abundances without Eu anomalies. Geological features of the metagabbro dykes

indicate that they are likely derived from partial melting of the subduction-related metasomatised lithospheric mantle. Combined with the evidence of mafic-felsic dykes in the Hadamengou and magmatism in the adjacent area, a complex tectonic evolution history during Late Neoarchean to Middle Palaeoproterozoic is presented in the Daqingshan region, which is associated with the amalgamation of micro-blocks within the North China Craton (NCC), regional extension after cratonisation and subduction of the old ocean between the Yinshan Block and the Ordos Block.

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第 28 篇

标　　题： La-Icp-Ms Dating Of High-Uranium Columbite From No. 1 Pegmatite At Dakalasu, The Chinese Altay Orogen: Assessing Effect Of Metamictization On Age Concordance

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期　　刊： LITHOS

摘　　要： High-uranium (similar to 4200 to 8500 ppm U) columbite-group minerals (CGMs) from No. 1 pegmatite at Dakalasu, the Chinese Altay orogen were used to assess the effect of metamictization on the U-Pb isotopic systematics. Backscattered electron (BSE) imaging shows that the high U concentrations are due to the U in the crystal structure itself. In the rims, the part of CGM next to cracks or pores filled by titanuranoan fluorcalciomicrolite is altered. The microlite was likely formed via a dissolution-reprecipitation process that resulted in fractionation between U and Pb and potential discordance of the U-Pb isotopic systematics in the altered CGM. Raman spectroscopy indicates that the columbite samples are metamictized to various extents. However, the CGM samples dated by laser ablation - inductively coupled plasma - mass spectrometer (LA-ICP-MS) show excellent U-Pb age concordance, with thirty eight out of forty analyses displaying concordant U-Pb ages (229.0 +/- 1.0 Ma to 228.1 +/- 0.6 Ma) overlapping within analytical uncertainty (2 sigma). The alpha-decay doses are estimated to be 1.53 to 2.31 x 10(15) alpha-decay events/mg, indicating that the CGMs are at a transition stage from being crystalline to completelymetamict states. Although spatial separation between U and radiogenic Pb isotopes caused by a-recoil is inevitable, the displacement is on sub-micron scale, much smaller than the scale of laser ablation pits (43 mu m) for LA-ICP-MS dating. Therefore, the U-Pb isotopic systematics of partially metamict, U-rich CGM may still remain concordant for CGMs that have not suffered hydrothermal alteration or metasomatism and do not contain U- or Pb-rich inclusions within the laser ablation pits. Additionally, the chemical compositions of the CGM have no control over the U-Pb isotopic systematics. (C) 2020

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第 29 篇

标　　题： Grenville-Age Orogenic Event Along The Northeastern Margin Of The Quanji Massif, Nw China: Constraints From ~1.1 Ga Migmatite

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期　　刊： GEOSCIENCES JOURNAL

摘　　要： Detailed petrologic, geochemical and geochronological investigation on migmatites provide key information on the tectonic-magmatic history of the Quanji Massif, NW China. The studied migmatites are mainly composed of granitic gneisses, with lenticular refractory residua spread along its foliation. Zircon U-Pb ages of 1129.2 +/- 7.4 Ma (1 sigma, MSWD = 0.34, N = 31) and 1135.1 +/- 9.5 Ma (1 sigma, MSWD = 0.05, N = 22) were determined for the granitic gneiss and refractory residue, respectively. Garnet grains from the refractory residue show no distinctive intra-crystalline zonation, and are rich in Fe and Mg, but poor in Ca and Mn, akin to those from metapelite. Samples from the granitic gneisses have high contents of Si0(2) (from 67.92% to 69.89%), K2O (from 3.94% to 5.00%) and A/CNK (1.11-1.17), with LREE enrichment and distinctly negative Eu anomalies (Eu/Eu* = 0.49-0.53) in the chon-drite-normalized REE patterns, and significantly negative Nb, Ta, Ti and Sr anomalies in the primitive mantle-normalized spider diagrams. Granitic gneisses samples have consistent Nd isotope compositions with negative epsilon(Nd)(t) values ranging from -1.06 to -6.04, and T-DM model ages ranging from 1.83 to 2.23 Ga. These geochemical features suggest that the granitic rocks belong to the S-type granites, which were predominately derived from a late Paleoproterozoic crustal source. The granitic gneiss was probably formed by partial melting of the sediments which had been suffered graunlite-facies metamorphism. The components with low melting points (e.g., felsic minerals) might replace the sediments to form migmatites and migmatitic granites, and thus preserved the refractory residua. Therefore, the late Mesoproterozoic orogenic event is the coeval response of the global Grenvillian orogeny, indicating an important crustal remelting episode in the Quanji Massif.

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第 30 篇

标　　题： Debris Flow Events Of 4000 Abpand Its Resulting Archaeological Site Destruction In Qian River Gorge, The Upper Reach Of Wei River, Central China

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： In the study of global change, the relationship between the Holocene climatic disaster events and the rise and fall of ancient civilization is of considerable significance to a profound understanding of civilization evolution and human-land harmony. During the geological survey in the western Wei River Basin, a debris-flow event that would have destroyed an archaeological site was uncovered in the Holocene loesson the south bank of the Qian River. They were studied by field observations and laboratory analysis, including magnetic susceptibility, particle size distribution, carbonate content determination, and AMS(14)C dating. The debris-flow event was dated at about 3702 BP to 4084 cal BP by using the AMS(14)C in combination with archaeological artefacts age determination. Mingling with cultural layer, whole pig bones, and covering ash pit and cellars, the debris flow incident was linked to the site destruction. Combined with the global climate background at about 4000 a BP, the palaeo-floods records in the Wei River Basin, and the regional palaeo-earthquakes, we infer that the debris-flow was triggered by large earthquake and heavy rainfall and was a regional hydrological response to the 4.0 ka global climate event. Moreover, the debris-flow incident and its resulting archaeological site ruin have essential scientific significance for exploring the climate environment evolution, the ancient civilization evolvement, and the human-land relationship development in the Wei River Basin and surrounding area.

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第 31 篇

标　　题： Geochronology And Geochemistry Of Early Carboniferous Basalts From Baogutu Formation In West Junggar, Northwest China: Evidence For A Back-Arc Extension

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通讯作者： Li, YJ (corresponding author), Changan Univ, Sch Earth Sci & Resources, Xian 710054, Shaanxi, Peoples R China.

期　　刊： INTERNATIONAL GEOLOGY REVIEW

摘　　要：Early Carboniferous magmatism of the southern West Junggar (SWJ) region is essential for understanding the accretionary processes and crustal growth in the southwestern segment of the Central Asian Orogenic Belt. A comprehensive study of geochronological, geochemical, and Sr-Nd-Pb-Hf isotopic compositions was carried out in this study for basalts from the Baogutu Formation in Sulushuoke region, aiming to provide constraints on the Early Carboniferous tectonic evolution of the SWJ, NW China. LA-ICP-MS zircon U-Pb dating of four basalt samples yielded crystallization ages ranging from 339 Ma to 347 Ma, indicating the presence of early Carboniferous volcanic rocks in West Junggar. The studied tholeiitic basalts are geochemically characterized by nearly flat REE patterns, enriched large iron lithosphere elements (e.g. K) and depleted high field strength elements (e.g. Nb, Ta, Zr, Hf) relative to those in N-MORB, resembling those of modern Mariana Trough back-arc basin basalts. In addition, they have high positive epsilon Nd(t) values (+5.86 to +6.59) with initial(87)Sr/Sr-86 ratios in the range of 0.704783-0.705315 and variable epsilon Hf(t) values (+3.99 to +15.6). The rocks cover restricted ranges in initial Pb isotope ratios with (Pb-206/Pb-204)(i)from 17.529 to 18.289, (Pb-207/Pb-204)(i)from 15.509 to 15.627, and (Pb-208/Pb-204)(i)from 37.628 to 38.397. These signatures indicate that the tholeiitic basalts were derived from 10% to 20% partial melting of a spinel-lherzolitic N-MORB-like depleted mantle source modified by fluids released from the subducted lithosphere in a back-arc extensional setting. From our new data presented in this study and in conjunction with those from previous works, we, therefore, suggest that a back-arc basin related to the northwestward subduction of the Junggar oceanic crust was developed in the Hatu-Baogutu region during the early Carboniferous time.

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第 32 篇

标　　题：Evaluating The Co2 Geological Storage Suitability Of Coal-Bearing Sedimentary Basins In China

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期　　刊：ENVIRONMENTAL MONITORING AND ASSESSMENT

摘　　要：The geological storage of CO2 is potentially one of the most effective methods to reduce the CO2 concentration in the atmosphere. Coalbeds are possibly suitable storage reservoirs, meaning that evaluating the suitability of individual coalbeds and associated engineering and construction is an important step in developing geological CO2 storage. This evaluation requires the development of a reasonable evaluation index system and associated weightings. This paper focuses on coal-bearing basins in China and outlines a technical process whereby the CO2 storage suitability of these basins can be comprehensively evaluated. This study uses an earth system science approach to

determine the uncertainties involved in identifying ideal CO2 storage sites, develops an index that outlines the conditions related to the suitability of Chinese coal-bearing basins for geological CO2 storage, and incorporates this index into a hierarchical index system model for geological CO2 storage suitability that allows the comprehensive evaluation of coal-bearing basins and includes 5 aspects, 23 indexes, and 5 index levels. The weighting assigned to each evaluation index was determined using the analytic hierarchy process (AHP) and was subsequently incorporated into a fuzzy logic-based comprehensive evaluation approach. This approach was applied to assess the suitability of the Qinshui Basin for geological CO2 storage, revealing that this basin is indeed a suitable coalbed reservoir. The comprehensive geological CO2 storage evaluation model outlined here can also assess the CO2 storage suitability and capacity of other coal-bearing basins elsewhere in China and globally.

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第 33 篇

标　　题： Neo-Tethyan Evolution In Southeastern Extension Of Tibet: Constraints From Early Paleocene To Early Eocene Granitic Rocks With Associated Enclaves In Tengchong Block

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期　　刊： LITHOS

摘　　要： The granite is one of most widely distribution rocks in crust, and its petrogenesis is crucial to advance our knowledge of thermal condition in continental crust. The long-time tectonic evolution of crust in the active continental margin could be recorded by multi-stages of granitic assemblage. In order to reveal the subduction of Neo-Tethys and initial collision of Indian-Asian continents in eastern Tibetan Plateau, we selected the Early Paleocene to Early Eocene granitic rocks with associated enclaves in Tengchong Block, southeastern extension of Gangdese magmatic belt, to clarify their different derivation regimes using geochemical and isotopic compositions, mineral compositional variation. The zircon data show that Early Paleocene granites formed at 64 Ma, and Early Eocene granitic rocks formed at 54 Ma. Combing with the field contact relationship, the similar and enriched Sr-Nd-Pb and zircon Hf isotopic compositions indicate that the two stages of granitic rocks have a common and ancient lower crustal source. The endaves in Early Paleocene granites could represent crystallization of coeval and cognate magmas at margin of magmatic conduit, but the enclaves in Early Eocene granitic rocks are products of magma mixing between mafic and felsic magma. According to rock assemblages and geochemical signatures of granitic rocks during Early Paleocene to Early Eocene in Tengchong Block, we propose

that Early Paleocene granitic rocks are derived from partial melting of lower crustal rocks induced by long-lived heat accumulation with no or minimal basalt flux during the Neo-Tethyan subduction, whereas Early Eocene granitic rocks are derived from melting of crustal materials resulted from high malic magma flux during Indian-Asian continental collision. The initial collision occurred at ca. 55 Ma. (C) 2020 Elsevier B.V. All rights reserved.

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第 34 篇

标　　题： A Method To Probe The Pore-Throat Structure Of Tight Reservoirs Based On Low-Field Nmr: Insights From A Cylindrical Pore Model

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期　　刊： MARINE AND PETROLEUM GEOLOGY

摘　　要： This research proposes a new method of estimating pore-throat size distribution that converted based on nuclear magnetic resonance (NMR) T-2 spectra, so as to more accurately explore the pore-throat structures of tight reservoirs. In this work, one of the most potential shale formations, Yanchang shales in the Ordos basin, NW China, was targeted. Take Chang 2 Member as an example, the experimental parameters were comprehensively analyzed, including petrological property analysis, NMR, and constant-rate mercury injection porosimetry (MIP). This research compared the pore-throat size distributions which are converted from NMR T-2 spectra using a conventional method, an empirical formula method, and the new method. The research found that the results obtained through the linear relationship of the conventional method showed low accuracy, and the fitting coefficients vary from 0.5339 to 0.8238. Although the empirical method lacks physical significance and mathematical derivation, the fitting coefficients are from 0.8565 to 0.9886, which is referable. The new method brought in the physical significance of formula derivation and took into account the distribution characteristics of experimental data, resulting in higher fitting coefficients of 0.9928-0.9999. Based on the fitting results, the new method is more reasonable and feasible, which can be used for conversion of pore-throat size distribution through NMR T-2 spectrum to obtain the NMR pore-throat structure.

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第 35 篇

标　　题：Geochronological Constraints On The Genesis Of High-Grade Iron Ore In The Gongchangling Bifs From The Anshan-Benxi Area, North China Craton

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期　　刊：ORE GEOLOGY REVIEWS

摘　　要：The Gongchangling iron deposit located in the northeast of the North China Craton is hosted in late Neoarchean Algoma-type BIFs. It is famous for the major production of high-grade iron ore in the Gongchangling No.2 mining area in China. With regard to the genesis of high-grade iron ore, more and more evidences indicate that it was related with hydrothermal enrichment of BIFs. However, the hydrothermal nature was argued for meteoric, metamorphic or migmatitic fluid. In this study, the trace element compositions of garnet from the altered wall-rock of high-grade iron ore obtained by LA-ICP-MS show compositional zoning, indicating it is a metamorphic origin. These garnets yield a Sm-Nd isochron age of 1888 +/- 77 Ma, interpreted as the time of metamorphism in this area. LA-ICP-MS U-Pb dating of zircon from the upper migmatite zone shows that the migmatitic granite was formed at 2478 +/- 36 Ma. Since the REE patterns of garnet suggest that it was formed in the nearly neutral fluid rather than the acid meteoric fluid in the Paleoproterozoic. Hence, combined the ages of metamorphism and migmatization with high-grade iron ore of 1840 +/- 7 or 1860 +/- 7 Ma obtained by previous studies, it indicates that the genesis of the high-grade iron ore derived from the enrichment of BIFs by metamorphic hydrothermal fluid.

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第 36 篇

标　　题：Provenance And Depositional Mechanism Analyses Of The Yangtianba Formation, Northwestern Margin Of The Yangtze Block, Southwestern China

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期　　刊：JOURNAL OF GEODYNAMICS

摘　　要：The Yangtianba Formation in the northwestern Bikou Terrane preserves sedimentary

archives for the Early to Middle Neoproterozoic tectonic evolution of the northwestern margin of the Yangtze Block (YB). However, its provenance and depositional mechanism are still matter of debates. This paper presents geochronological and petrographic studies of two granite gravel samples and one coarse-grained sandstone sample as well as facies analysis of the conspicuous Yangtianba Formation conglomerates (YFC). The weighted average Pb-206/U-238 ages of the two granite gravels are 743 +/- 6 Ma and 762 +/- 4 Ma, respectively. The detrital zircon U-Pb ages of the sandstone sample peak at ca. 880 to 740 Ma, close to the depositional age of the Yangtianba Formation. Together with the dominantly angular to subangular morphology and clear oscillatory or broad zoning of these detrital zircons, the Yangtianba Formation is likely sourced from the Early to Middle Neoproterozoic igneous rocks. Facies analysis of the YFC shows they are stacked bundles of fining- and thinning-upward units of conglomeratessandstone, suggesting a decreasing supply of coarse clastic materials from the episodic mass flow (debris flow) in the submarine channels rather than tillites. Combining with the previous work, the Yangtianba Formation probably mainly sourced from the Neoproterozoic igneous rocks in the Micangshan-Hannan area in the northwestern margin of the YB and is subaqueous sediment gravity flow deposits rather than glacial-marine deposits. These findings favor the model that the northwestern margin of the YB may be an active continental margin setting during the Early- to Middle- Neoproterozoic (ca. 835 to 720 Ma).

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第 37 篇

标　　题： Crystal Size Distributions And Trace Element Compositions Of The Fluorapatite From The Bijigou Fe-Ti Oxide-Bearing Layered Intrusion, Central China: Insights For The Expulsion Processes Of Interstitial Liquid From Crystal Mush

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期　　刊： JOURNAL OF PETROLOGY

摘　　要： The Neoproterozoic Bijigou intrusion is one of the largest and well-differentiated Fe-Ti oxide-bearing layered intrusion in Central China, and hosts Fe-Ti oxide ore layers in the middle zone with a total thickness of similar to 112 m. In order to examine the role of compaction and compositional convection on the solidification of a layered intrusion associated with the crystallization of large amounts of Fe-Ti oxides, we collected the samples from a drill core profile of the apatite-oxide gabbronorite unit above the main Fe-Ti oxide layer in the middle zone of the Bijigou intrusion and carried out a detailed study on the crystal size distributions (CSDs) and trace element compositions of the fluorapatite in the samples. The apatite-oxide gabbronorite unit is mainly composed of pyroxene and plagioclase with Fe-Ti oxides and fluorapatite interstitial to the silicates,

and can be further divided into the lower and upper sections in terms of grain size, rare earth element (REE) concentrations of fluorapatite and stress deformation of minerals. In the lower section, the plagioclase and pyroxene of the rocks are often bent, fluorapatite crystals have grain sizes ranging from similar to 0.10 x 0.30 mm to similar to 1.00 x 2.50 mm and the average Ce concentration of the fluorapatite of each sample varies from 230 to 387 mu g/g. In contrast, the plagioclase and pyroxene of the rocks from the upper section are sparsely bent, fluorapatite crystals range in size from similar to 0.05 x 0.05 mm to similar to 0.15 x 0.40 mm, and the average Ce concentration of the fluorapatite of each sample varies from 468 to 704 mu g/g. Modeling results show that the fraction of trapped liquid (F-TL) is similar to 7% in the lower section and similar to 15% in the upper section, and relatively elevated REE (e.g. Ce) concentrations of the fluorapatite of the upper section are thus likely attributed to the trapped liquid shift (TLS) effect. The TLS effect may have also enhanced the textural coarsening of the fluorapatite of the upper section, which is illustrated by a convex-upward curve for <0.1 mm crystals and a counter-clockwise rotation around a fixed point in the CSDs of the fluorapatite. The CSDs of the fluorapatite of the lower section, however, change from a steep slope for <0.25 mm crystals to a gentle slope for >0.25 mm crystals with a kinked trend akin to mixed crystal populations, which is interpreted as the exchange of interstitial liquid with the main magma body due to compositional convection. The different F-TL and fluorapatite CSDs of the lower and upper sections indicate that the interstitial liquid may have been expelled from the crystal mush of the lower section more efficiently than from the upper section, which is likely controlled by both compaction and compositional convection. However, it was the compositional convection that dominated the expulsion of interstitial liquid in the whole apatite-oxide gabbronorite unit, indicating that compositional convection may prevail after the crystallization of large amounts of Fe-Ti oxides from interstitial liquid and weaken the role of compaction.

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第 38 篇

标　　题： Automatic Building Detection From Very High-Resolution Images Using Multiscale Morphological Attribute Profiles

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期　　刊： REMOTE SENSING LETTERS

摘　　要： Morphological building indexes (MBI) have proven to be effective tools for automated building spatial-feature-extraction tasks in images from urban areas. However, owing to the intrinsic shortcomings of MBI, commission and omission errors occur in regions

with spectral properties similar to those of buildings and dark heterogeneous roofs, respectively. Some targets (such as bright bare land or roads) can cause substantial interference, which poses an even greater challenge in performing accurate building detection from images of complex environments. In this study, a new automated building detection approach based on a morphological attribute profile is presented with the goal of reducing commission and omission errors. As the first step, corners are detected in very high-resolution (VHR) remote sensing images through an automatic optimization procedure, and weighted spatial voting is performed to predict the presence of built-up areas. Then, by investigating the properties between the attribute filters and buildings, a novel morphological attribute building index is constructed by considering the extracted built-up area as an input image. To validate the detection performance, the approach was tested using VHR images with 1-m spatial resolution. The quantitative assessment indicates that the proposed approach improves the building detection accuracy in images of complex environments.

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第 39 篇

标　　题： Neoproterozoic Tectonic Evolution Of The Northwestern Margin Of The Yangtze Block (Southwestern China): Evidence From Sandstone Geochemistry And Detrital Zircon U-Pb Ages Of The Hengdan Group

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期　　刊： PRECAMBRIAN RESEARCH

摘　　要： The Hengdan Group in the northwestern part of the Bikou Terrane preserves sedimentary archives for the debated early to middle Neoproterozoic tectonic evolution of the northwestern margin of the Yangtze Block (YB), while its depositional age, provenance and tectonic setting remain controversial. This research has reported the geochemical and geochronological studies on the sandstones in the Hengdan Group. Our work indicates that the sandstones in the Hengdan Group experienced low degree of chemical weathering and sedimentary recycling, and are mainly sourced from acidic to intermediate igneous rocks. In addition, their elemental contents (i.e., La, Ce, Th and Sigma REE) and ratios (i.e., La-N/Yb-N and Eu/Eu*) are comparable to those deposited in an active continental margin setting. All samples yield similar age distribution, having a dominated age range at ca. 850 to 720 Ma. Together with the dominantly angular to subangular morphology and clear oscillatory or broad zoning internal structure of these aged detrital zircons, indicating that the Hengdan Group should be

proximally sourced from the early to middle Neoproterozoic igneous rocks. In addition, the youngest group of detrital zircon U-Pb ages of the sandstones in the Hengdan Group suggest that the onset and ending of the deposition of this group is later than ca. 741 Ma and ca. 722 Ma, respectively. Combining with previous work, the Hengdan Group was most likely deposited during ca. 741 to 717 Ma in a forearc basin setting at the northwestern margin of the YB, and with its primary provenance probably from nearby acidic to intermediate igneous rocks. In addition, all these above further supports that the northwestern margin of the YB should be a long-lived active continental margin setting during early to middle Neoproterozoic (ca. 835 to 717 Ma) and, the South China Block should be located at the relative peripheral location of the Rodinia supercontinent.

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第 40 篇

标　　题： Application Of Remote Sensing To Identify Copper-Lead-Zinc Deposits In The Heiqia Area Of The West Kunlun Mountains, Chinas

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期　　刊： SCIENTIFIC REPORTS

摘　　要： The harsh natural environment and inaccessibility of the West Kunlun Mountains are barriers for their investigation via field geology. Remote sensing technology has the advantage of being efficient on a macroscale and not being restricted by terrain or road conditions in sparsely vegetated areas with exposed bedrock. This work focuses on copper-lead-zinc deposits in the Heiqia area in the West Kunlun Mountains as a case study to illustrate the application of IKONOS remote sensing images as major data sources to fabricate a standard image map, the extraction of information on ore-controlling factors and mineralization through the use of image enhancement methods, and the interpretation of remote sensing data to identify mineral resources. Alteration anomaly information was extracted from ASTER data, verified via field survey and sampling, and used to develop a remote sensing model for utilization in future prospecting efforts. The results of the survey showed that in IKONOS (band 3, 2, and 1 synthesis) images, the copper mineralization zone exhibits interlaced gray-white, blue-gray, and blue tones in a narrow strip-like pattern, while the lead-zinc mineralization zone shows gray-white, light gray-yellow, and yellowish-brown tones in a strip-like pattern. The main remotely sensed alteration anomalies are characteristic of hydroxyl. Six hydroxyl anomalies were delineated in the study area, of which five were found to be copper-lead-zinc deposits. The location of the ore bodies coincides well with the ASTER anomalies extracted. Two Cu-Pb-Zn mineralization belts are present in the study area. The ore-bearing rock series of belt No. I is phyllite interbedded with

metasandstone, and the ore comprises mainly copper deposits supplemented by lead-zinc deposits. Belt No. II is in limestone and consists mainly of lead-zinc deposits supplemented by copper deposits. A remote sensing geological prospecting model for structurally altered Wenquangou Group copper-lead-zinc deposits with a genesis related to hot water basins is established. This provides a basis for future prospecting for similar minerals in the West Kunlun metallogenic belt.

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第 41 篇

标　　题： A Unique Record Of Cercis From The Late Early Miocene Of Interior Asia And Its Significance For Paleoenvironments And Paleophytogeography

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期　　刊： JOURNAL OF SYSTEMATICS AND EVOLUTION

摘　　要： The climatic impacts of the Tibetan Plateau since the Neogene and the phytogeographic pattern changes of formerly widely-distributed forest communities on the plateau remain poorly constrained. Today,CercisL. (Fabaceae) is a well-known arborescent genus typically distributed in subtropical to warm temperate zones of the Northern Hemisphere, and Paleogene fossil occurrences from Eurasia and North America show a long history of the genus in mid-low latitudes of the Northern Hemisphere. Here, we describe a fossil species,Cercis zekuensissp. nov. based on well-preserved fruits from the early Miocene of the northeastern Tibetan Plateau. Detailed morphological comparison (e.g., ventral margin with a veinless wing) of extant and fossil members ofCercisand other genera confirmed validity of the present taxonomic identity. Based on the comparison with extant relatives and their climate preferences, this unexpected occurrence of thermophilicCercisin northeastern Tibetan Plateau indicates this area had higher temperature and precipitation in the Miocene than today. Integrated with inferred (paleo-)temperature lapse rates, this indicates a low paleoelevation of less than 2.4 km. In contrast with the present-day alpine climate here (similar to 3.7 km), such a low elevation facilitated a more favorable habitat with comparatively high biodiversity and warm temperate forests at that time, as were evidenced by co-occurring megafossils. Moreover, the present existence ofCercisimplies the genus was widespread in interior Asia during the early Neogene and shows its modern disjunction or diversification

between eastern and central Asia was possibly shaped by the late Cenozoic regional tectonic uplift and consequential environmental deterioration.

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第 42 篇

标　　题： Origin And Paleoenvironmental Reconstruction Of Phosphorus-Bearing Sandstones Of The Cambrian Xinji Formation, Southwestern Margin Of The Ordos Basin, China

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期　　刊： CANADIAN JOURNAL OF EARTH SCIENCES

摘　　要： Increasing exploration interest in oil and gas hosted by early Cambrian strata has focused research efforts on early Cambrian sandstones. The origin of phosphorus and the paleoenvironment of phosphorus-bearing sandstones from the Xinji Formation are discussed in this paper. X-ray diffraction, optical microscopy, grain size analysis, total organic carbon, and the concentrations of major, trace, and rare earth elements (REEs) are analyzed in this work. The sandstones are mostly sublitharenite with calcareous cement. The content of the sandstone samples is quartz (39.8%-73.9%), with Mite (7.9%-27.6%) and calcite (4.5%-29%). The mineral particles of sandstone samples are mainly well sorted with a fine particle size, suggesting strong paleohydrodynamic force. The value of SiO2 is 37.69%-78.19%, followed by Al2O3 (6.11%-13.67%). Compared with upper continental crust, the boron in the sandstone samples is relatively enriched, whereas Sc. Sr, and Ba are relatively depleted. The Sigma REE content is 124.46-323.99 ppm. Phosphorus is of biogenic origin and enriched by upwelling current. The source of the Xinji Formation sandstone samples was mainly a mixture of sedimentary rock, granite, and alkali basalt, with the provenance of terrestrial clastic materials. The sandstone was deposited under oxic conditions and a warm and humid paleoclimate with saline to brackish features on a passive continental margin. Phosphorus occurring in sandstones is sensitive to paleoclimate and can be used as an indicator to judge paleoclimate, as it is more enriched in warm and humid weather.

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第 43 篇

标　　题： Genesis Of The Changba-Lijiagou Giant Pb-Zn Deposit, West Qinling, Central China: Constraints From S-Pb-C-O Isotopes

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期　　刊： ACTA GEOLOGICA SINICA-ENGLISH EDITION
摘　　要： The extensive Changba-Lijiagou Pb-Zn deposit is located in the north of the Xihe-Chengxian ore cluster in West Qinling. The ore bodies are mainly hosted in the marble, dolomitic marble and biotite-calcite-quartz schist of the Middle Devonian Anjiacha Formation, and are structurally controlled by the fault and anticline. The ore-forming process can be divided into three main stages, based on field geological features and mineral assemblages. The mineral assemblages of hydrothermal stage I are pale-yellow coarse grain, low Fe sphalerite, pyrite with pits, barite and biotite. The mineral assemblages of hydrothermal stage II are black-brown cryptocrystalline, high Fe shalerite, pyrite without pits, marcasite or arsenopyrite replace the pyrite with pits, K-feldspar. The features of hydrothermal stage III are calcite-quartz-sulfide vein cutting the laminated, banded ore body. Forty-two sulfur isotope analyses, twenty-five lead isotope analyses and nineteen carbon and oxygen isotope analyses were determined on sphalerite, pyrite, galena and calcite. The delta S-34 values of stage I (20.3 to 29.0 parts per thousand) are consistent with the delta S-34 of sulfate (barite) in the stratum. Combined with geological feature, inclusion characteristics and EPMA data, we propose that TSR has played a key role in the formation of the sulfides in stage I. The delta S-34 values of stage II sphalerite and pyrite (15.1 to 23.0 parts per thousand) are between sulfides in the host rock, magmatic sulfur and the sulfate (barite) in the stratum. This result suggests that multiple S reservoirs were the sources for S2- in stage II. The delta S-34 values of stage III (13.1 to 22 parts per thousand) combined with the structure of the geological and mineral features suggest a magmatic hydrothermal origin of the mineralization. The lead isotope compositions of the sulfides have Pb-206/Pb-204 ranging from 17.9480 to 17.9782, Pb-207/Pb-204 ranging from 15.611 to 15.622, and Pb-208/Pb-204 ranging from 38.1368 to 38.1691 in the three ore-forming stages. The narrow and symmetric distributions of the lead isotope values reflect homogenization of granite and mantle sources before the Pb-Zn mineralization. The delta C-13(PDB) and delta O-18(SMOW) values of stage I range from -0.1 to 2.4 parts per thousand and from 18.8 to 21.7 parts per thousand. The values and inclusion data indicate that the source of fluids in stage I was the dissolution of marine carbonate. The delta C-13(PDB) and delta O-18(SMOW) values of stage II range from -4 to 1 parts per thousand and from 12.3 to 20.3 parts per thousand, suggesting multiple C-O reservoirs in the Changba deposit and the addition of mantle-source fluid to the system. The values in stage III are -3.1 parts per thousand and 19.7 parts per thousand, respectively. We infer that the process of mineralization involved evaporitic salt and sedimentary organic-bearing units interacting through thermochemical sulfate reduction through the isotopic, mineralogy and inclusion evidences. Subsequently, the geology feature, mineral assemblages, EPMA data and isotopic values support the conclusion that the ore-forming hydrothermal fluids were mixed with magmatic hydrothermal fluids and forming the massive dark sphalerite, then yielding the calcite-quartz-sulfide vein ore type at the last stage. The genesis of this ore deposit was epigenetic rather than

the previously-proposed sedimentary-exhalative (SEDEX) type.

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第 44 篇

标　　题： Application Of Unmanned Aerial Vehicle (Uav) Thermal Infrared Remote Sensing To Identify Coal Fires In The Huojitu Coal Mine In Shenmu City, China

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期　　刊： SCIENTIFIC REPORTS

摘　　要： China is a major coal-producing country that consumes large amounts of coal every year. Due to the existence of many small coal kilns using backward mining methods, numerous worked-out areas have been formed. The coal mines were abandoned with no mitigation, so air penetrates into the roadways and contacts the coal seams; as a result, the residual coal seams spontaneously ignite to form coal fires. These coal fires have burned millions of tons of valuable coal resources and caused serious environmental problems. To implement fire suppression more effectively, coal fire detection is a key technology. In this paper, thermal infrared remote sensing from unmanned aerial vehicle combined with a surface survey is used to identify the range of coal fires in the Huojitu coal mine in Shenmu city. The scopes and locations of the fire zones are preliminarily delineated, which provides an accurate basis for the development of fire suppression projects.

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第 45 篇

标　　题： Reasonable Degree Of Formation Pressure Maintenance In Low Permeability Reservoirs

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期　　刊： CHEMISTRY AND TECHNOLOGY OF FUELS AND OILS

摘　　要： Due to the decline of formation pressure in the middle and late periods of low permeability reservoir development, the development effect deteriorates. Therefore, it is essential to restore and maintain reasonable formation pressure. Based on the two-phase fractional flow equation in low permeability porous media, we consider the flow

characteristics in reservoirs with threshold pressure gradient and the influence of formation pressure on oil viscosity. By applying the material balance equation, we deduce the theoretical formula of future cumulative oil production with different formation pressures. In view of the contradictory relationship between cumulative oil production and water cut increasing rate, and we construct a bi-objective function to evaluate the reasonable formation pressure. Results show that during transition process from current formation pressure to reasonable formation pressure, when the reservoir formation pressure maintenance degree is 0.88, it can ensure that future cumulative oil production is relatively large and water cut increasing rate is relatively low. Under the condition of the same formation pressure maintenance degree, as threshold pressure gradient grows, the impact on cumulative oil production gradually increases. In order to provide a good development result, the formation pressure should be recovered as early as possible before it drops significantly. This method can be used to calculate reasonable formation pressure quantitatively and provide a reference for high efficiency development in low permeability reservoirs.

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WOS 号： 000566367200002

第 46 篇

标　　题： Stratigraphy And Its Environmental Implications Of The Late Pleistocene Shuidonggou Formation In The Western Ordos Block, North China

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： The Late Pleistocene sedimentary strata that is widely developed in North China records the signature of prehistoric human settlement. The Late Palaeolithic Shuidonggou Formation that is mainly distributed in the western Ordos Block of North China is best known for containing abundant palaeontological fossils and palaeolithic artefacts with an age span of similar to 35-20 ka B.P. However, its sequence and chronostratigraphy are poorly understood due to the lack of stratigraphic correlation of a uniform relative stratigraphy, hindering our understanding of the way of human adaptation to the environmental and climatic changes. In this article, analyses of high-resolution stratigraphy of Shuidonggou Formation complemented with chronostratigraphic framework were performed based on our field investigations, Optically Stimulated Luminescence dating and literature survey, to reconstruct environmental and climatic conditions in western Ordos Block in the Late Pleistocene. Stratigraphic correlations and chronological evidence indicate that the sedimentary

units of the Shuidonggou Formation are similar to 35-10 ka B.P. in age, and three lithologic units of Shuidonggou Formation that is well approximated on a regional basis were identified: gravel layers that were deposited in a fluvial environment at the bottom, rhythm layers consist of sand layers, and clay layers deposited in a lacustrine environment in the lower part, and cycles composed of lacustrine silt and loess in the upper part. These units are defined by sedimentology, matching to lake levels. Continuous and widely developed clay and sandy clay about 3-10 m thick occur at various levels within river terrace II and littoral deposits located 10-20 m above the current lake level provide evidence for the existence of the high lake level/palaeo-lake in western Ordos Block between similar to 35 and 22 ka B.P. Palaeo-lake shrinking occurred after when lakeshore sand and gravel, as well as sandy facies of aeolian origin, started to accumulate in the study area in 22-17 ka B.P. The development of the palaeo-lake probably had been climate-controlled since the warmer and humid climate conditions suggested by the lower sequences corresponds to the Marine Isotope Stage 3 while the cool and dry climate were identified in upper sequences corresponds to the Last Glaciation Maximum. Besides, the human occupation in the Shuidonggou site was synchronous with the development of the palaeo-lake of the same time window. It is suggested that the evolution of the palaeo-lakes in the Late Pleistocene, together with the environmental effects of climate change, play an important role in the human occupation and survival strategies.

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第 47 篇

标　　题： The Middle Permian Hongshanliang Manto-Type Copper Deposit In The East Tianshan: Constraints From Geology, Geochronology, Fluid Inclusions And H-O-S Isotopes

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期　　刊： ORE GEOLOGY REVIEWS

摘　　要： The Hongshanliang copper deposit, hosted in the tuff of the Lower Carboniferous Yamansu Formation, is a typical copper deposit in the Aqishan-Yamansu belt, East Tianshan. Based on crosscutting relationships of veins, textural relationships and mineral assemblages, five alteration/mineralization stages at Hongshanliang have been established: chlorite-sulfide stage (Stage I), quartz-pyrite stage (Stage II), quartz-polymetallic sulfide stage (Stage III), late veins (Stage IV) and supergene process (Stage V). Stage I has mineral assemblage of chlorite-pyrite +/- chalcopyrite +/-

quartz +/- sericite, and is commonly characterized by euhedral pyrite with silicates (e.g., chlorite, quartz and sericite) and/or chalcopyrite as its pressure shadow, indicating an early mineralization event with apparent deformation. Stage II is characterized by quartz-pyrite +/- chalcopyrite or locally quartz +/- gypsum +/- anhydrite +/- pyrite veins cutting Stage I chlorite-pyrite. The main mineralization stage (Stage III) at Hongshanliang has typical mineral assemblages of quartz-chalcopyrite +/- chlorite +/- calcite +/- sericite, quartz-chalcopyrite-sphalerite-galena +/- pyrite and quartz-sphalerite-galena +/- chlorite, with veins, veinlets, disseminations and local massive ore types, similar to Manto-type copper deposits regarding mineralization and ore structures. Detailed fluid inclusion study shows temperature of fluids decreased from Stage II (307-484 degrees C) through Stage III (peak at 160-180 degrees C, consistent with quartz-chlorite oxygen isotope geothermometer of 190 degrees C) to Stage IV (129-169 degrees C), with corresponding salinities of 2.7-26.2 wt% NaCl equiv. (peak at 8 wt%), 2.1-12.3 wt% NaCl equiv. (peak at 8 wt%) and 0.5-7.7 wt% NaCl equiv. (peaks at 4-6 wt%), respectively, indicating an evolved hydrothermal ore-forming system. Such fluid evolution can also be supported by H-O isotopes during water-rock reaction from Stage II (delta O-18(fluid) = 6.3-8.3 parts per thousand and delta D-fluid = -77 parts per thousand to -64 parts per thousand) through Stage III (delta O-18(fluid) = - 1.7 parts per thousand to 7.0 parts per thousand and delta D-fluid = - 82 parts per thousand to - 58 parts per thousand) to Stage IV (delta O-18(fluid) = - 2.5 parts per thousand to - 2.1 parts per thousand and delta D-fluid = - 77 parts per thousand to - 73 parts per thousand) with a magmatic-hydrothermal origin. Furthermore, sulfur isotopes suggest that fluids of the two mineralization stages (Stage I and III) are predominantly magmatic-hydrothermal, with other influx contribution into the oreforming system, i.e., minor Early Carboniferous seawater in Stage I (delta S-34(fluid) varying from - 3.5 parts per thousand to 6.1 parts per thousand, with peak at 0 parts per thousand) and minor organic materials in Stage III (d34Sfluid varying from - 6.5 parts per thousand to 4.1 parts per thousand, with peak at 0-1 parts per thousand, and detection of CH4 and C2H6 from fluid inclusions). In combination of alteration, paragenesis, nature and source of ore-forming fluids and comparison with other typical deposits, we proposed that the Hongshanliang copper deposit underwent two mineralization events with the main mineralization similar to Manto-type copper deposits. Ar-40/Ar-39 dating of sericite from a massive chalcopyrite ore indicates the Hongshanliang main mineralization formed at 269.0 +/- 0.4 Ma, generally coeval with regional K-feldspar granite emplacement (ca. 272 Ma). Integrating the regional tectonic setting, magmatism and metallogenesis of the Aqishan-Yamansu belt and the East Tianshan, we suggest that the Aqishan-Yamansu belt has potential of mineral prospecting for the Middle Permian Manto-type copper deposits.

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第 48 篇

标　　题： Origin Of Northeast Fujian Basalts And Limitations On The Heterogeneity Of Mantle Sources For Cenozoic Alkaline Magmatism Across Se China: Evidence From Zircon

U-Pb Dating, Petrological, Whole-Rock Geochemical, And Isotopic Studies

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期　　刊：MINERALS

摘　　要：Cenozoic alkali basalts in Southeast (SE) China generally are genetically related to intracontinental rifting. Hence, they can be used to probe the nature of their underlying mantle sources and aid studies of the tectonic background in this region. This paper focuses on the Shanhoujian alkali basalts located in Bailing County, northeastern Fujian, SE China. We herein report their petrology, whole-rock major, and trace element geochemistry, and Sr-Nd isotopic composition and provide a new zircon U-Pb age for the basalts (similar to 40 Ma, Eocene). These data help to constrain the petrogenesis of alkali basalts, their mantle source, and tectonic settings. The basalts are characterized by high Mg-#(58.21-63.52) with Na2O/K2O > 1. MgO content is weakly correlated with CaO and Cr content but shows no correlation with Ni and Fe2O3(total). Such features suggest that fractionation of clinopyroxene rather than olivine was important. In terms of trace elements, the alkali basalts display: (1) enrichment in La, Ce, Rb, Ba, Nb, and Ta and depletion in K, Pb, Zr, Hf, and Ti and (2) notable fractionation of light rare earth elements from heavy rare earth elements. Determined (Sr-87/Sr-86)(i)is in the range of 0.7041-0.7040 and epsilon(Nd)(t) is between +3.2 and +3.3. The Shanhoujian alkali basalts show a notable affinity to oceanic island basalts (OIBs) with little assimilation of crustal materials. They were derived from a pyroxenite and carbonated peridotite mantle source metasomatized by sediments carried by the subduction plate at different depths. The primary magmas of these basalts were derived from partial melting of this metasomatized mantle source during upwelling of the asthenospheric mantle as an intracontinental rift formed through extension in this part of SE China.

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第 49 篇

标　　题：Timing Of Structural Deformation And Age Of Mineralization In The Northern Shiquan-Hanyin Gold Orefield, South Qinling Belt, China: Constraints From Zircon U-Pb And Biotite Ar-40-Ar-39 Isotope Dating

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期　　刊： ORE GEOLOGY REVIEWS

摘　　要： The northern Shiquan-Hanyin gold orefield in southern Shaanxi, China, is located within the South Qinling belt-North Dabashan thrust-nappe system. The ore-bearing rocks in the orefield comprise low-grade metamorphic rocks and intensely deformed schist of the lower Silurian Meiziya Formation (S(1)m), and the structural framework includes five similar to E-W-trending brittle-ductile shear zones. However, important aspects of the orefield are still uncertain, such as the genetic type of the deposits, the characteristics and development of brittle-ductile shear zones, the division of structural stages, and the ages of structural deformation and mineralization. The present study uses large-scale structure-alteration mapping, zircon U-Pb chronology, and biotite Ar-40-Ar-39 isotope dating to characterize the structural development and mineralization of the orefield. Three stages of structural deformation are identified; the second stage (S-2) is dominant and included the formation of thrustnappe ore-controlling brittle-ductile dextral shear zones. A zircon U-Pb age (180.2 +/- 3.6 Ma) of a granite dike in a brittle-ductile shear zone and biotite Ar-40-Ar-39 plateau ages (191.0 +/- 1.1, 178.4 +/- 0.8, 170.4 +/- 0.9, and 168.4 +/- 0.9 Ma) of lamprophyre and altered mineralized rocks indicate that the main structural-magmatic-mineralization event occurred during the Early-Middle Jurassic, coeval with intracontinental orogenesis in the South Qinling belt. Ore formation occurred in three stages. In stage 1 (similar to 190 Ma), the upper crust underwent a transition from a compressive to an extensional tectonic environment, and the initial deposition of gold likely occurred. In stage 2 (similar to 180 Ma), under an intracontinental orogenic collapse regime, several brittle-ductile shear zones and a series of extensional strike-slip normal faults developed, making stage 2 the main stage of mineralization. In stage 3 (similar to 170 Ma), the late stage of intracontinental orogeny, the main tectonic style gradually transformed from extensional collapse to tectonic-extrusion-related nappe-fold deformation, inducing late alteration-mineralization that superimposed and enriched the existing mineralization.

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第 50 篇

标　　题： General High-Pressure Closed Acidic Decomposition Method Of Rock Samples For Trace Element Determination Using Inductively Coupled Plasma Mass Spectrometry

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期　　刊： JOURNAL OF ANALYTICAL CHEMISTRY

摘　　要： Complete decomposition is an essential prerequisite for accurate trace element

quantification in geological samples. This work presents a general high-pressure closed digestion approach for rock samples from basic to acidic rocks by inductively coupled plasma mass spectrometry. Using HNO3-HF mixed system, different geological reference materials have been investigated for trace element determination, with acid ratio, decomposition time, digestion temperature, sample mass and reagent amount discussed in detail. In brief, 2.0 mL of HNO3-HF with the ratio of 1 : 1 and a digestion time of 12 h at 185 degrees C in high-pressure sealed bomb are optimal for 50 mg rock sample decomposition. With relative errors under 10%, the analytical results of W-2a, BCR-2, GSP-2, AGV-2 and GSR-1 agree well with certified values. This proposed high-pressure sealed digestion method is characterized with less acid consumption, complete digestion and less damage for digestion process, well meeting the requirements for large sample throughput in geological laboratory.

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第 51 篇

标　　题： Late Silurian To Early Devonian Volcanics In The East Kunlun Orogen, Northern Tibetan Plateau: Record Of Postcollisional Magmatism Related To The Evolution Of The Proto-Tethys Ocean

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期　　刊： JOURNAL OF GEODYNAMICS

摘　　要： The late Early Paleozoic volcanic rocks in the East Kunlun orogen are crucial to determining collisional processes related to the evolution of the Proto-Tethys Ocean. We report new zircon U-Pb ages, whole-rock geochemistry and Sr-Nd isotopes from these volcanic rocks and constrain their tectonic setting and magmatic processes. This volcanic suite consists mainly of foliated metarhyolites and minor metabasalts. Zircon U-Pb ages indicate that the bimodal volcanic rocks formed from Late Silurian to Early Devonian (ca. 420-409 Ma). The basalts show tholeiitic geochemical signatures characterized by low contents of SiO2 (47.19-54.83 %), MgO (2.21-7.52 %), and K2O/Na2O ratios (0.32-0.77%) and high contents of TiO2 (1.80-2.91 %). Their chondrite-normalized REE patterns are characterized by enrichments in LREEs (LREE/HREE = 3.68-6.09) with slight Eu anomalies (delta Eu = 0.67-1.00); their patterns are similar to the reference line of oceanic island basalt (OIB). The primitive mantle-normalized trace element diagram also shows similarities with OIBs and features overall enrichments in large ion lithophile and high field strength elements, except for Nb and Ta. The epsilon(Nd)(t = 422 Ma) values range narrowly from -1.79 to +1.32. These features suggest that the basalts were most likely derived from an asthenospheric mantle that was contaminated by small volumes of subcontinental

lithospheric mantle (SCLM)/crust. The variations in major and trace elements show that the basalts experienced fractional crystallization of olivine, pyroxene and plagioclase. In contrast, the metarhyolites have high SiO2 (65.85-70.83 %), Na2O + K2O (6.71-10.09 %), K2O/Na2O ratios (1.69-2.80 %) and low MgO, Ni, and Cr contents. Their trace element signatures show enrichments in LILEs and LREEs (e.g. Cs, Rb, Ba), depletion of HFSEs (e.g. Nb, Ti, Ta) and high negative Eu anomalies. These features suggest a crustal origin lacking interactions with mantle melts. Considering all the geochemical and tectonic events of this area, it is concluded that the Maoniushan Formation volcanic rocks in EKOB formed in a postcollisional extensional setting related to asthenospheric mantle upwelling and continental delamination processes during the Late Silurian to Early Devonian. These tectonic-magmatic events, together with previous data, suggest that the Proto-Tethys Ocean had closed and evolved to postcollisional collapse stage since the Late Silurian.

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第 52 篇

标　　题： A New Scalidophoran Animal From The Cambrian Fortunian Stage Of South China And Its Implications For The Origin And Early Evolution Of Kinorhyncha

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期　　刊： PRECAMBRIAN RESEARCH

摘　　要： Kinorhyncha is a cycloneuralian phylum with about 240 extant species, and it was not until 2015 that the first and only fossil kinorhynch species Eokinorhynchus rarus was reported. Here, we describe a new scalidophoran animal, Zhongpingscolex qinensis gen. a sp. nov., from the Cambrian Fortunian Kuanchuanpu Formation at Zhangjiagou section, southern Shaanxi Province, South China. The holotype and only specimen possesses morphology comparable to that of E. rarus. They both possess heterogeneous trunk annuli, and compared with E. rarus, Z. qinensis gen. a sp. nov. lacks a neck. Phylogenetic analysis resolves Z. qinensis gen. a sp. nov. as the sister group of E. rarus, both constituting stem-lineage derivatives of Kinorhyncha. The evolutionary scenario from the last common ancestor of crown-group Scalidophora to the last common ancestor of total-group Kinorhyncha includes the acquisition of a much shortened body with a relatively low body length to width ratio, heterogeneous trunk annuli, and macroannuli with simple armatures. The spines, large spinose sclerites, and annular rings of rectangular plates are autapomorphic to E. rarus, and segments (zonites) with

independent cuticular plates as in crown-group kinorhynchs were evolved later.

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第 53 篇

标　　题： Intraspecific Variation Of Radial Symmetry Number Of A 535 Million-Year-Old Jellyfish

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期　　刊： PRECAMBRIAN RESEARCH

摘　　要： Although modern jellyfishes are stably tetramerous, intraspecific variation of radial symmetry number is not uncommon and spans from unimery to octamery. However, intraspecific variation of radial symmetry number among fossil cnidarians is rarely reported. We report a single new specimen of Quadrapyrgites quadratacris from the Cambrian Fortunian Kuanchuanpu Formation at the Zhangjiagou Lagerstatte in southern Shaanxi Province, South China. Quadrapyrgites quadratacris has previously been interpreted to be a coronate scyphozoan with stable tetramery. The new specimen has morphology well comparable with the previously reported specimens of Q. quadratacris, with the exception that it is pentamerous. This is the first report of intraspecific variation of radial symmetry number among the Fortunian cnidarians. It demonstrates that tetramery is stable for Quadrapyrgites, with pentamery as less common intraspecific variation, and that the Fortunian scyphozoans have acquired the ability of regulating and changing their radial symmetry number during their alternation of generations.

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第 54 篇

标　　题： New Macrobenthic Cycloneuralians From The Fortunian (Lowermost Cambrian) Of South China

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期　　刊： PRECAMBRIAN RESEARCH

摘　　要： Although morphology-based phylogenetic analyses and molecular data suggested that the cycloneuralians might have emerged in the Ediacaran Period, the oldest known fossil remains of cycloneuralians were first reported from the Cambrian Fortunian Stage of South China, and to date four genera and species as well as nine indeterminate forms have been described. Here, we report the latest discoveries of cycloneuralians from the Fortunian Kuanchuanpu Formation at Zhangjiagou Lagerstatte, Dahe Village, Xixiang County, southern Shaanxi Province, South China. A new genus and species Dahescolex kuanchuanpuensis n. gen. n. sp. is described, and a previously reported genus and species Eopriapulites sphinx is re-described. Dahescolex kuanchuanpuensis n. gen. n. sp. is suggested to be a stem-lineage derivative of Scalidophora, whereas E. sphinx may represent a stem-lineage derivative of Cycloneuralia. From the fragments discovered, the new specimens are suggested to have reached millimeters in dimension, and the original individuals are estimated to have dimensions in centimeter, hence falls within the size range of macrobenthos. Therefore, at least some of the Fortunian cycloneuralians can be considered macrobenthic, and it is suggested here that the Cycloneuralia may have originated in the Fortunian macrobenthos.

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第 55 篇

标　　题： Preparation And Performance Evaluation Of A Hydrophobically Associating Polymer As A High-Strength Water-Swelling Temporary Plugging Material

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期　　刊： CHEMISTRY AND TECHNOLOGY OF FUELS AND OILS

摘　　要： The use of degradable polymer materials as controlling additives to the working fluid during hydraulic fracturing is an area of interest in developing stimulation technologies. A temporary plugging agent with high compressive strength is used to block pre-fracturing or natural cracking and to initiate new fracture joints in order to increase the oil and gas passages, thereby realizing a stable production of oil and gas reservoirs. The temporary plugging agent prevents the fluid from entering the existing cracks,

allowing the fracturing fluid to create new cracks and a more complex network of fractures within the reservoir. Considering the technological requirements, the temporary plugging agent must have a strong pressure resistance, good water solubility, and good returning performance, which can make new and old cracks simultaneously effective. In this paper, a new type of internal temporary plugging agent is developed, and the temporary plugging mechanism is evaluated through experiments, including plugging material microstructure, particle size, water absorption, water absorption speed, temporary plugging effect, and conductivity after dissolution. Our study shows that the temporary plugging agent provides a good temporary plugging effect, causes no pollution to the oil well, and can play a good protective role on the reservoir in repeated fracturing.

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第 56 篇

标　　题： Further Constraints On A Neoproterozoic Active Continental Margin From Sandstones Of The Hengdan Group In The Bikou Terrane, Northwestern Margin Of The Yangtze Block, South China

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期　　刊： JOURNAL OF ASIAN EARTH SCIENCES

摘　　要： The Neoproterozoic Hengdan Group in the northwestern margin of the Yangtze Block preserves archives for the debated early to middle Neoproterozoic (ca. 835-720 Ma) tectonic evolution of the margin of the Yangtze Block, and could potentially shed lights on the breakup mechanism of the Rodinia supercontinent. However, its depositional age, provenance and tectonic setting remain controversial. We address these issues through studies of petrography, geochemistry and detrital zircon U-Pb ages on the Hengdan Group sandstones. The Hengdan Group sandstones have low compositional and textural maturity and experienced low degree of chemical weathering and sediment recycling. They were mainly sourced from proximal acidic to intermediate arc-related igneous rocks, and their modal compositions, trace elemental contents (i.e., La, Ce, Th, and FREE) and ratios (i.e., La-N/ Yb N and Eu/Eu*) are comparable to those deposited in an active continental margin. Detrital zircons from the Hengdan Group sandstones yield similar unimodal age distributions at 950-740 Ma, with the youngest age clusters at ca. 730 Ma. Combining with previous work, the Hengdan Group was most likely deposited during ca. 733-717 Ma in a forearc basin and its primary provenance was probably from the nearby arc-related acidic to intermediate igneous rocks. In addition, the northwestern margin of the Yangtze Block was most likely in an active continental

margin setting between ca. 835 and 720 Ma, and hence the slab retreating during a long-term oceanic subduction is favored as the dominant breakup driving force in the supercontinental margin(s).

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第 57 篇

标　　题： Testing Final Closure Time Of The Paleo-Asian Ocean Along The Solonker Suture By A Transition Of Compressional And Extensional Setting

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期　　刊： GEOSCIENCE FRONTIERS

摘　　要： The giant Central Asian Orogenic Belt is an extensive accretionary orogen, of which the Solonker suture, as a major regional suture, coincides closely with an early Permian paleobiogeographical boundary. This suture is considered to mark the location of the final closure of the Paleo-Asian Ocean between the North China Craton and the Mongolian Terrane. Although the closure time of the Paleo-Asian Ocean along the Solonker suture has generally been regarded as Late Permian-Early Triassic, uncertainty remains because of a lack of typical collision-related features (e.g., high-grade regional metamorphism and well-developed fold-thrust structures) and a scarcity of outcrops. The present study reports Early Permian foliated gabbros and dikes (288-275 Ma) and Middle-Late Permian undeformed layered gabbros, strongly peraluminous granites, and I-type granites (265-254 Ma) in the Xinhure area along the northern margin of the North China Craton. The Early Permian foliated intrusions have a subduction-related geochemical signature and were derived from partial melting of lithospheric mantle modified by subduction-related melts or fluids at the active margin of the North China Craton. In contrast, the Late Permian undeformed layered gabbros and strongly peraluminous granites were derived from partial melting of lithospheric mantle and middle-upper crust, respectively, triggered by asthenospheric upwelling. Therefore, a transition from an end-compressional to an extensional environment according to a transition from collision termination to postcollision of the North China Craton and Mongolian Terrane may have occurred between 275 Ma and 262 Ma. This time span can be considered as the final closure time of the Paleo-Asian Ocean along the Solonker suture.

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第 58 篇

标　　题：Geochemical, Sr-Nd-Pb And Zircon U-Pb-Hf Isotopic Constraints On The Late Carboniferous Back-Arc Basin Basalts From The Chengjisihanshan Formation In West Junggar, Nw China

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期　　刊：GEOLOGICAL MAGAZINE

摘　　要：West Junggar in the southwestern Central Asian Orogenic Belt is a critical area for the study of the Junggar oceanic basin and may also reveal tectonic evolutionary events before the final closure of the Palaeo-Asian Ocean. The sedimentary formations and paragenetic associations of the Upper Carboniferous Chengjisihanshan Formation in southern West Junggar jointly reveal a back-arc basin setting with zircon U-Pb ages of 313-310 Ma for the basaltic rocks. Geochemically, the basaltic rocks are tholeiitic with low SiO2 (47.76-52.06 wt %) and K2O (0.05-0.74 wt %) but high MgO (6.55-7.68 wt %) contents and Mg no. (52.9-58.9) values. They display slightly flat rare earth element patterns with weak positive Eu anomalies, and show enrichments in large ion lithophile elements relative to high field strength elements with negative Nb and Ta anomalies, exhibiting both N-MORB-like and arc-like signatures, similar to the back-arc basin basalt from the Mariana Trough. The high positive zircon epsilon Hf(t) and bulk epsilon Nd(t) values as well as high initial Pb isotopes, together with relatively high Sm/Yb and slightly low Th/Ta ratios imply a depleted spinel lherzolitic mantle source metasomatized by slab-derived fluids. The field and geochemical data jointly suggest that the volcanic rocks within the Chengjisihanshan Formation were formed in an intra-oceanic back-arc basin above the northwestward subduction of the Junggar oceanic lithosphere in southern West Junggar. The confirmation of the Late Carboniferous back-arc basin basalts, together with other geological observations, indicate that an arc-basin evolutionary system still existed in southern West Junggar at c. 310 Ma, and the Junggar Ocean closed after Late Carboniferous time.

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第 59 篇

标　　题：Machine Learning For Source Identification Of Dust On The Chinese Loess Plateau

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期　　刊： GEOPHYSICAL RESEARCH LETTERS

摘　　要： The provenance of voluminous eolian dust on the Chinese Loess Plateau (CLP) is still highly debated. Here we apply machine learning methods of support vector machine and convolutional neural network to train models using element compositions of surface sediments from eight potential source regions, accordingly, to determine the dust sources and contributions by classifying the last glacial loess and present interglacial sediments on the CLP. The trained models succeed in differentiating major secondary sources and quantitatively estimating the contributions of both primary and secondary sources at least during the last glacial-interglacial cycle. The understanding that a constant dust source despite changing climate conditions agrees with those derived from Sr-Nd isotopes and U-Pb age spectra. Our observations demonstrate that big geochemical data sets coupled with machine learning technology are fully capable of tracing sources.

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WOS 号： 000593976300055

第 60 篇

标　　题： Petrogenesis Of Ca. 113 Ma Volcanic Rocks In The Central Lhasa Subterrane, Southern Tibet: Implications For The Tectonic Setting And Continental Crustal Reworking

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期　　刊： GEOLOGICAL JOURNAL

摘　　要： Voluminous Early Cretaceous volcanic rocks in the central Lhasa subterrane provide an ideal opportunity for understanding the mantle-crust interaction and tectonic-magmatic evolution of the Lhasa Terrane. Here, we report zircon U-Pb ages, geochemical and Sr-Nd-Pb-Hf isotopic data for the Early Cretaceous volcanic rocks, including high-silica rhyolites (117.2 +/- 1.1 Ma) and contemporaneous andesites (114.1 +/- 0.8 Ma) in the Sailipu area, central Lhasa subterrane. All these rocks show enriched light rare earth elements (LREE), and radioactive heat-generating elements (e.g., Th, U, K, and Pb) but depleted high-field-strength elements (HFSEs, e.g., Nb, Ta, P, and Ti). The different bulk-rock Sr-Nd-Pb and zircon Hf isotopic compositions of the rhyolites and

andesites suggest that these rocks have distinct magma sources and petrogenetic history rather than an identical source involving assimilation-fractional crystallization process. The Sailipu high-silica rhyolites exhibit the characteristics of fractional crystallization and have varying zircon epsilon(Hf)(t) values (-12.2 to +5.2), negative epsilon(Nd)(t) values (-9.5 to -1.6), high and variable initial Sr isotopic compositions ([Sr-87/Sr-86](i) = 0.7047-0.7116) and radiogenic Pb isotopic signatures (Pb-206/Pb-204 = 18.784-18.802, Pb-207/Pb-204 = 15.722-15.737, and Pb-208/Pb-204 = 39.382-39.492). A combined process of magma mixing (involving crustal-derived felsic melts and mantle-derived mafic melts) and subsequent fractional crystallization were mainly responsible for the formation of these high-silica rhyolites. The Sailipu andesites show more enriched Sr-Nd isotopic compositions [(Sr-87/Sr-86)(i) = 0.7088-0.7154, epsilon(Nd)(t) = -9.9 to -6.7] relative to rhyolites, and less radiogenic Pb isotopic compositions (Pb-206/Pb-204 = 18.632-18.669, Pb-207/Pb-204 = 15.686-15.689, Pb-208/Pb-204 = 39.140-39.201). They were likely derived from partial melting of an enriched mantle wedge previously metasomatized by melts derived from subducted sediments. We interprete these Early Cretaceous volcanic rocks as the product of slab break-off during the southward subduction of the Bangong-Nujiang Tethyan oceanic seafloor. The dominantly positive epsilon(Hf)(t) and ancient T-DM(C) ages (0.85-1.90 Ga) of Sailipu high-silica rhyolites further imply that, under the stress relaxation regime, the mantle-derived melts locally reworked the ancient basement of the central Lhasa subterrane.

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第 61 篇

标　　题： Detrital Zircon U-Pb Ages Of Middle-Late Permian Sedimentary Rocks From The Southwestern Margin Of The North China Craton: Implications For Provenance And Tectonic Evolution

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期　　刊： GONDWANA RESEARCH

摘　　要： The southwestern margin of the North China Craton (NCC) is located between the Alxa Terrane to the northwest, the North Qilian Orogen to the west and the North Qinling Orogen to the south. However, the paleogeographic and tectonic evolution for the southwestern part of the NCC in the Late Paleozoic is still poorly constrained. In order to constrain the Late Paleozoic tectonic evolution of the southwestern NCC, we carried out detailed field work and detrital zircon U-Pb geochronological research on Middle-Late Permian sedimentary rocks at the southwestern margin of the NCC. The U-Pb age spectra of detrital zircons from six samples are similar, showing four populations of 2.6-2.4 Ga, 2.0-1.7 Ga, 500-360Ma and 350-250Ma. Moreover, on the basis of the weighted-mean age of the youngest detrital zircons (257 +/- 4Ma),

combined with the published results and volcanic interlayers, we propose that the Shangshihezi Formation formed during the Middle-Late Permian. Our results and published data indicate that the detrital zircons with age groups of 2.6-2.4 Ga and 2.0-1.7 Gawere likely derived from the Khondalite Belt and Yinshan Block in the northwestern NCC. The junction part between the North Qinling and North Qilian Orogen may provide the 500-360 Ma detrital zircons for the study area. The 350-250 Ma detrital zircons were probably derived fromthe northwestern part of the NCC. The majority of materials from Shangshihezi Formation within the study area were derived from the northwestern part of the NCC, indicating that the northwestern part of the NCC was strongly uplifted possibly resulting from the progressive subduction and closure of the Paleo-Asian Ocean. A small amount of materials were sourced from southwestern part of the NCC, indicating that the North Qinling Orogen experienced a minor uplift resulting from the northward subduction of the South Qinling terrane.

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第 62 篇

标　　题： Neoproterozoic Non-Glaciogenic Iron Formation: Insights From Fe Isotope And Elemental Geochemistry Of The Shalong Iron Formation From The Central Tianshan Block, Southern Altaids

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期　　刊： PRECAMBRIAN RESEARCH

摘　　要： The return of widespread banded iron formation (BIF) deposition during the Neoproterozoic Era after a more than one-billion-year hiatus appears to be a hallmark of the Neoproterozoic, and may be indicative of critical changes in the Earth's environmental and tectonic conditions. However, consensus on the Fe sources and origin of Neoproterozoic iron formations (NIFs) remains elusive. Here we present new petrographic and geochemical data from the newly discovered Shalong NIF from the Central Tianshan block in order to constrain the iron source and elucidate the origin and depositional conditions of the NIF. The major and trace element composition of the Shalong NIF indicates that it is a relatively pure chemical sediment with a low detrital input. Rare earth elements and Y patterns (REY) exhibit seawater-like signature such as depletion in light REEs (LREEs) and enrichment in heavy REEs (HREEs). The weak positive Eu anomalies (Eu/Eu* = 1.11-1.31) and consistent chondritic Y/Ho ratios of 25

to 29 (average 26) suggest a predominant influx of low-temperature hydrothermal fluids. The geochemistry of the Shalong NIF also supports a predominant hydrothermal iron source characterized by low-temperature hydrothermal fluids. The lack of negative Ce anomalies, as well as weak positive Eu anomalies, and positive and variable delta Fe-56 values (-0.09 parts per thousand to +1.28 parts per thousand) in the Shalong NIF indicates partial Fe2+ oxidation in a relatively large dissolved iron marine basin under oxygen-limited conditions. The Shalong NIF deposition likely took place on the slope of an extensional oceanic basin in a low energy environment. The Shalong NIF has a close association with metamorphized- bimodal volcanic rocks and predominant hydrothermal iron source. Combined with no sign for any glacial influence and depositional age prior to the global Sturtian glaciations, we suggest that the Shalong NIF is a non-glaciogenic Neoproterozoic iron formation in association with volcanic and hydrothermal activity. Our results, in conjunction with previous studies, suggest that glacial events are not essential or necessary for the origin of all the NIFs. Instead, hydrothermal activity seems to be a more important controlling factor for the build-up of ferruginous basins and subsequent iron oxidation events in the Neoproterozoic leading to the sudden recurrence of NIFs.

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第 63 篇

标　　题： Pore Structure Of Triassic Yanchang Mudstone, Ordos Basin: Insights Into The Impact Of Solvent Extraction On Porosity In Lacustrine Mudstone Within The Oil Window

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期　　刊： JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING

摘　　要： Low-pressure nitrogen physisorption was performed on Triassic Yanchang mudstones before and after solvent extraction to characterize the extractable organic matter (EOM) occurrence and ascertain the impact of extracts on the nanoporosity of lacustrine mudstone within the oil window. Organic-rich Yanchang mudstones are currently thermally mature (vitrinite reflectance of 0.48%-0.92%). SEM-observed pore types chiefly comprise interparticle and intraparticle pores related to inorganic minerals, with organic matter pores less developed. Pore volume (PV) of the original mudstones is 0.35-2.15 cm(3)/100 g and the specific surface area (SSA) is 1.22-7.77 m(2)/g. Brittle minerals (quartz + feldspar + carbonates) and I/S mixed layer jointly show the positive effect on the pore space development in the Yanchang mudstone. Four groups of mudstones with obvious differences in pore structure properties were identified, which probably result from the various development degrees of interparticle pores at the edge of brittle minerals, and intraparticle pores associated with I/S aggregates. Generally, solvent extraction will result in a noticeable increase in the volume of N-2 adsorbed due

to the reopening of pore space blocked by EOM, which is related to increases in PV an SSA. A declining case, probably caused by the progressive shift of the enlarged open pore space to the larger macropore range (d > 200 nm) which is not detected by N-2 adsorption and counteracts the increased porosity by extraction, however, was also observed in the current study. Overall, the infilling degree of EOM increased with increasing thermal evolution degree of shales within the oil window, which mainly blocks minor pores in lower mature samples but larger pores in higher mature samples.

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第 64 篇

标　　题： Mineralogy Of Nickel And Cobalt Minerals In Xiarihamu Nickel-Cobalt Deposit, East Kunlun Orogen, China

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期　　刊： FRONTIERS IN EARTH SCIENCE

摘　　要： Located in the East Kunlun Orogen, China, the Xiarihamu magmatic nickel-cobalt sulfide deposit is the country's second largest deposit of this type. It was formed in special early Paleozoic with low copper grade (0.14 wt%) compared with other deposits of the same type. The mineralogy of nickel and cobalt minerals, which are direct carriers of these elements, can clearly reflect their behavior in the process of mineralization; however, such information for this deposit remains unreported. In the present study, we use an electron microscope and electron probe microanalyzer to delineate and analyze many nickel and cobalt minerals such as maucherite, nickeline, cobaltite, violarite, gersdorffite, parkerite, and arsenohauchecornite in various rocks and ores. With the increase in crustal material contamination, it can reach arsenide saturation locally in sulfide melt, then a separate Ni-rich arsenide (bismuth) melt exsolves somewhere. This melt will crystallize into nickeline, parkerite, arsenohauchecornite, and maucherite first. Second, most of nickel and cobalt tend to enter cobaltite and pentlandite phases, rather than existing in chalcopyrite and pyrrhotite phases as isomorphism during sufficient fractional crystallization of sulfide melt, which gathered nickel and cobalt elements widely. Also, more than one magma might result in the superposition of ore-forming elements. Later, the ore-forming elements redistribute limitedly through a hydrothermal process. The metallogenic mechanism model of nickel and cobalt established in the present study not only explains the process of nickel-cobalt mineralization in Xiarihamu but also can be applied to similar deposits and has a wide universal replicability.

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工程机械学院

第 1 篇

标　　题：An Unsupervised Online Monitoring Method For Tool Wear Using A Sparse Auto-Encoder

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期　　刊：INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

摘　　要：Tool wear, and its online monitoring, plays an important role in increasing productivity and improving product quality. We describe an unsupervised method to monitor the wear state of milling cutter by tracking an error sequence generated by reconstructing monitoring signals from a sparse auto-encoder (SAE). The monitoring signals consist of the force and vibration signals collected during the cutting process. We establish a well-structured SAE model, which can adaptively extract the characteristics of the signal and complete the training of the model without supervision of the empirical label and investigate the reconstruction performance of the model for cutting signal. On this basis, an automatic online tool wear state identification strategy is designed to monitor the milling process. The mean reconstruction error (MRE) sequence associated with tool wear is recorded in real time by reconstructing the next signal segment from the SAE model, which is trained and updated using the current signal segment. Monitoring criteria and thresholds are recommended to automate the identification of tool wear conditions based on the filtered MRE curve. Five experiments with two different milling environments are run to confirm the feasibility of tool wear monitoring using this method, and the results show that the method can be used to monitor tool wear conditions online under different milling conditions without being supervised by any empirical labels.

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第 2 篇

标　　题：A Bi-Level Nested Sparse Optimization For Adaptive Mechanical Fault Feature Detection

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期　　刊： IEEE ACCESS

摘　　要： Denoising is a permanent topic and there are various denoisers proposed in the fault diagnosis of industrial systems. However, it is still ambiguous to evaluate their performance quantitatively in terms of mean square error (MSE) and further achieve their maximum gains, because it is always infeasible to obtain the MSE metric without real feature signals in the engineering practices. Therefore, leveraging Stein Unbiased Risk Estimator (SURE) theory, a bi-level nested sparse optimization framework (BiNSOF) is proposed to jointly optimize a parameterized sparse denoiser as well as its regularization parameter, further obtaining the near-optimal fault features with a minimum MSE. The inner level of BiNSOF utilizes a regularized sparse denoiser to describe the intrinsic sparse structure of feature information, which can be effectively addressed by popular primal-dual splitting schemes. The core of the outer optimization level is a SURE-based unbiased estimator for MSE, and the minimum MSE search problem is transformed into a quadratic optimization problem which could be fast solved by classic golden section search schemes. The proposed BiNOSP can perfectly approximate the oracle MSE without any real feature information, and further provides a reliable way to obtain the optimal hyper-parameter sets for the maximum performance gains of the sparse denoiser. The computational complexity of the advocated approach is also investigated. Moreover, its feasibility and performances are profoundly evaluated by a set of comprehensive numerical studies. Lastly, two bearing fault detection cases confirm the applicability and superiority of the proposed framework.

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第 3 篇

标　　题： Design And Modeling Of Oceanographic Environment Adaptive Variable Pumps

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期　　刊： IEEE ACCESS

摘　　要： Variable pumps are important hydraulic power units in deep-sea exploitation due to their good energy-saving and high precision capabilities. However, their application in such hostile environment suffers from the risk of control failure. Moreover, developed throughout trials and error in onshore simulation experiment, it is thus not just a time-consuming and expensive task but also required to implement an adaptive scheme capability to be used in deep-sea application. In this paper, a self-adaptive pressure sensing scheme and a novel close-loop control structure involved oceanographic environment adaptive variable pump (OEAVP) are proposed to autonomously adapt to the variable seawater conditions. Furthermore, based on environmental and fluid

models, dynamic performances of the OEAVP model for pressure and flow-rate controls are analyzed. MATLAB/Simulink pack tool is used to perform the OEAVP system stability and comparative deep-sea water and shallow-water stability control are addressed. It reveals oceanographic environment influences on control performances of OEAVP from the direct effect of ambient pressure and the indirect effect of hydraulic fluid properties changes. Ultimately experimental tests including SPSS performances, control characteristics and dynamic responses of OEAVP & x2019;s are performed in a simulation hull, which demonstrates consistent performances in oceanographic environment and confer to the proposed OSVP with high adaptive capability.

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第 4 篇

标　　题： A Robotic Grinding Motion Planning Methodology For A Novel Automatic Seam Bead Grinding Robot Manipulator

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通讯作者： Zhu, YG (corresponding author), Changan Univ, Key Lab Rd Construct Technol & Equipment MOE, Xian 710064, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： Industrial robotics is a continuously developing area of in-depth robotics research, as industrial robots have demonstrated to possess advantages in the robotic automation solutions in the industrial automation applications. In this paper, a novel automatic seam bead grinding robot manipulator with the integration of machining and measuring is proposed and an experimentation platform is developed for the robotic removal of the seam weld beads at welded pipe ends. Also, a robotic grinding motion planning methodology, which consists of a robotic operation process motion planning approach and a robotic seam bead grinding method, is presented for the appropriate motion planning and applications of the operational processes. Furthermore, the effectiveness of the robotic grinding motion planning methodology and the superiorly operational manipulation performance of the proposed robot manipulator are verified through a robotic grinding experiment for the removal of external seam weld beads at a helical welded pipe end.

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第 5 篇

标　　题： Robust Control For Nonlinear Delta Parallel Robot With Uncertainty: An Online Estimation Approach

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期　　刊：IEEE ACCESS

摘　　要：A series of fractional robust trajectory tracking controls are proposed for the Delta parallel robot with uncertainty. For the high speed and heavy load, the Delta parallel robot could not ignore the influences of the high nonlinearity (by the dynamics of the multiple closed-loops mechanism and the nonlinear joints friction) and the various kinds of uncertainties (i.e., the unknown dynamic parameters and external disturbances caused by the residual vibration). By formulating the motion equation of the Delta parallel robot, the nonlinearity is settled by a norm model based control design. The uncertainty considered in the paper is time-varying but unknown. An online estimation with an exponential type leakage term and dead-zone is construct to investigate the realtime information of the uncertainty. In virtue of the estimated information, two fractional robust trajectory tracking controls with the joints friction compensation are designed. Under the proposed controls, the system performance of the Delta parallel robot can be deterministically guaranteed (which includes uniform boundedness and uniform ultimate boundedness).

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第 6 篇

标　　题：A Deep Multi-Label Learning Framework For The Intelligent Fault Diagnosis Of Machines

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期　　刊：IEEE ACCESS

摘　　要：Deep learning has been applied in intelligent fault diagnosis of machines since it trains deep neural networks to simultaneously learn features and recognize faults. In the intelligent fault diagnosis methods based on deep learning, feature learning and fault recognition are achieved by solving a multi-class classification problem. The multi-class classification, however, has not considered the relationships of fault labels, leading to two weaknesses of these methods. One is that it cannot ensure to learn the correlated features for related faults and the other is that it cannot handle missing label problem. To overcome these weaknesses, we introduce a concept of multi-label classification into intelligent fault diagnosis and propose a deep multi-label learning framework called multi-label convolutional neural network (MLCNN). MLCNN builds the relationship between the labels, and thus it is able to learn the correlated features from mechanical vibration signals and be well trained using the samples with missing labels. A motor bearing diagnosis case and a compound fault diagnosis case are used to verify the proposed method, respectively. The results show that the relationships between features are learned by MLCNN, and the classification accuracies of MLCNN are higher than traditional methods when the missing label problem occurs.

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WOS 号： 000546417200011

第 7 篇

标　　题： Cycle Condition Identification Of Loader Based On Optimized Knn Algorithm

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期　　刊： IEEE ACCESS

摘　　要： The working conditions of loaders alternate between stages of full or empty loads, loading or unloading, and moving forward or backward, which complicates the vehicle's characteristic response. Based on the K-nearest neighbor (KNN) algorithm and a principal component analysis (PCA) method, stages recognition algorithm under the V-type working conditions of a loader was studied. First, the collected transmission signals were noise-reduced and filtered. Second, the PCA was used to reduce the dimensions of the data. Finally, the working condition samples were established from the data obtained, which were later trained and classified using the KNN algorithm. Compared with the neural network algorithm, the accuracy of the optimized KNN algorithm reaches 99.4%, and its running time is 2.1s. The algorithm described in this paper guarantees a high accuracy under recognition of the loader conditions in a short running time. It can be extended to an intelligent identification using big data and artificial intelligence control of the construction machinery.

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WOS 号： 000549825600004

第 8 篇

标　　题： Deep Neural Network Ensemble For The Intelligent Fault Diagnosis Of Machines Under Imbalanced Data

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期　　刊： IEEE ACCESS

摘　　要： Imbalanced classification using deep learning has attracted much attention in intelligent fault diagnosis of machinery. However, the existing methods use individual deep neural network to extract features and recognize the health conditions under imbalanced dataset, which may easily over-fit the mechanical data and affect the diagnosis accuracy. To deal with this problem, this paper takes the advantages of ensemble learning and proposes an ensemble convolutional neural network (EnCNN) for the intelligent fault diagnosis for machines under imbalanced data. In the proposed method, a convolutional neural network with the input of multi-sensor signals is used as the base classifier. Firstly, the mechanical imbalance dataset is first split into balanced training

subsets through under-sampling strategy, and each subset is used to train a base classifier. Then the weight coefficients of each trained base classifier are calculated by G-mean score and anomalous base classifiers are screened using classifier selection. Finally, the base classifiers are integrated into EnCNN through weighted voting strategy. The proposed EnCNN is validated by the imbalanced dataset collected from a machinery fault test bench. By comparing with the related methods, the superiority of EnCNN is verified in intelligent fault diagnosis of machines under imbalanced data.

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第 9 篇

标　　题： Research On The Prediction Method Of Ultimate Bearing Capacity Of Pbl Based On Iaga-Bpnn Algorithm

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期　　刊： IEEE ACCESS

摘　　要： In order to better predict ultimate bearing capacity of perfobond leiste shear connection (PBL), the six specimens were designed for push-out test, and the prediction models were built based on an Improved Adaptive Genetic Algorithm (IAGA) and Back Propagation neural network (BPNN) algorithm. With the finite element model established, it was found that the effects of different parameters on the ultimate bearing capacity of PBL vary greatly if using a single parameter method. The calculation results showed that transverse reinforcement diameter, hole diameter of steel plate, the thickness of steel plate and the strength grade of concrete were the four key factors affecting the ultimate bearing capacity of PBL. In order to overcome the disadvantages of BPNN, such as slow convergence speed and easy to fall into local optimization, an improved adaptive genetic algorithm is used to optimize the initial weights and thresholds of BPNN. The comparison shows that the algorithm is superior to the standard genetic algorithm and other heuristic algorithms, in terms of convergence speed, global search ability and robustness. The IAGA-BPNN prediction model was established. Using the experimental data obtained from both the fatigue test and the references as samples to train the prediction model, the results show that the IAGA-BPNN algorithm proposed in this article can accurately predict the ultimate bearing capacity of PBL, with an average error of 1.69%. The comprehensive sensitivity analysis (CSA) method adopts to explore the relative contribution of each key factors and the interaction between the key factors, and the analysis results show that the ultimate bearing capacity of PBL increases significantly with the increase of the thickness of steel plate and hole diameter of steel plate. The accuracy and stability were better than formulas for calculating the ultimate bearing capacity and the BP neural network prediction algorithm.

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WOS 号： 000578807900001

第 10 篇

标　　题： A Novel State Estimation Approach Based On Adaptive Unscented Kalman Filter For Electric Vehicles

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期　　刊： IEEE ACCESS

摘　　要： Accurately estimating the state-of-charge (SOC) of battery is of particular importance for real-time monitoring and safety control in electric vehicles. To obtain better SOC estimation accuracy, a joint modeling method based on adaptive unscented Kalman filter(AUKF) and least-squares support vector machine(LSSVM) is proposed. This article improves the accuracy of SOC estimation from four aspects. Firstly, the nonlinear relationship between SOC, current, and voltage is established by LSSVM. Secondly, a novel voltage estimation method based on improved LSSVM is proposed. Thirdly, the measurement equation of the novel AUKF is created by the improved LSSVM. Finally, the effectiveness of the proposed model is verified under different driving conditions. The comparison results show that the model can improve the accuracy of voltage and SOC estimation, and the SOC estimation error is controlled within 2%.

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WOS 号： 000584045100001

第 11 篇

标　　题： State Of Charge Estimation Of Lithium-Ion Batteries Using Lstm And Narx Neural Networks

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期　　刊： IEEE ACCESS

摘　　要： Highly accurate state of charge (SOC) estimation of lithium-ion batteries is one of the key technologies of battery management systems in electric vehicles. The performance of SOC estimation directly influences the driving range and safety of these vehicles. Due to external disturbances, temperature variation and electromagnetic interference, accurate SOC estimation becomes difficult. To accurately estimate the SOC of lithium-ion batteries, this article presents a novel machine-learning method to address the risk of gradient explosion and gradient decent using the dynamic nonlinear auto-regressive models with exogenous input neural network (NARX) with long short-term memories (LSTM).The proposed hybrid NARX model embeds LSTM memory, which provides jump-ahead connections in the time-unfolded model. These jump-ahead connections provide a shorter path for the propagation of gradient

information, therefore reducing long-term dependence on the recurrent neural network. Experimental results show that the estimation performance root mean square error (RMSE) of the proposed model is less than 1%, and this model has better multitime prediction performance. Finally, the hybrid NARX and LSTM model is compared with the standard back propagation neural network based on particle swarm optimization (BPNN-PSO), the least-squares support vector machine (LS-SVM) and LSTM existing models under urban dynamometer driving schedule (UDDS) and dynamic stress test (DST) conditions. The proposed hybrid NARX-LSTM model yield relative to other methods and can estimate the battery SOC with high accuracy. The RMSE of proposed model is improved by approximately 60% compared with the standard LSTM

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WOS 号： 000584804900001

第 12 篇

标　　题： A Novel State Of Charge Approach Of Lithium Ion Battery Using Least Squares Support Vector Machine

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期　　刊： IEEE ACCESS

摘　　要： Lithium-ion batteries(LIBs) have been used in electric vehicles(EVs) because of its high energy density and no pollution. As one of the important parameters of battery management system(BMS), accurately estimating the state-of-charge (SOC) can ensure the energy distribution and safe use of the battery. Therefore, in order to obtain accurate SOC estimation, this paper improves the estimation accuracy of SOC from four aspects. Firstly, to overcome the dependence of the model on the internal parameters of the battery, this paper uses the least squares support vector machine (LSSVM) to establish the battery model. The current, voltage, temperature are used as input vectors to estimate the SOC. Besides, the parameters of LSSVM are determined by a grey wolf optimizer(GWO). The GWO can improve the ability of LSSVM model by finding the global optimal solution. Thirdly, in order to improve the estimation accuracy of SOC, a novel LSSVM model based on the sliding window is proposed. The SOC estimated at the previous time, together with voltage, current and temperature measured at the current time are selected as the input vectors by sliding window method to improve the SOC accuracy. Finally, the effectiveness of the proposed model is verified under different driving conditions at different temperatures by comparing with other estimators. The comparison results indicate that the SOC estimation error(MAE) can be controlled within 1%, the root mean square error (RMSE) decreases from 0.89% to 0.22%, which are verified the effectiveness and robustness of the model.

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第 13 篇

标　　题：Microstress Cycle And Contact Fatigue Of Spiral Bevel Gears By Rolling-Sliding Of Asperity Contact

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期　　刊：FRICTION

摘　　要：The rolling contact fatigue (RCF) model is commonly used to predict the contact fatigue life when the sliding is insignificant in contact surfaces. However, many studies reveal that the sliding, compared to the rolling state, can lead to a considerable reduction of the fatigue life and an excessive increase of the pitting area, which result from the microscopic stress cycle growth caused by the sliding of the asperity contact. This suggests that fatigue life in the rolling-sliding condition can be overestimated based only on the RCF model. The rubbing surfaces of spiral bevel gears are subject to typical rolling-sliding motion. This paper aims to study the mechanism of the micro stress cycle along the meshing path and provide a reasonable method for predicting the fatigue life in spiral bevel gears. The microscopic stress cycle equation is derived with the consideration of gear meshing parameters. The combination of the RCF model and asperity stress cycle is developed to calculate the fatigue life in spiral bevel gears. We find that the contact fatigue life decreases significantly compared with that obtained from the RCF model. There is strong evidence that the microscopic stress cycle is remarkably increased by the rolling-sliding motion of the asperity contact, which is consistent with the experimental data in previous literature. In addition, the fatigue life under different assembling misalignments are investigated and the results demonstrate the important role of misalignments on fatigue life.

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第 14 篇

标　　题：Hidden Markov Model-Based Autonomous Manufacturing Task Orchestration In Smart Shop Floors

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期　　刊：ROBOTICS AND COMPUTER-INTEGRATED MANUFACTURING

摘　　要：Smart manufacturing requires flexible production organization and management to handle the dynamic customer requirements rapidly and efficiently. In the context of smart manufacturing, work-in-progress (WIP), machines, and other physical resources in smart shop floors are endowed with intelligence, such as self-perception and self-decision-making. In this situation, the manufacturing task orchestration in such smart shop floors becomes autonomous, which is different from the traditional one that is centrally set and managed. The manufacturing tasks are accomplished with the help of autonomous communication between the WIP and the machines. This paper firstly clarifies the logic of autonomous manufacturing, in which the core idea is the autonomous communication and collaboration between the WIP and the machines during production. Furthermore, the autonomous manufacturing task orchestration (AMTO) problem is described. An improved hidden Markov model (HMM) is proposed to formulate the problem and generate an optimal AMTO solution for a certain process flow. A demonstrative case is implemented to verify the feasibility of the proposed model and method. The results show that HMM can give suggestions on AMTO and dynamically adjust the situation based on the real-time manufacturing data.

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第 15 篇

标　　题：Uncertain Demand Modeling Of Warehouse Product Service System Based On Interval Number Optimization

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通讯作者：Zhang, FQ (corresponding author), Changan Univ, Key Lab Rd Construct Technol & Equipment MOE, Xian, Shaanxi, Peoples R China.; Zhang, FQ (corresponding author), Changan Univ, Inst Smart Mfg Syst Engn, Xian, Shaanxi, Peoples R China.

期　　刊：INTERNATIONAL JOURNAL OF COMPUTER INTEGRATED MANUFACTURING

摘　　要：In the context of service-oriented manufacturing, warehouse product service system (WPSS) has been proposed through integrating smart warehouse and 'centralized purchase + shared storage + JIT distribution' services for various enterprises in an Industrial Park. The influence mechanism of enterprises' uncertain demand on profit decision of WPSS was deduced. Firstly, a mathematical model was established by turning enterprises' uncertain demand into service cost. Its maximum profit was taken as the object, considering the storage income, penalty income for delayed storage, and distribution cost. Then, an improved interval number optimization method with midpoint and width was adopted to optimize the possibility of maximum profit; its possibility was used to quantify the decision makers' tolerance for uncertain demand. Finally, a case study was presented to verify the feasibility of the proposed method. It is expected that the maximum profit under enterprises' uncertain demand can provide

decision support for resources configuration and operation scheduling of WPSS.

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第 16 篇

标　　题： Porosity Effects On Mechanical Properties Of 3D Random Fibrous Materials At Elevated Temperatures

作　　者： [Li, Datao] Changan Univ, Key Lab Rd Construct Technol & Equipment, MOE, Xian 710064, Peoples R China; [Li, Datao; Yu, Wenshan; Xia, Wei; Fang, Qinzhi; Shen, Shengping] Xi An Jiao Tong Univ, State Key Lab Strength & Vibrat Mech Struct, Shaanxi Engn Lab Vibrat Control Aerosp Struct, Sch Aerosp, Xian 710049, Peoples R China

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期　　刊： ACTA MECHANICA SOLIDA SINICA

摘　　要： In this study, we prepare the specimens of three-dimensional random fibrous (3D RF) material along its through-the-thickness (TTT) and in-plane (IP) directions. The experimental tests of tensile and compressive properties as well as fracture toughness of 3D RF material are performed at elevated temperatures. Then, the porosity (83%, 87% and 89%) and temperature dependence of the tensile and compressive strength, elastic modulus, fracture toughness and fracture surface energy of the 3D RF materials for both the TTT and IP directions are analyzed. From the results of the tensile strength and elastic modulus versus material porosities at various temperatures, we find that tensile strength and elastic modulus for the TTT direction are more sensitive to the porosity, but not for the IP direction. Fracture toughness increases firstly and then decreases at a certain critical temperature. Such critical temperature is found to be the lowest for the porosity of 83%. On the other hand, at below 1073 K, the temperature-dependent fracture surface energies with three porosities for the TTT direction show similar variation trends.

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第 17 篇

标　　题： Effects Of A Combination Impeller On The Flow Field And External Performance Of An Aero-Fuel Centrifugal Pump

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期　　刊： ENERGIES

摘　　要： Aero-fuel centrifugal pumps are important power plants in aero-engines. Unlike most of

the existing centrifugal pumps, a combination impeller is integrated with the pump to improve performance. First, the critical geometrical parameters of the combination impeller and volute are given. Then, the effects of the combination impeller on the flow characteristics of the impeller and volute are clarified by comparing simulation results with that of the conventional impeller, where the effectiveness of the selected numerical method is validated by an acceptable agreement between simulation and experiment. Finally, the experiment is set to test the external performance of the studied pump. A significant feature of this study is that the flow characteristics are significantly ameliorated by reducing the flow losses that emerged in the impeller inlet, impeller outlet, and volute tongue. Correspondingly, the head and efficiency of a combination impeller are higher with comparison to a conventional impeller. Consequently, it is a promising approach in ameliorating the flow field and improving external performance by applying a combination impeller to an aero-fuel centrifugal pump.

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第 18 篇

标　　题： Fatigue Property And Improvement Of A Rounded Welding Region Between The Diaphragm Plate And Closed Rib Of An Orthotropic Steel Bridge Deck

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通讯作者： Li, DT; Lu, PM (corresponding author), Changan Univ, MOE, Key Lab Rd Construct Technol & Equipment, Xian 710064, Peoples R China.

期　　刊： METALS

摘　　要： By means of finite element modeling (FEM) and fatigue experiments, we study the fatigue performance of the rounded welding region between the diaphragm plate and closed rib of orthotropic steel bridge deck in this work. A local sub-model of the rounded welding region from the orthotropic steel bridge deck was developed to analyze the stress distributions. Based on the analysis results we designed the fatigue specimen for the fatigue test of this detailed structure. The fatigue experimental results revealed that the crack initiates from the weld toe of the rounded welding region and the stress concentration at the rounded welding region is the main mechanism of fatigue crack initiation. In addition, we propose three improvements to reduce the stress concentration of the rounded welding region, and the local structure optimization scheme of the diaphragm-rib weld can effectively improve the fatigue resistance of the detailed weld structure.

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第 19 篇

标　　题： Temperature Dependence Of The Fracture Toughness J(C) Of Random Fibrous Material

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： The temperature dependence of the fracture toughness J(C) of a three-dimensional (3D) random fibrous (RF) material, with a porosity of 87% along the through-the-thickness (TTT) direction, was investigated using experiments and the finite element method (FEM) in this study. The temperature considered ranges from 299 to 1273 K. The experimental observations revealed the fracture toughness J(C) with crack length-to-width ratios of 0.4 and 0.5, which increased from 47.32 to 328.28 J/m(2) and from 44.92 to 280.09 J/m(2), respectively, as the temperature increased. Then, a 3D FE model, considering the meso-morphology characteristics of the 3D RF material, was developed to simulate a size-scaled compact tension (CT) specimen with a single edge crack. Using the elastic modulus and the fracture strength of the silica fibers at room temperature, we verified the effectiveness of the FE model, then predicted the fracture strength of the silica fibers and the bonding between the fibers at elevated temperatures. In addition, our developed FE model proved to successfully simulate the fracture toughness J(C) from 299 to 1273 K and reveal the deformation mechanism of the 3D RF material at different temperatures.

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第 20 篇

标　　题： Impact Of Vibration Compaction On The Paving Density And Transverse Uniformity Of Hot Paving Layer

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通讯作者： Wan, YP (corresponding author), Changan Univ, Sch Construct Machinery, Key Lab Highway Construct Technol & Equipment, Minist Educ, Xian, Peoples R China.

期　　刊： INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING

摘　　要： The compaction performance of asphalt pavement depends upon not only the material design but also the construction procedure. This paper intends to quantitatively evaluate the impacts of material properties and paving parameters on the paving compaction quality (i.e., the density and uniformity). A vibration model of screed-paving layer interactions was built to simulate the screed vibration response and the vibration transmission to the paving layer with the vibration frequency and material stiffness. Then, the force transmitting ratio (FTR), contact force, moment transmitting ratio (MTR) and transmitting rotation moment were used to evaluate the compaction of the

paving layer. Moreover, a quantized density model was proposed to quantitatively predict the paving compaction performance. In contrast to traditional analyses, the transverse amplitude uniformity of the screed was considered in this work. Finally, the simulation model was validated through a field test. The results show that the paving layer stiffness is positively associated with the initial layer density, which depends on the tamper frequency. For the case study in this paper, the optimum frequency is approximately 163 rad/s, 175 rad/s and 190 rad/s when the tamper frequency is 19 rad/s, 57 rad/s and 95 rad/s, respectively. Larger variation coefficient (CV) and density ratio (DR) indicate that the uniformity of the paving layer density distribution and the pavement roughness are worse. Therefore, it is recommended that the screed vibration frequency and mixture stiffness, which both affect the paving layer density and compaction uniformity, should be considered for future construction procedures.

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第 21 篇

标　　题： Calculation Method And Its Application For Energy Consumption Of Ball Mills In Ceramic Industry Based On Power Feature Deployment

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期　　刊： ADVANCES IN APPLIED CERAMICS

摘　　要： Owing to the lack of effective energy consumption models of ball mills in the ceramic industry, a calculation model to forecast energy consumption of ceramic ball mills during the grinding process was developed based on power feature deployment. The energy consumption of the working process was defined by different combinations of power of components involved in tasks. The total energy consumption was divided into three parts: power lost in the electrical motor, power lost in mechanical transmission and power used for grinding materials. These three components were described separately by taking the principle of an electrical motor, mechanical transmission and grinding process into account. Measurement results of two ball mills in a real ceramic manufacturing plant showed that the proposed calculation models could achieve an accuracy of more than 96% for predicting the ball mill energy consumption during which the power fluctuates periodically to complete one rotation cycle of the ball mills.

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第 22 篇

标　　题：A Novel Method To Forecast Energy Consumption Of Selective Laser Melting Processes

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期　　刊：INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH

摘　　要：As a promising additive manufacturing (AM) technology, the applications of selective laser melting (SLM) are expanding. Yet, due to the complex structure of SLM machines and low processing rates, the SLM process is highly energy-intensive. Energy forecasting is crucial for accurate evaluation and reduction of SLM energy consumption. However, due to the diversity of SLM machines and their various operating states, the energy consumption of SLM processes is difficult to predict. This article presents a novel method to forecast the energy consumption of SLM processes. The proposed approach is based on the power modelling of machine subsystems and the temporal modelling of sub-processes. Through identifying the working statuses of subsystems of SLM machines in each sub-process, forecast accuracy can be greatly improved. Two cases of aluminium components fabricated by an SLM process using an SLM 280HL facility are selected to demonstrate the effectiveness of the proposed method. Results show that the proposed method outperforms specific, stage-based and subsystem-based energy benchmark models in energy consumption forecasting.

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第 23 篇

标　　题：Effects Of Daily Activities And Position On Kinematics And Contact Mechanics Of Dual Mobility Hip Implant

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期　　刊：JOURNAL OF HEALTHCARE ENGINEERING

摘　　要：Dual mobility hip implants have been widely introduced to overcome dislocation in recent years. However, the potential influence of different gaits on kinematics and contact mechanics for dual mobility hip implants is still unclear. Furthermore, a large

range of motion coupling with the implant position, especially high inclination or anteversion angle, may result in poor kinematics and contact mechanics. A previously developed dynamic finite element method was adopted in this study to examine the kinematics and corresponding stability of dual mobility hip implants under different gaits coupling with different inclinations or anteversion angles. The results showed only inner relative sliding under knee-bending for dual mobility hip implants under moderate inclination and anteversion angles, whereas an anteversion angle of 25 degrees induced both impingement and consequent relative sliding of the outer articulation. However, the impingement (between the stem neck and the liner inner rim) indeed happened under stair-climbing and sitting-down/stand-up as well as combined movements when inclination and anteversion angles were set as 45 degrees and 0 degrees, respectively, and this finally led to relative sliding at the outer articulation. A high inclination angle did not worsen both the impingement and related outer sliding compared to modest inclination and anteversion angles of the liner, but a high anteversion angle prolonged the period of both the impingement and the outer relative sliding. The extreme motions and high anteversion angles are hardly inevitable, and they indeed lead to motions at both articulations for dual mobility hip implants.

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第 24 篇

标　　题： Aero-Engine Bearing Fault Detection: A Clustering Low-Rank Approach

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期　　刊： MECHANICAL SYSTEMS AND SIGNAL PROCESSING

摘　　要： Different from classic exponential-decaying feature waveform, the fault information of high-speed aero-engine bearing presents an overlapping distortion or even approximately-harmonic morphology, which brings a new challenge for popular bearing diagnosis techniques. From the nonlocal similarity perspective of vibration waveforms, this study first reveals the singular value coupled pattern among strong similarity structure, weak similarity structure and noises, which consequently yields the overlapping coherent pathology in the SVD-based low-rank domain. Leveraging an adaptive clustering into the low-rank regularization theory, a tailored diagnostic framework (dubbed AMS-CIuLR) is then proposed to address the challenging problem. The main highlight of AMS-CIuLR is to adaptively cluster local feature waveforms into multiple isolated groups to guarantee that different similarity structures are reliably concentrated into their matched low-rank domain, which effectively eliminates the singular value overlapping coherent pathology while keeping the structural

completeness of relatively weak similarity features. Moreover, an alternative minimization solver is developed for the AMS-CIuLR model to rapidly achieve a satisfying stationary solution. The embedded clustering operation's necessity and AMS-CIuLR's superiority are profoundly investigated through a set of comprehensive numerical studies. An aero-engine bearing experiment under high-speed conditions with rotational speed up to 25,000 rev/min is further conducted to corroborate AMS-CIuLR's superiority. Experimental results show that the proposed framework substantially outperforms state-of-the-art bearing fault detection methods in terms of both information volumes and visual quality. (C) 2019 Elsevier Ltd. All rights reserved.

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第 25 篇

标　　题： A Quadratic Weighted Centroid Algorithm For Tunnel Personnel Positioning

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期　　刊： INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS

摘　　要： To improve the accuracy and generalization of tunnel personnel positioning systems, this article proposes a quadratic weighted centroid algorithm. By adopting a Gaussian filter model to improve the range accuracy of the received signal strength indicator algorithm and combining the centroid algorithm and weighting factor with a trilateration positioning model, a quadratic weighted centroid algorithm is proposed to improve the positioning accuracy of unknown positioning nodes. The key ideas behind the quadratic weighted centroid algorithm include an optimization of the received signal strength indicator range value scheme, a centroid algorithm based on trilateral measurement positioning, and a weighting factor to improve the positioning accuracy of the trilateral centroid positioning algorithm. Compared with the centroid algorithm, the Min-Max multilateration algorithm, and the weighted centroid based on distance algorithm, the simulation results showed that (1) the positioning performance of the quadratic weighted centroid algorithm was superior to the other three algorithms; (2) when the reference nodes were symmetrically arranged, the positioning accuracy was higher than a fold line layout; and (3) when the lateral reference node spacing was extended from 20 to 30 m, the average positioning error met positioning accuracy requirements, which could reduce overall system costs.

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第 26 篇

标　　题： A Three-Point Hyperbolic Combination Model For The Settlement Prediction Of Subgrade Filled With Construction And Demolition Waste

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期　　刊：MATERIALS

摘　　要：Using construction and demolition waste (CDW) as road subgrade filling materials is an excellent way to solve the disparity between increased demand and road construction aggregate shortages. However, a key quality control problem is predicting the subgrade settlement, primarily because the CDW subgrade settlement prediction methods are not yet mature. To go some way in overcoming this problem, in this paper we developed a three-point hyperbolic combination model to predict CDW subgrade settlement, in which three appropriate points for the measured settlement curve were selected in the prediction samples to improve the hyperbolic model. Then, common prediction models-namely, the hyperbolic model, the three-point model, and the Hushino model-were compared with the proposed combination model to assess its viability. Finally, the three-point hyperbolic combination prediction accuracy was analyzed for different start points t(0) and time intervals Delta t. The analyses found that the proposed model was in good agreement with the measured data, had a high correlation coefficient, and had only small errors. However, the time interval <mml:semantics>Delta t</mml:semantics> needed to be greater than 80 days and the start point t(0) needed to be selected at the beginning of the stable post-filling period, that is, t(0) = 90-100 days. The application parameters were also determined to provide a reference for the large-scale application and settlement predictions of CDW subgrade.

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第 27 篇

标　　题：Practical Control Of A Cold Milling Machine Using An Adaptive Pid Controller

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期　　刊：APPLIED SCIENCES-BASEL

摘　　要：This paper presents a supervised Hebb learning single neuron adaptive proportional-integral-derivative (PID) controller for the power control of a cold milling machine. The proposed controller aims to overcome the deficiency of the current power control algorithm, and to achieve as high an output power as possible for the cold milling machine. The control process and system model are established and presented to provide the insight and guidance to the controller design and analysis. The adaptive PID controller is developed using a supervised Hebb learning single neuron method

with detailed algorithm and structure analysis. The field test is performed to validate the proposed single neuron adaptive PID control for the power control. In the test, the 8 cm-depth milling is conducted on a cement concrete pavement in which the cement is not well-distributed. The test results show that when the machine speed is adjusted by the machine itself or manually without the adaptive power control system, the machine is often overloaded or underloaded, and the average work speed is 2.4m/min. However, when the adaptive control system is implemented on the machine, it works very close to its rated work condition during its work process. With the developed controller, the machine work speed is adjusted in time to the load variation and uncertain dynamics. The average machine work speed can reach up to 2.766 m/min, which is 15.25% higher than the wok speed of the machine without an adaptive power control system.

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WOS 号： 000533356200315

第 28 篇

标　　题： Modelling And Testing Of Large-Scale Masonry Elements Under Three-Point Bending - Tough And Strong Nacre-Like Structure Enlarged By A Factor Of 20,000

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期　　刊： ENGINEERING FRACTURE MECHANICS

摘　　要： Large-scale brick-mortar structures and tough/strong nacre have common layered structure features. If enlarged by 20,000 times, fracture patterns in natural nacre consisting of microlayered structures around 2 mu m in thickness are virtually identical to those in large-scale brick walls. In this study, large brick-wall blocks about 3 m long and over 1 m tall were tested under three-point-bending and explained by a simple closed-form model. Two notch lengths (two and four brick heights) and two wall heights (about 1.1 and 0.6 m) were tested with 35 brick-mortar blocks. A linear relation between the maximum fracture load P-max and the equivalent area A(e) was established with the structureal tensile strength f(t) of brick walls as its slope, affirming one of the most common physical relations in Solid Mechanics, P-max = f(t) x A(e). The equivalent area A(e) contains all brick wall dimensions including the brick height C-ch. As the characteristic structural measurement of brick wall elements, C-ch plays a key role in modelling of the overall damage zone in front of the initial notch.

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第 29 篇

标　　题： Modulating Electromagnetic Properties In Three-Dimensional Diamond-Structured Photonic Crystals With Double Planar Defects

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期　　刊： MICROWAVE AND OPTICAL TECHNOLOGY LETTERS

摘　　要： Three-dimensional (3D) diamond structure photonic crystals (PhCs) with planar defects were fabricated with alumina using 3D printing combining gel casting, sintering process, and vacuum freezing-dry technique. In this article, the influences of twinned planar defect and the positions of planar defect in a single lattice period on the transmission properties of the electromagnetic wave (EM) in the PhCs is studied. The normalized resonant intensities are 0.5 for twinned planar defected photonic crystals (PhCs). When the planar defect position lies in the nonkey positions (key position is n*(a/4)), the band gap becomes narrow and the resonant peak disappears. When the twinned planar defected with different interval periods is integer, obvious resonant peaks can be found in the EM band gap of the planar defects PhCs with 2 and 3 symmetrical periods. When a PhC with two planar defects is constructed, its band gap width increases and the resonant peaks intensities decrease.

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第 30 篇

标　　题： Udwadia-Kalaba Constraint-Based Tracking Control For Artificial Swarm Mechanical Systems: Dynamic Approach

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通讯作者： Chen, YW (corresponding author), Changan Univ, Natl Engn Lab Highway Maintenance Equipment, Xian 710065, Shaanxi, Peoples R China.

期　　刊： NONLINEAR DYNAMICS

摘　　要： A novel swarm tracking control for artificial swarm mechanical systems consisting of multiple mechanical agents is proposed. In this paper, the agents could not only perform some biological swarm behaviors, such as the repulsion and attraction between agents, but also track the moving target or desired trajectory together. Based on the artificial potential functions, the kinematic modeling of each agent is constructed. The kinematic performance of the swarm system is analyzed, which includes convergence, tracking, aggregation and formation. Inspired by Udwadia-Kalaba constraints, the kinematic modeling of the swarm system is treated as servo constraints and formulated in the second-order form. With the second-order constraints, the explicit servo constraint forces are derived. In virtue of the constraint forces in the closed form, we creatively design a dynamic control for each agent which guarantees the controlled swarm system to obey the required motion. The proposed control scheme is proved by a series of theorems and illustrated by the simulation of multiple nonholonomic mobile robots.

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第 31 篇

标　　题： Automatic Detection Of Moisture Damages In Asphalt Pavements From Gpr Data With Deep Cnn And Irs Method

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期　　刊： AUTOMATION IN CONSTRUCTION

摘　　要： Accurate detection and localization of moisture damage in asphalt pavements using Ground Penetrating Radars (GPR) has been attracting more and more interest in research. Existing approaches rely heavily on human efforts and expert experience and are thus both time and cost consuming and are also subject to accuracy issues caused by stochastic human errors. To address this issue, this paper presents an automated moisture damage detection and localization method by leveraging the state-of-the-art deep learning approach and newly proposed incremental random sampling (IRS) approach. First, 2.3 GHz Ground coupled GPR system was used to survey moisture damages on 16 asphalt pavement bridges to create three moisture damage datasets with different resolutions including 2135 moisture damages and 474 steel joints. On this basis, we propose mixed deep convolutional neural networks (CNN) including ResNet50 network, for feature extraction, and YOLO v2 network, for recognition, to detect and localize moisture damages. In addition, to prepare the input for the deep learning models, an IRS algorithm is proposed to generate suitable GPR images from GPR data to feed the CNN. Comprehensive experimental testing, analysis, and comparison of the proposed approaches are conducted. Experimental results demonstrated the promising performance and superiority of the proposed approaches in detecting and localizing moisture damages in asphalt pavements.

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第 32 篇

标　　题： Effects Of Resin Pre-Coating On Interfacial Bond Strength And Toughness Of Laminar Cfrp With And Without Short Aramid Fibre Toughening

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期　　刊： JOURNAL OF COMPOSITE MATERIALS

摘　　要： The brittle adhesive layer in carbon fiber-reinforced polymer (CFRP) laminates was strengthened by using short aramid fibers in this study. To ensure the feasibility and

effectiveness of short aramid fiber interfacial toughening at the interface between the carbon-fiber face sheets, the self-prepared short aramid fibre tissue and the wettability treatment technology with resin pre-coating were applied to enable short aramid fibres to be well embedded in the uneven regions in the CFRP fabrics with fibres oriented at 0 degrees and 90 degrees to form a strong pulling resistance. The ultimate load and the mode I interlaminar fracture toughness have been improved by 75% and 103.9% from the double cantilever beam mode I crack propagation tests, respectively. The reinforcing mechanisms within the composite adhesive layer as a result of short aramid fibres are discussed together with detailed scanning electron microscopy observations and comparison test results.

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WOS 号： 000533917000001

第 33 篇

标　　题： Optimal Design Of Adaptive Robust Control For The Delta Robot With Uncertainty: Fuzzy Set-Based Approach

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： An optimal control design for the uncertain Delta robot is proposed in the paper. The uncertain factors of the Delta robot include the unknown dynamic parameters, the residual vibration disturbances and the nonlinear joints friction, which are (possibly fast) time-varying and bounded. A fuzzy set theoretic approach is creatively used to describe the system uncertainty. With the fuzzily depicted uncertainty, an adaptive robust control, based on the fuzzy dynamic model, is established. It designs an adaptation mechanism, consisting of the leakage term and the dead-zone, to estimate the uncertainty information. An optimal design is constructed for the Delta robot and solved by minimizing a fuzzy set-based performance index. Unlike the traditional fuzzy control methods (if-then rules-based), the proposed control scheme is deterministic and fuzzily optimized. It is proven that the global solution in the closed form for this optimal design always exists and is unique. This research provides the Delta parallel robot a novel optimal control to guarantee the system performance regardless of the uncertainty. The effectiveness of the proposed control is illustrated by a series of simulation experiments. The results reveal that the further applications in other robots are feasible.

DOI： 10.3390/app10103472

WOS 号： 000541440000133

第 34 篇

标　　题： Properties Of Drillstring Vibration Absorber For Rotary Drilling Rig

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期　　刊： ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING

摘　　要： During drilling into hard rocks, the vibration of telescopic drillstring for the rotary drilling rig becomes more severe, which not only leads to the fracture of drillstring, but also reduces the rock-breaking efficiency, the service life, and the reliability of the rotary drilling rig. A drillstring vibration absorber for the rotary drill rig was proposed based on nonlinear targeted energy transfer technology, and the theoretical model of the absorber was adopted. By applying the instantaneous nonlinear energy absorption rate of the absorber, the vibration responses of the system were predicted on different structure parameters and impact amplitudes. To evaluate the feasibility of the absorber, experiments were carried out. Moreover, the amplitude decrease rate was generated for various working conditions. Furthermore, the analytical results were verified by the experiment. The results indicate that the absorber has a distinct effect on vibration reduction.

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第 35 篇

标　　题： Effect Of Contact Characteristics On The Self-Rotation Performance Of Conical Picks Based On Impact Dynamics Modelling

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期　　刊： ROYAL SOCIETY OPEN SCIENCE

摘　　要： Conical picks have a harsh working environment and 70% of their failures are caused by wear. It has been found that conical picks can rotate while interacting with the working material. This self-rotation ability is an important factor affecting pick wear, but the self-rotation mechanism remains unclear. Researching the mechanism involves the impact and friction dynamics of the interaction between a pick and its holder. Thus, a dynamic finite-element numerical model for the pick-holder interaction is established. How the handle-holder gap width, pick body and handle lengths and pick handle diameter affect the settling time and the percentage of time with no contact is studied to compare the numerical results with the equivalent effects on the rotation angle in

experiments. Doing so indicates that the main factor in the self-rotation ability of a conical pick is not the magnitude of the contact load but its duration. The present research provides a new method for revealing the mechanism for the self-rotation of conical picks.

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第 36 篇

标　　题： In-Situ Recognition Of Moisture Damage In Bridge Deck Asphalt Pavement With Time-Frequency Features Of Gpr Signal

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期　　刊： CONSTRUCTION AND BUILDING MATERIALS

摘　　要： A complete solution, including an effective non-destructive evaluation (NDE) method and an automatic recognition model, was provided for the rapid diagnosis of moisture damage in the asphalt pavement by using ground-penetrating radar (GPR) signals. A ground-coupled 2.3 GHz antenna was used to conduct a GPR survey on an asphalt pavement of a bridge deck, where the moisture damage areas were detected and visually recognized in processed GPR B-scan images and further validated in subsequent pavement coring. Field GPR traces of the asphalt layer were read and classified to build a dataset which included 8215 moisture damage and 8215 normal pavement traces. A 28-element time-frequency feature vector was extracted and further reduced to an 11-element sensitive feature vector via the linear discriminant analysis (LDA) method. Principal component analysis (PCA) was adopted to decompose the feature vector into the PCs (principal components), which was used to train a BP-ANN model. The result indicates the high accuracy of the ANN model with sensitive feature vectors, i.e., 95.3% for normal and 92.4% for moisture classification. Finally, the ANN model was used to evaluate the GPR survey data, and its result is consistent with the GPR B-scan feature. These findings suggest that the ground-coupled GPR system with 2.3 GHz antenna and the recognition model will enable an innovative quality evaluation system for asphalt pavement.

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第 37 篇

标　　题： A Hybrid Finite Element And Analytical Model For Determining The Mesh Stiffness Of Internal Gear Pairs

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期　　刊： JOURNAL OF MECHANICAL SCIENCE AND TECHNOLOGY

摘　　要： This work developed an efficient model for calculating the mesh stiffness of spur/helical internal gear pairs by combining the finite element method (FEM) and analytical formula. The tooth global deformation is obtained by separation of the deformation of a full finite element model and a partial model, and the local contact deformation is derived by an analytical line contact formula based on Hertz contact theory. The transmission error and mesh stiffness of the gear pair can be acquired after solving the nonlinear contact equilibrium equations. Compared with the conventional FEM, the proposed method has much smaller computational consumption. Furthermore, it also overcomes the disadvantage that the analytical method is difficult to consider different ring gear structures. Then the influences of ring thicknesses and the number of support pins of the ring gear on the mesh stiffness are discussed. The results show that the ring flexibility will change the amplitude-frequency components of the mesh stiffness a lot.

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第 38 篇

标　　题： Back Recursive Estimation Of Unknown Frequency Sinusoidal Disturbance In Superconducting Rf Cavities

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期　　刊： ISA TRANSACTIONS

摘　　要： A novel back recursive estimation (BRE) scheme is proposed for superconducting radio frequency (SRF) cavities. Microphonic,the main source of cavities detuning is modeled as unknown frequency sinusoidal disturbance. The disturbance property is excited by an auxiliary filter and the frequency information is estimated in observer framework. Furthermore, the sinusoidal disturbance is rearranged as a series of dynamics form using virtual disturbances. Back recursive signal is calculated according to the correlation between virtual disturbance and equivalent input disturbance. As a result, the asymptotic stability of estimation error can be obtained based on Lyapunov function, and robustness can be obtained if another external bounded disturbance exists. Simulations verify the effectiveness of the proposed method. (c) 2020 ISA. Published by Elsevier Ltd. All rights reserved.

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第 39 篇

标　　题：Extrapolation Algorithm Of Ship Track Smoothing Based On Spline Theory

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期　　刊：JOURNAL OF COASTAL RESEARCH

摘　　要：Due to the poor transition effect of traditional ship track control, the shipping pressure is too large. The research on extrapolation algorithm of ship track smoothing based on spline theory is proposed. Based on the principle of spline fitting, a three degree of freedom motion model of ship's horizontal plane is established to analyze the force on the ship in the process of motion, so the motion equation is obtained. The extrapolation algorithm is used to analyze the intersection of wave gates. Considering the actual situation and the influence parameters, the research on extrapolation algorithm of ship track smoothing based on spline theory is completed. The control experiment is designed to compare the track control effect of the proposed algorithm with that of the traditional algorithm. The results show that the combination of the spline theory and the extrapolation method results in a higher fit between the control curve and the actual route, which is obviously superior to the traditional results, and the control effect of the ship track is optimized.

DOI：10.2112/SI103-189.1

WOS 号：000543720600189

第 40 篇

标　　题：Mode I Interlaminar Fracture Toughness Of Cfrp Laminates Reinforced With Short Aramid Fibers

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期　　刊：JOURNAL OF ADHESION SCIENCE AND TECHNOLOGY

摘　　要：Adhesive bonding has been applied successfully in many technologies. The short aramid fibers can be effectively embedded in interface layer wit adhesive-rich regions of the CFRP fabrics with carbon fibers oriented at 0 degrees and 90 degrees to form a strong pulling resistance. In this paper, the interface toughness of carbon fiber composite reinforced by aramid short fiber is studied based on the mode I crack growth test of double cantilever beam. The effort of the length and density of aramid short fiber on the interface toughness of carbon fiber composite are discussed. The test result shows that the best bonding strength is obtained at the condition of the aramid fibers with the length of 3 mm at the density of 24 g/m(2). The ultimate load and the Mode I

interlaminar fracture toughness are improved by 292.87% and 168.59%, respectively. The crack propagation path and fracture effect are analyzed and compared by Scanning Electron Microscopy (SEM) observations.

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WOS 号： 000552425000001

第 41 篇

标　　题： Enhanced Transmission Performance Of A Dipole Antenna Based On A Ceramic Diamond-Structure Pbg Substrate With A Defect Cavity

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期　　刊： JOURNAL OF ELECTRONIC MATERIALS

摘　　要： The radiation performance of a dipole antenna on a diamond-structured photonic crystal (PC) substrate with point defects fabricated using three-dimensional (3D) printing technology has been investigated. Meanwhile, according to the reflection properties of the PCs, corresponding dipole antennas were fabricated and packaged with standard coaxial lines. The experimental results showed a strong radiation frequency of the dipole antenna at about 13 GHz, in basic agreement with the strongest reflection frequency of the PCs with point defects. The experimental results also show that the maximum gain of the major lobe in the dipole antenna was close to -67 dB, while the angular range of the major lobe was 5-55 degrees. The maximum gain of the major lobe increased to -60 dB in the composite antenna, representing an improvement of 7 dB compared with the dipole antenna, while the width range of the major lobe was 240-270 degrees. These results show that the use of such substrates based on diamond-structure PCs with point defects could significantly improve the gain and directivity of the antenna, providing a basis for engineering applications.

DOI： 10.1007/s11664-020-08269-6

WOS 号： 000542102400002

第 42 篇

标　　题： Investigating The Contact Responses Of The Roller Cavity Surfaces In The Compressor Blade Rolling Process

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期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：The investigation of the contact responses is the key for evaluating the local wear of dies in the plastic forming process. This paper investigated the contact load distributions and evolutions of the roller cavities in the compressor blade rolling process by the FEM. It was the first study to quantify the distributions and evolutions of the contact responses for rolling irregular components. The results indicated that the maximum contact pressure is generally present at the center of the contact interfaces, and the magnitudes of contact pressure decreased with evolution of the blade rolling process. The rolling contact interfaces can be divided into the backward slip zone, the stick zone, and the forward slip zone based on the shear stress distributions. The stick zone was a narrow belt which separated the forward and the backward slip zone, and the shear stress in the stick zone was nearly zero. The shear stress magnitudes in the forward slip zone were smaller than those in the backward slip zone, and the directions of shear stress in forward and backward slip zones were adverse. The magnitudes of shear stress over the forward and backward slip zones decreased with evolution of the blade rolling process. The distributions of local sliding were in a V-shape, the local sliding in the stick zone was nearly zero, and the bigger sliding in backward and forward slip zones was present at the boundaries of rolling entrance and exit sections. The local sliding velocity magnitudes in the backward slip zones were always bigger than those in the forward slip zones, and the magnitudes of local sliding at the rolling entrance sections were bigger than those at the rolling exit sections. In general, the local sliding velocity magnitudes increased firstly and decreased sharply at 2T/3. The current paper develops the distributions and evolutions of contact responses in the blade rolling process. The contact responses can be used for studying the wear of roller cavities to avoid the accuracy inconsistency of the shaped blade.

DOI：10.1155/2020/1286040

WOS 号：000552805800003

第 43 篇

标　　题：Collaborative Sparse Classification For Aero-Engine'S Gear Hub Crack Diagnosis

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期　　刊：MECHANICAL SYSTEMS AND SIGNAL PROCESSING

摘　　要：It is a big challenge to robustly detect the early crack fault of the differential gear train's gear-hub of an aero-engine from the vibration signals of its engine casing, because of imprecise dynamic model guidance, extremely weak signature, complex modulation effects and limited training data. In this paper, a novel collaborative sparse classification

framework (CSC), which collaborates the prior knowledge based sparse filtering and data-driven classification strategy, is proposed as a new endeavor for health condition assessment of aero-engine's gear-hub. The sparse filtering model collaborates the empirically established fault pattern and its intrinsic local self-similar properties, by which the feature to interference ratio is enhanced. Subsequently, a sparse classification method is adopted to further explore the latent discriminative signatures and thus the health conditions of gear-hub can be automatically recognized. This work can not only recognize the abnormal vibration with high accuracy but also locate is source component to some extent. The effectiveness, superiority, parameter robustness and generalization performance of the proposed framework are thoroughly demonstrated by enormous comparison experiments with the state-of-the-arts.

DOI： 10.1016/j.ymssp.2019.106426
WOS 号： 000529084500001

第 44 篇

标　　题： A Novel Evaluation Of Fracture Toughness For Random Fibrous Material

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期　　刊： COMPOSITE STRUCTURES

摘　　要： In this study, we perform three-point-bending tests for 3-dimensional random fibrous (3D RF) material specimens of two porosities (87% and 83%) with a crack. The crack with two different crack-length-to-specimen-width ratios (0.2 and 0.5) is considered. Using the tensile strength obtained from experiments and a characteristic average fiber spacing parameter from an equivalent orthotropic fiber network model, a simple theoretical model is developed to evaluate the fracture toughness of 3D RF material. This model gives the fracture toughness of 3D RF material, which is in good agreement with that from compact tension test, and better than the results calculated via the American Society for Testing Materials (ASTM) standard for three-point-bending test. This fact not only rationalizes the use of average fiber spacing size in the developed model, but also demonstrates the model efficiency in evaluating the fracture toughness of 3D RF material. Further, considering the temperature effect on the fracture strength of material, this theoretical model can be successfully used to predict fracture toughness of 3D RF materials at elevated temperatures (299 K similar to 1073 K).

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WOS 号： 000531512100003

第 45 篇

标　　题：Robust Trajectory Tracking Control For Uncertain Mechanical Systems: Servo Constraint-Following And Adaptation Mechanism

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期　　刊：INTERNATIONAL JOURNAL OF CONTROL

摘　　要：The paper proposes a novel trajectory tracking control for uncertain mechanical systems. We reformulate the trajectory tracking control as a constraint-following problem. A new set of servo constraints are constructed to fulfill the requirement of trajectory tracking. By the advantage of the second-order form of constraints, the constraint forces required in the constraint-following are derived in an explicit form. The uncertainty considered in the mechanical system is time-varying and bounded. But the bound is unknown. An adaptation mechanism with leakage and dead-zone is designed. Based on the adaptation, a new class of robust control is proposed. The performance of the resulting controlled system, including uniform boundedness and uniform ultimate boundedness, is guaranteed.

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WOS 号：000544485300019

第 46 篇

标　　题：Unsupervised Online Prediction Of Tool Wear Values Using Force Model Coefficients In Milling

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通讯作者：Jiao, SJ (corresponding author), Changan Univ, Sch Construct Machinery, Xian 710064, Peoples R China.

期　　刊：INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

摘　　要：Tool wear prediction is an important research in metal cutting, which aims to improve machining accuracy and production efficiency, maximize tool utilization, and reduce machining cost. However, due to high complexity and nonlinearity of tool wear process, it is difficult to establish a general tool wear prediction model, which limits its application in industrial production. To solve this problem, an unsupervised online prediction method for tool wear values is proposed. In the method, a milling force model considering tool wear is established by using analytical method, and parameters varying with tool wear in the force model are integrated into five force model coefficients. The coefficients are solved and updated continuously using the least square

estimation method according to the cutting force signals collected in real time. Based on study of relationship between the coefficients and tool wear, a tool flank wear value estimation model is constructed, combined with a time series analysis model, to achieve prediction of tool flank wear values. Experiments are conducted to test the prediction accuracy of tool wear values using the proposed method, and the results show that the average online prediction accuracy reached 72.0%, without supervision. The method has the advantages of low cost and strong adaptability, and can be used for online prediction of tool wear in machining industry.

DOI： 10.1007/s00170-020-05684-1

WOS 号： 000547803300006

第 47 篇

标　　题： Vision-Based Optimization Of The Generalized Predictive Active Disturbance Rejection Controller

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期　　刊： JOURNAL OF VISUAL COMMUNICATION AND IMAGE REPRESENTATION

摘　　要： The batching system of the integrated mixing and spreading equipment for MOH material is a nonlinear system with large uncertainty. It is difficult for conventional control strategies to meet the requirements for system performance. This research combines generalized predictive control and active disturbance rejection technique to propose a new generalized predictive active disturbance rejection controller (GPADRC) used in the batching system of MOH material. For the nonlinearity and uncertainty of the batching system, the extended state observer in the active disturbance rejection technique is used for estimation and compensation. The batching system model is converted into an integrator form, based on which the use of generalized predictive control can greatly reduce the impact of nonlinear models and uncertainties on the controller. Aiming at the problem that the parameters of the proposed new controller are numerous and difficult to tune, the adaptive genetic algorithm is used to realize the automatic tuning of the parameters. The simulation experiment shows that the designed GPADRC can well adapt to the working conditions of the batching system and can meet the requirements for various control indicators. At the same time, the adaptive genetic algorithm can realize the rapid tuning of the controller parameters, which reduce the difficulty and time consumption of the tuning process, and improve the applicability and achievability of the designed controller.

DOI： 10.1016/j.jvcir.2019.102728

WOS 号： 000571423900012

第 48 篇

标　　题： Probabilistic Relation Between Stress Intensity And Fracture Toughness In Ceramics

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通讯作者：Zhang, XC (corresponding author), East China Univ Sci & Technol, Key Lab Pressure Syst & Safety, MOE, Shanghai 200237, Peoples R China.; Zhang, CG (corresponding author), Changan Univ, Middle Sect Naner Huan Rd, Xian 710064, Peoples R China.

期　　刊：CERAMICS INTERNATIONAL

摘　　要：For fracture toughness (K-IC) testing, the critical stress intensity factor (K-C) equals K-IC only when specimens satisfy linear elastic fracture mechanics (LEFM). Thus, direct experiments may not yield the K-IC of a ceramic if the relation between K-C and K-IC is not well understood because valid tests are difficult for polycrystallines. This study proposes a fracture model characterizing the K-C/K-IC ratio as a function of the relative crack size a/G (a: initial crack size, G: average grain size). In addition, normal distribution is incorporated to describe the inevitable scatters in K-C-measurements. The results show that the upper and lower bounds with 96% reliability cover nearly all experimental data, and they contribute to a better understanding of fracture unsatisfied with LEFM.

DOI：10.1016/j.ceramint.2020.05.173

WOS 号：000542949400110

第 49 篇

标　　题：Notch Radius Effect On Fracture Toughness Of Ceramics Pertinent To Grain Size

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期　　刊：JOURNAL OF THE EUROPEAN CERAMIC SOCIETY

摘　　要：Unlike fracture toughness, the notch fracture toughness of a ceramic is not a constant; rather, it increases with the notch-root radius rho in a notched specimen. In this study, by analyzing the fracture measurements of eight different notched ceramics with an average grain size G of 3-40 mu m, a simple model describing the relation between the notch fracture toughness and fracture toughness is proposed as a function of the relative notch-root radius rho/G. The normal distribution is incorporated to consider the inevitable scatter in measurements where fracture mechanisms and errors are present. The results demonstrate that the model can effectively predict the quasi-brittle fracture variation trend for ceramics, including the upper and lower bounds, with 96% reliability, from a normal distribution; thus, it can address virtually all of the experimental data. We also determined that the notch fracture toughness approximates the fracture toughness if rho <= G.

DOI： 10.1016/j.jeurceramsoc.2020.03.030
WOS 号： 000541149500046

第 50 篇
标　　题： Research On Coupling Dynamics And Coordinated Control Of A Legged Robot
作　　者： [Chen, Zhengcang; Yang, Chaoyue; Shen, Jianjun; Jia, Feng] Changan Univ, Key Lab Rd Construct Technol & Equipment, MOE, Xian 710064, Peoples R China
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期　　刊： JOURNAL OF VIBRATION AND CONTROL
摘　　要： This article develops a coupling dynamic method focusing on the coupling relationship between the leg and the body of a legged robot. The dynamic equation of the method reflects the mechanism between an active operating part and a passive moving part among a multibody system. It is used to adjust the position and posture of the body by driving the motion of the joint of the leg, thereby solving problems such as rollover or overturning of the body during its walking or running. Because the robot has enough redundant degrees of freedom, we can design other additional constraints to achieve coordinated control of the robot. The developed dynamic modeling method is applied for two control tasks. By the results of numerical simulations, the effectiveness of this method is verified.
DOI： 10.1177/1077546320960879
WOS 号： 000571237700001

第 51 篇
标　　题： Study On The Applicability Of Needle/Cone Penetration Experiment For Asphalt-Rubber
作　　者： [Yao, Zechen; Yang, Renfeng; An, Haichao; Zhang, Qingzhe; Yuan, Wei] Changan Univ, Sch Construct Machinery, Xian 710064, Peoples R China; [Liu, Zhonglin] Hebei Prov Transportat Dept, Shijiazhuang 050000, Hebei, Peoples R China
通讯作者： Yao, ZC (corresponding author), Changan Univ, Sch Construct Machinery, Xian 710064, Peoples R China.
期　　刊： ADVANCES IN CIVIL ENGINEERING
摘　　要： In order to quantitatively study the applicability of needle/cone penetration experiment for asphalt-rubber (AR), the dynamic model of needle/cone in penetration process was established based on theKelvinmodel, and the different impacts of crumb rubber (CR) particles on needle/cone penetration depth were analyzed usingMatlab. The probability of needle/cone contacting CR particles in penetration process was statistically calculated. AR binders with different CR particle sizes were observed using scanning electron microscope (SEM) and prepared for testing needle/cone penetration. The results showed that the solid-liquid two-phase feature of AR binders gradually weakened with the reduction of CR particle size. At the same viscoelastic parameters, CR particles had little impact on cone penetration depth when cone contacted CR particles. The probability of cone contacting CR particles was close to 100% in penetration process while that of needle was around 50%. The standard deviations of

the needle penetration experimental results for AR binders with #20, #30, #40, #60, and #80 mesh CR were 4.0, 3.8, 2.8, 1.1, and 1.1 times of cone penetration, respectively. This study shows that the cone penetration experiment has a significant advantage in evaluating the consistency of the AR binder with coarse CR.

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WOS 号： 000578173600004

第 52 篇

标　　题： An Inverse Decaying Frequency Modulation Emd Method For Closely Spaced Modal Parameter Identification In High Precision With Laplace Wavelet Correlation Filtering

作　　者： [Zhang, XiaoLi; Yang, Ji; Yan, Qiang; Zhang, Han] Changan Univ, Minist Educ, Key Lab Rd Construct Technol & Equipment, Xian 710064, Peoples R China; [Wang, Baojian] Xi An Jiao Tong Univ, State Key Lab Mfg Syst Engn, Xian 710049, Peoples R China

通讯作者： Zhang, XL (corresponding author), Changan Univ, Minist Educ, Key Lab Rd Construct Technol & Equipment, Xian 710064, Peoples R China.

期　　刊： MEASUREMENT SCIENCE AND TECHNOLOGY

摘　　要： Modal parameter identification is a useful tool to reveal natural vibration characteristics in dynamic design and analysis. Due to the influence of closely spaced modes with close frequencies and large dampings, identification accuracy using traditional Hilbert-Huang transform is always unsatisfactory, since the deadline requirement of neighboring intrinsic mode functions cannot be satisfied when the frequency ratio (high frequency versus low frequency) of two adjacent modes is less than two. Therefore, an inverse decaying frequency modulation empirical mode decomposition method is proposed, in order to separate multiple closely spaced modes in high precision, which not only adjusts the frequency ratio by frequency modulation, but also decreases damping by inverse decaying simultaneously. Next, the modal parameters of each separated single mode are picked up by means of Laplace wavelet correlation filtering. The effectiveness of the proposed method is validated by simulated signals in noise and noise-free conditions, and compared with other methods, showing the advantages of high-precision, closely spaced mode identification. In addition, the proposed method is applied to the assembly tightness identification of bolts in an aero-engine rotor, which achieves successful results.

DOI： 10.1088/1361-6501/ab8cfe

WOS 号： 000553414000001

第 53 篇

标　　题： Optimization Of The Coupling Parameters And Mixing Uniformity Of Multiple Organic Hydraulic Mixtures Based On The Discrete Element Method And Response Surface Methodology

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期　　刊： ADVANCED POWDER TECHNOLOGY

摘　　要： To address the mixing uniformity of multiple organic hydraulic (MOH) mixtures in a continuous mixer, three types of mixing parameters and their coupling effects were studied by the discrete element method (DEM) and response surface methodology. To achieve the research goal, only one parameter was selected for each type of parameter, and the corresponding model was established. Numerical simulations and optimization were implemented. A three-level, three-factor Box-Behnken Design method combined with response surface methodology was applied for the numerical design. The influence of the parameters on the mixing uniformity of the mixture was analyzed by analysis of variance (ANOVA). The ANOVA results show that the rotation speed, the installation angle, the filling ratio and the coupling between the rotation speed and the filling ratio have a significant effect on the mixing uniformity of the mixture, that the rotation speed and the filling ratio have the strongest effect on the response, and that of the fitting model of the mixing uniformity can fit the simulation data well. The coupling effect results show that the influence of coupling between the revolution and installation angle on the mixing uniformity is consistent with that between the filling ratio and installation angle and that the coupling effect between the rotation speed and the filling ratio is different. It is also found that the optimal parameter range under one factor is different from that under multivariable coupling. The optimization results show that when the discrete coefficient is the smallest, the optimal combination of the parameters is a revolution of 350 r/min, an installation angle of 25 degrees, and a filling ratio of 70%. The experimental results are consistent with the optimization results, which indicate the correctness of the parameter optimization results. (C) 2020 The Society of Powder Technology Japan. Published by Elsevier B.V. and The Society of Powder Technology Japan. All rights reserved.

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WOS 号： 000583749700022

第 54 篇

标　　题： Image Retrieval Via Learning Content-Based Deep Quality Model Towards Big Data

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通讯作者： Yang, YK (corresponding author), Changan Univ, Natl Engn Lab Highway Maintenance Equipment, Xian 710100, Peoples R China.

期　　刊： FUTURE GENERATION COMPUTER SYSTEMS-THE INTERNATIONAL JOURNAL OF ESCIENCE

摘　　要： Image retrieval aims to search specific image from large-scale datasets. Traditional text-based and content-based image retrieval approaches have shown competitive performance. However, both of which are limited by semantic gap, i.e., they cannot

reflect human perception of images. To narrow semantic gap in image retrieval, this paper proposes a deep neural network (DNN) based image retrieval method, where saliency map is derived to form human gaze shifting paths by constraint metrics. More specifically, we first design a DNN-based image saliency prediction. Subsequently, we leverage image quality assessment (IQA) algorithm to select high-quality salient regions, which will be concatenated in sequence by using proposed constraint metrics to mimic human visual perception. Afterwards, we leverage the CNN-based architecture for deep representation acquisition of each images, where spatial structure among salient regions can be well preserved. Subsequently, based on the quality score of the query image, a series of candidate images whose quality scores are similar to that of the query image are derived. Finally, we engineer a ranking distance metric to refine the candidate images to achieve image retrieval. Extend experiments demonstrate that our method outperforms several state-of-the-art algorithms.

DOI： 10.1016/j.future.2020.05.016
WOS 号： 000567826800019

第 55 篇

标　　题： Carbon Nanomaterial Manufacturing System And Automatic Synthesis Equipment And Its Control Device And Control Methods

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期　　刊： JOURNAL OF CHEMISTRY

摘　　要： In recent years, people are committed to developing new technologies and technologies for energy storage and conversion, environmental detection, high-performance sensors and energy security, and other aspects of the increasingly prominent problems in the field of environmental and biosafety. The purpose of this paper is to explore the manufacturing system and automatic synthesis equipment of carbon nanomaterials, understand the control device and control method, and analyze the structure and morphology characteristics of three kinds of carbon nanomaterials produced by carbon nanomaterial manufacturing system by X-ray diffraction and infrared spectroscopy. The results show that the carbon nanomaterial manufacturing system and automatic synthesis system in this paper solve the problems of high cost, low efficiency, and small scale of the existing carbon nanomaterials manufacturing and achieve the precision control of automatic production, so that the productivity is increased by 20%-35%, and the cost is reduced by 15%-30%. Therefore, they are widely used in the fields of science and technology, environmental protection, and intelligent manufacturing broad prospects. Carbon nanotube manufacturing equipment and automatic synthesis equipment have great production advantages, which can greatly improve the quality and efficiency of carbon nanomaterials. UPY, GO, and UGO carbon nanomaterials produced by carbon nanotube manufacturing equipment are not easy to fall off from the materials. When the wavelength is 500 nm, the absorption frequency of the three

materials is the largest. With the extension of the spectral wavelength, the absorption frequency of the three materials is reduced by 52%, 33%, and 34.7%, respectively.

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WOS 号： 000594651200001

第 56 篇

标　　题： Failure Analysis Of Bolts On Fatigue Test Bench For Excavator Stick

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期　　刊： ENGINEERING FAILURE ANALYSIS

摘　　要： In this study, a new bench device with full-scale fatigue test for excavator stick was designed. The test bench has the function of dynamic load self-balancing, because a part of the load applied to the specimen of stick is directly transferred to the pillars of the test machine through the high-strength bolts connection. Accordingly, the ground under the test machine was not affected by the test load. However, some bolts located on the fatigue test bench failed and fractured during fatigue testing for excavator stick. To determine the failure reasons of bolts, mechanical and scanning electron microscope (SEM) analyses were conducted. The tensile stress of bolt group under ultimate load was evaluated via finite element model (FEM) of test bench according to test load spectrum. Moreover, under the test load spectrum, the stress range of bolt group was obtained and the fatigue life prediction of bolts was conducted by referring to Eurocode 3. It should be noted that the results of numerical simulation of fatigue lives for failure bolts were consistent with the actual lives of failure bolts during test. A fractured surface on one of the failed bolts was examined by SEM observation to determine the failure initiation and failure mode.

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WOS 号： 000587913600051

第 57 篇

标　　题： Numerical Simulation Analysis On Multi-Layer Low-Temperature Heating Method Of Asphalt Pavement In Hot In-Place Recycling

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期　　刊： JOURNAL OF CENTRAL SOUTH UNIVERSITY

摘　　要： Asphalt mixture pavement reheating is one of the important steps in hot in-place recycling (HIR). To improve the heating speed of asphalt pavement in HIR, based on the numerical analysis model of asphalt mixture heating process, a new multi-layer low-temperature heating method (MLHM) was proposed. Considering input heat flux,

the thermal capacity and thermal resistance of asphalt mixture, the heat transfer model was established based on energy conservation law. By heating the asphalt mixture in layers, it changes the situation that the heat energy can only be input from the upper surface of the asphalt mixture pavement. Through the simulation of the heating method of asphalt mixture in the existing technology, the result shows that the existing heating methods lead to serious aging or charring of the asphalt mixture. By MLHM, the upper and the bottom of the asphalt mixture are heated at the same time, and the heating temperature is lower than other heat methods, which not only reduces the heating thickness and increases the heating area of the asphalt mixture pavement, but also improves the heating speed, saves the energy resource and ensures the heating quality. Especially, by MLHM, the heating uniformity is better and speed is faster.

DOI： 10.1007/s11771-020-4577-6

WOS 号： 000613268200021

第 58 篇

标　　题： A New C-0 Layerwise Wavelet Finite Element Formulation For The Static And Free Vibration Analysis Of Composite Plates

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期　　刊： COMPOSITE STRUCTURES

摘　　要： In this paper, a new C-o layerwise wavelet finite element is proposed for the static and free vibration analysis of composite plates. The refined zigzag theory is adopted to introduce the zigzag effects in multilayered plate structures by using piecewise linear C-o continuous functions. Then the layerwise wavelet-based BSWI element is derived based on the higher-order plate theory by means of two-dimensional BSWI scaling functions. The proposed model satisfies the conditions of transverse shear stress continuity at the layer interfaces as well as yields to the stress-free boundary conditions on the surface of plate without a shear correction factor. What's more, the layerwise wavelet-based BSWI element also possesses the advantages of high convergence, high accuracy and reliability with fewer degrees of freedom on account of the excellent approximation property of BSWI. The accuracy and effectiveness of proposed layerwise wavelet-based BSWI element is assessed for static and free vibration analysis of laminated composite and sandwich plates with available 3D elasticity solutions, finite element solutions and other referential solutions in published literatures.

DOI： 10.1016/j.compstruct.2020.112852

WOS 号： 000579724400036

第 59 篇

标　　题： Identification Of Cross-Section Loads For Steel Beam With Simple Cross-Sectional Shape Based On Measured Strain And Its Application

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期　　刊： JOURNAL OF MECHANICAL SCIENCE AND TECHNOLOGY

摘　　要： A new strain gauge layout method on the structural surface is proposed to identify the six-component loads in cross-section. Numerical simulation of a cantilever beam and an industrial case study, i.e., identification of hinge joint loads on excavator working device under actual excavating condition, are presented to demonstrate the practicability of the proposed method for industrial scale problems. The hinge joint loads deduced from the stick's six-component cross-section loads identified by the new method were compared with the values calculated by traditional method, and the recurrence degree of stress and fatigue cumulative damage of the stick's fatigue critical points were also compared. The maximum deviation between the actual damage of each selected measuring point and the damage caused by the identified hinge joint loads was only 1.69 %. The field test results showed that the new method could be conveniently applied with high identification accuracy for complicated actual loads.

DOI： 10.1007/s12206-020-1106-3

WOS 号： 000603304800026

运输工程学院

第 1 篇

标　　题： Entropy-Based Effect Evaluation Of Delineators In Tunnels On Drivers' Gaze Behavior

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期　　刊： ENTROPY

摘　　要： Driving safety in tunnels has always been an issue of great concern. Establishing delineators to improve drivers' instantaneous cognition of the surrounding environment in tunnels can effectively enhance driver safety. Through a simulation study, this paper explored how delineators affect drivers' gaze behavior (including fixation and scanpath) in tunnels. In addition to analyzing typical parameters, such as fixation position and fixation duration in areas of interest (AOIs), by modeling drivers' switching process as Markov chains and calculating Shannon's entropy of the fit Markov model, this paper quantified the complexity of individual switching patterns between AOIs under different delineator configurations and with different road alignments. A total of 25 subjects participated in this research. The results show that setting delineators in tunnels can attract drivers' attention and make them focus on the pavement. When driving in tunnels equipped with delineators, especially tunnels with both wall delineators and pavement delineators, the participants exhibited a smaller transition entropy Ht and stationary entropy Hs, which can greatly reduce drivers' visual fatigue. Compared with

left curve and right curve, participants obtained higher Ht and Hs values in the straight section.

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WOS 号： 000516825400008

第 2 篇

标　　题： Research On Sample Selection Of Urban Rail Transit Passenger Flow Forecasting Based On Scbp Algorithm

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期　　刊： IEEE ACCESS

摘　　要： Due to the wide applications of deep learning in the field of urban rail transit passenger flow forecasting, the selection problem of training samples has become increasingly more worthy of researchers & x2019; attention, as it is closely related to urban rail transit passenger flow time series. Therefore, it is necessary to study the distribution characteristics of the contribution degree of the training sample to guide sample selection in the deep learning training process. In this study, based on the prediction accuracy and the sample contribution degree, the optimal sample contribution combination algorithm (GWO-SCBP) was ultimately generated by the grey wolf optimizer (GWO) and error back propagation (EBP) algorithms. The contribution of training samples for each station of the Xi & x2019;an metro network was calculated and analyzed. The results show that the sample contribution is not only related to the distance between the sample and predicted value, but is also closely related to the station flow characteristics. By classifying the network stations and fitting the contribution degree of the central station of each type of station, linear equations of sample contribution degree were obtained, and the $R<^>{2}$ values attained at least 0.65, indicating a good fitting effect.

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WOS 号： 000538727700045

第 3 篇

标　　题： Drivers Route Switching Behavior Based On Group Classification

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期　　刊： IEEE ACCESS

摘　　要： Drivers & x2019; route switching behavior shows obvious difference when they face various traffic conditions. The article studies the drivers & x2019; route switching behavior based on group classification. Questionnaire combining SP survey and RP survey is carried out to collect the drivers & x2019; route choice behavior under the influence of individual attributes, daily travel characteristic and traffic conditions.

Latent Class Model (LCM) is used to analyze the behavior characteristic. According to the goodness of models, drivers are divided into three categories. Drivers of sensitive pattern will switch route easily which is represented by young people with shorter driver-age. In contrast, drivers of unresponsive pattern will not switch routes easily and the pattern is represented by elder people with longer driver-age. Based on the drivers & x2019; classification results, ordinal logistic model is established. According to the odds ratio of each variable, we find that, age, driver-age, nature of drivers, and travel frequency all affect drivers & x2019; route switching behavior.

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WOS 号： 000541121800045

第 4 篇

标　　题： Benefits And Risks Of The Driving Restriction Policy: A Case Study Of Xi'An, China

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通讯作者： Cui, SS (corresponding author), Changan Univ, Sch Transportat Engn, Xian 710064, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： With the deterioration of air pollution and traffic congestion especially in urban areas, the policy restricting cars operating on the road is deemed as an effective strategy to mitigate the negative impacts. After implementing the driving restriction policy (DRP), some benefits were yielded albeit a few problems appeared. It is desirable to assess the benefits and risks of the DRP and thus propose measures to maintain the benefits. A revealed preference (RP) survey was conducted in the field and via the internet. There are 585 valid samples collected, which were classified by socioeconomic factors, and the corresponding reactions were analyzed and compared. The correlation analysis was used to identify significant and independent demographic/characteristic variables. The results show that most travelers perceive benefits from reducing car ownership and have positive views on DRP. However, others would negatively react to the DRP, which is mainly manifested by buying another car, driving during non-restricted hours and traveling against regulations. Furthermore, socio-demographic characteristics show a relatively high correlation with travel mode choice. Automobile is favorable to middle-aged travelers with upper-middle income. Family characteristics (i.e. household structure, pick up children and cars ownership) are also important inducing travelers to use private cars. These findings will be helpful for formulating the DRP to yield greater benefits after implementation.

DOI： 10.1109/ACCESS.2020.2994375

WOS 号： 000541127800045

第 5 篇

标　　题： Taxi High-Income Region Recommendation And Spatial Correlation Analysis

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期　　刊： IEEE ACCESS

摘　　要： Taxis provide essential transport services in urban areas. In the taxi industry, the income level remains a cause of concern for taxi drivers as well as regulators. Analyzing the variation trend of taxi operation efficiency indicators throughout the day, mining high-income orders hot-spots and high-income regions at different periods, will effectively improve the average hourly incomes (AHI) of drivers. This paper selects the order data for each day of holidays, working days, and non-working days through the taxi order dataset of October 2019 in Xi'an. Firstly, we analyze the variation trend of taxi operation efficiency indicators in the three days. We next divide the orders into four income levels based on the Natural Breaks accordingly. Then, we use Tyson polygon and mash map matching methods to visualize the high-income orders hot-spots and high-income regions. It is significantly to analyze and summarize the visualization results. Finally, we compute the Moran'I index to measure the spatial correlation between high-income orders regions and high-income regions. The results show that (1) the number and the spatial distribution of high-income orders hot-spots and high-income regions at different periods are different. (2) Some places are hot-spots, but neither high-income orders hot-spots nor high-income regions. (3) The high-income orders regions and high-income regions have a strong correlation in spatial distribution. This study provides suggestions and insights to taxi companies and taxi drivers to increase their average hourly income (AHI) and enhance the efficiency of the taxi industry.

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WOS 号： 000558163000001

第 6 篇

标　　题： Comparing Factors Affecting Injury Severity Of Passenger Car And Truck Drivers

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期　　刊： IEEE ACCESS

摘　　要： This study aims to explore factors affecting passenger car and truck driver injury severity in passenger car-truck crashes. Police-reported crash data from 2007 to 2017 in

Canada are collected. Two-vehicle crashes involving one truck and one passenger car are extracted for modeling. Different injury severities are not equally represented. To address the data imbalance issue, this study applies four different data imbalance treatment approaches, including over-sampling, under-sampling, a hybrid method, and a cost-sensitive learning method. To test the performances of different classifiers, five classification models are used, including multinomial logistic regression, Naive Bayes, Classification and Regression Tree, support vector machine, and eXtreme Gradient Boosting (XGBoost). In both the passenger car driver and truck driver injury severity analysis, XGBoost combined with cost-sensitive learning generates the best results in terms of G-mean, area under the curve, and overall accuracy. Additionally, the Shapley Additive Explanations (SHAP) approach is adopted to interpret the result of the best-performing model. Most of the explanatory variables have similar effects on passenger car and truck driver fatality risks. Nevertheless, six variables exhibit opposite effects, including the age of the passenger car driver, crash hour, the passenger car age, road surface condition, weather condition and the truck age. Results of this study could provide some valuable insights for improving truck traffic safety. For instance, properly installing traffic control devices could be an effective way to reduce fatality risks in passenger car-truck crashes. Besides, passenger car drivers should be extremely cautious when driving between midnight to 6 am on truck corridors.

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WOS 号： 000564185900001

第 7 篇

标　　题： Optimizing Multi-Terminal Customized Bus Service With Mixed Fleet

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期　　刊： IEEE ACCESS

摘　　要： The customized bus (CB) transit is recognized as an effective transportation mode offering more flexible and demand-responsive service than traditional bus transit with fixed route and schedule, especially during the peak hours. The novelty of this study is the development of a mixed integer non-linear model for optimizing multi-terminal CB service in an urban setting. According to the estimated spatiotemporal passenger demand, the objective total cost, consisting of supplier's and users' costs, is minimized subject to capacity and time window constraints. A mixed bus fleet with various bus sizes is employed to accommodate passenger demand, which increases vehicle utilization and reduces supplier's cost. The inconvenience of passengers caused by early arrival at the destination is treated as penalty and considered in users' cost. The study optimization problem is combinatorial with many decision variables including trip assignment, bus routing and associated timetables, and fleet size. A hybrid genetic algorithm (HGA) which integrates the features of genetic algorithm (GA) and simulated

annealing (SA) is developed to effectively search for the optimal solution. A real-world CB network is employed to demonstrate the applicability of the developed model and explore the relation between the model parameters and optimized results. It was found that the total cost can be reduced by 16.5% after employing multiple terminals and a mixed bus fleet.

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WOS 号： 000566101100001

第 8 篇

标　　题： Study On Urban Spatial Function Mixture And Individual Activity Space From The Perspectives Of Resident Activity

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期　　刊： IEEE ACCESS

摘　　要： The research on the relationship between residents' daily activities and urban spatial structure is of considerable significance to urban planning engineering and the organization of urban functions. However, little research considers the perspective of micro-spatial scale or resident perception. The increasing user-generated activity check-in data in social networks provides a database for this research. In this study, we first divided the urban space into nine functions that satisfy the residents' activities, then used the small-scale grid to divide the city blocks and used information entropy to evaluate the mixed degree of land use functions. We then introduced the latent Dirichlet allocation (LDA) topic model to identify 15 mixed patterns of land use functions and each spatial unit's topic distribution. Moreover, the JS divergence index was employed to measure spatial units' similarity, fit the distance-activity intensity decay curve, and studied the influence of the individual spatial function distribution choice. We demonstrate that in urban space, residents' daily activities mold the blending of urban area functions and shift single-function urban planning to mixed-use, consisting of single-function dominant and multi-function mixed. Besides, the functional complementarity between the activity units weakens the distance attenuation effect of the activity-space interaction intensity to some extent. The research on the interaction between active space and spatial activities expect to support the combination of urban land use types, the layout of facilities, and the guidance of residents' activities.

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WOS 号： 000580528000001

第 9 篇

标　　题： Optimal Multimodal Travelway Design For An Urban Street Network

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期　　刊：IEEE ACCESS

摘　　要：This study introduces a bi-level model for optimal travelway design of an urban street network by successively executing a lower-level model for traffic assignments and an upper-level model for network travel time minimization. A computational experiment is conducted for optimal travelway design of a 4-square-km urban street network containing 25 signalized intersections, 80 street segments, and 5 bus routes that accommodates 62,640, 43,200, and 33,120 person-trips per hour in AM/PM peak, adjacent-to-peak, and off-peak periods, respectively. Model execution results indicate that adopting a higher number of narrow lanes for auto use only and auto/bus shared use could potentially lead to increases in auto mode share and savings of network total travel time. More narrow lanes for auto use could raise auto speeds, but the auto/bus shared use of narrow travel lanes could slightly fluctuate bus speeds. Further converting narrow lanes for shared use by autos and buses to exclusive bus lanes (EBLs) could enlarge bus mode share, reduce network total travel time, slightly elevate auto speeds, and drastically increase bus speeds. The proposed model could be augmented to incorporate optimization of networkwide intersection signal timing plans, bus signal priorities, and bus dispatching frequencies into optimal travelway design.

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第 10 篇

标　　题：Demand Forecasting Of Online Car-Hailing With Stacking Ensemble Learning Approach And Large-Scale Datasets

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期　　刊：IEEE ACCESS

摘　　要：With the rapid development and convenient service of online car-hailing, it has gradually become the preferred choice for people to travel. Accurate forecasting of car-hailing trip demand not only enables the drivers and companies to dispatch the vehicles and increase the mileage utilization, but also reduces the passengers' waiting-time. The rebalance of spatiotemporal demand and supply could mitigate traffic congestion, reduce traffic emission, and guide people's travel patterns. This study aimed to develop a short-term demand forecasting model for car-hailing services using stacking ensemble learning approach. The spatial-temporal characteristics of online car-hailing demand were analyzed and extracted through data analysis. The region-level spatial characteristics, time features, and weather conditions were added into the forecasting model. Then the stacking ensemble learning model was developed to predict

the car-hailing demand at region-level for different time intervals, including 10 min, 15 min, and 30 min. The validation results suggested that the proposed stacking ensemble learning model has reasonable good prediction accuracy for different time intervals. The comparison results show that the short-term demand forecasting model based on stacking ensemble learning is better than single LSTM, SVR, lightGBM and Random Forest models. MAE and RMSE increased by 6.0% and 5.2% respectively at 30 min time interval, which further verifies the effectiveness and feasibility of the proposed model.

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WOS 号： 000589739400001

第 11 篇

标　　题： Research On Bus And Metro Transfer From Perspective Of Hypernetwork-A Case Study Of Xi'An, China (December 2020)

作　　者： [Wang, Jianwei; Fu, Xin] Changan Univ, Coll Transportat, Xian 710000, Peoples R China; [Ren, Jialing] Changan Univ, Sch Econ & Management, Xian 710000, Peoples R China

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期　　刊： IEEE ACCESS

摘　　要： Aiming at the blank of hypernetwork in the empirical research field of the composite transportation network, taking Xi'an city as an example, this paper uses the HyperEdge to connect the bus network with the metro network and constructs a large-scale complex hypernetwork, hereinafter referred to as B-M hypernetwork. In this paper, the topological characteristics of a single hypernetwork are analogized to a complex hypernetwork, and the interaction mechanism among bus networks, metro networks, and B-M hypernetwork is studied. A multi-source least transferred algorithm based on the incidence matrix is proposed to solve any two nodes' minimum transfer times in a large complex hypernetwork. The multi-source least transferred algorithm and matrix transfer algorithm is applied to the B-M hypernetwork, and the random attack and intentional attack analyze the robustness of the B-M hypernetwork. The results show that the improved multi-source minimum transmission algorithm based on the incidence matrix is feasible and effective and can obtain superior computing power for large and complex hypernetworks.

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WOS 号： 000604519800001

第 12 篇

标　　题： Determination Of The Peak Hour Ridership Of Metro Stations In Xi'An, China Using Geographically-Weighted Regression

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Engn, Xian 710064, Peoples R China.

期　　刊：SUSTAINABILITY

摘　　要：The ridership of a metro station during a city's peak hour is not always the same as that during the station's own peak hour. To investigate this inconsistency, this study introduces the peak deviation coefficient to describe this phenomenon. Data from 88 metro stations in Xi'an, China, are used to analyze the peak deviation coefficient based on the geographically weighted regression model. The results demonstrate that when the land around a metro station is mainly land for work, primary and middle schools, and residences, its station's peak hour is consistent with the city's peak hour. Additionally, the station's peak hour is more likely to deviate from the city's peak hour for suburban stations. There are two ridership options when designing stations, namely the extra peak hour ridership during a city's peak hour and that during a station's peak hour, and the larger of the two is used to design metro stations. The mixed land use ratio must be considered in urban land use planning, because although non-commuting land can mitigate the traffic pressure of a city's peak hour, it may cause the deviation of the station's peak hours from that of the city.

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WOS 号：000523751400102

第 13 篇

标　　题：Sequential Route Choice Modeling Based On Dynamic Reference Points And Its Empirical Study

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期　　刊：DISCRETE DYNAMICS IN NATURE AND SOCIETY

摘　　要：Aiming at the influence of information, we investigate and analyze the sequential route choice behavior under dynamic reference points based on cumulative prospect theory in this paper. An experiment platform collecting the sequential route choices based on C/S structure is designed and four types of information are released to participants, respectively. Real-time travel time prediction methods are then proposed for travelers' decision-making. Using nonlinear regression method, the parameters of the value function and weight function of cumulative prospect theory are estimated under different types of information, respectively. It is found that travelers' behavior showed obvious characteristic of risk pursuit under the circumstance where real-time travel time information is released. Instead, when they have access to descriptive information, they tend to be more conservative.

DOI：10.1155/2020/8081576

WOS 号：000525470100002

第 14 篇

标　　题：Crash Risk Assessment Of Off-Ramps, Based On The Gaussian Mixture Model Using Video Trajectories

作　　者：[Xu, Ting; Hao, Yanjun; Cui, Shichao; Wu, Xingqi; Zhang, Zhishun; Chien, Steven I-Jy] Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China; [Xu, Ting; He, Yulong] Beijing Univ Technol, Coll Metropolitan Transportat, Beijing 100124, Peoples R China; [Chien, Steven I-Jy] New Jersey Inst Technol, Dept Civil & Environm Engn, Newark, NJ 07102 USA

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期　　刊：SUSTAINABILITY

摘　　要：The focus of this paper is the crash risk assessment of off-ramps in Xi'an. The time-to-collision (TTC) is used for the measurement and cross-comparison of the crash risk of each location. Five sites from the urban expressway in Xi'an were selected to explore the TTC distribution. An unmanned aerial vehicle and a camera were used to collect traffic flow data for 20 min at each site. The parameters, including speed, deceleration rate, truck percentage, traffic volume, and vehicle trajectories, were extracted from video images. The TTCs were calculated for each vehicle. The Gaussian mixture model (GMM) was proposed to predict the TTC probability density functions (PDFs) and cumulative density functions (CDFs) for five sites. The Kolmogorov-Smirnov (K-S) test indicated that the samples followed the estimated GMM distribution. The relationship between the crash risk level and influencing factors was studied by an ordinal logistic regression model and a naive Bayesian model. The results showed that the naive Bayesian model had an accuracy of 86.71%, while the ordinal logistic regression model had an accuracy of 84.81%. The naive Bayesian model outperformed the ordinal logistic regression model, and it could be applied to the real-time collision warning system.

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WOS 号：000535598700009

第 15 篇

标　　题：Risk Perception Sensitivity Of Cyclists Based On The Cox Risk Perception Model

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通讯作者：Zhang, SR (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.; Zhang, SR (corresponding author), Changan Univ, Key Lab Transport Ind Management Control & Cycle, Traff Network Facil Ecol Secur Barrier Area, Xian 710064, Peoples R China.

期　　刊：SUSTAINABILITY

摘　　要：To promote the sustainable development and safety of bicycle traffic, survival analysis of the risk perception sensitivity of cyclists is proposed. The cumulative probability of survival serves as an index of risk perception sensitivity, and a Cox regression model is established. The proposed method is applied to middle school cyclists, and the factors of their risk perception are analyzed. Data are collected by questionnaire and traffic conflict survey and are quantified by factor analysis. The model results show that active and extroverted personality, negative peer influence, unsafe riding behavior intention, non-motor vehicle flow and speed, and a lack of separation facilities have negative correlations with risk perception sensitivity. Positive attitude towards traffic rules, good family education, heightened traffic safety awareness, motor vehicle flow and speed, pedestrian flow, and non-motorized lane width have positive correlations with risk perception sensitivity. The conflict type has no correlation with risk perception sensitivity. This study aims to improve the sensitivity of risk perception, prevent traffic conflicts and provide a theoretical basis for risk perception research on vulnerable traffic participants.

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WOS 号：000531558100038

第 16 篇

标　　题：How Does Financial Burden Influence The Crash Rate Among Taxi Drivers? A Self-Reported Questionnaire Study In China

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通讯作者：Peng, ZP (corresponding author), Changan Univ, Coll Transportat Engn, POB 487,South 2 Ring Rd, Xian 710064, Shaanxi, Peoples R China.

期　　刊：TRAFFIC INJURY PREVENTION

摘　　要：Objective: Taxis play an important role in the transportation system of China, but they have a relatively high accident rate. The current study discusses the driver's financial burden in the Chinese context and explores its correlation with working conditions, risky driving behavior, and other characteristics of taxi drivers who are involved in accidents. Method: A total of 2,391 taxi drivers from 29 companies in four Chinese cities were interviewed and then asked to complete a questionnaire concerning their socio-demographic characteristics, working conditions, risky driving behavior, and accident frequency during the previous two years. Given the increase in the management fee (measured in CNY) charged by taxi companies, the drivers were divided into three groups: the less than 150 group, the 150 to 180 group and the over 180 group, where were named Group 1, Group 2 and Group 3, respectively. Finally, the zero-inflated Poisson model was used to investigate the factors that contributed to the accident rate for each group. Result: The significant factors that lead to accidents differed significantly for drivers with different levels of financial burden. First, most of the factors were weakly correlated with the crash rate among Group 1 drivers. Second, many factors related to working conditions and risky driving behavior were significant for drivers in Groups 2 and 3, while working hours and off-duty days were significant only for drivers in Group 3. Third, working hours were negatively correlated with

accident rates for drivers in Group 3, and the drivers who suffered from the heaviest financial burden were most affected by fatigue and sleep problems. Conclusion: Financial burden is the root cause behind the propensity of taxi drivers to be involved in accidents. Taxi companies should find ways to reduce drivers' expenses, and new technologies, such as taxi-calling or location and navigation based on mobile applications, should be introduced into the traditional taxi industry.

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WOS 号： 000532210500001

第 17 篇

标　　题： Estimating Life-Cycle Co2 Emissions Of Urban Road Corridor Construction: A Case Study In Xi'An, China

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通讯作者： Wang, YQ (corresponding author), Changan Univ, Dept Transportat Engn, POB 487, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： The carbon dioxide (CO2) emissions characteristics of urban roads together with the corridors' municipal construction subprojects, such as drainage, water supply, power pipeline and illumination, are important for estimating the CO2 emissions for urban transportation. This paper aims to analyze the differences in the CO2 emission characteristics of one typical construction of Chinese urban road corridor in which the structure, materials and technologies are different with other published cases, to identify the important factors of the CO2 emissions and to provide some improving administration suggestions for the research type road. Choosing an example, which is the main urban road (Qinling) reconstruction project in Xi'an city, the documents of construction organization and the design budget estimation of the road are obtained, collected the construction process, machinery type and work time, and transportation distance as three type engineering quantities from five subprojects. Furthermore, the life-cycle assessment (LCA) and uncertainty analysis were applied for Qinling road corridor. The results are: (1) The CO2 emissions of the road subproject accounts for 53.19% of the whole corridor; (2) The CO2 emissions of the lime-fly ash, cement and lime accounts for 26.86%, 19.59%, 15.3% of the whole corridor respectively; (3) The CO2 emissions of on-site transportation, earth work, road building, hoisting accounts for 4.94%, 2.07%, 1.47%, 0.74% of the whole corridor, respectively; (4) The greater CO2 emissions coefficient of elasticity are from the production of lime, cement and asphalt concrete, which is 0.436, 0.134 and 0.125, respectively; (5) Compared with Route 35 reconstruction in New Jersey, the CO2 emissions of Qinling road corridor is 41.5 kg/m(2) higher because of the important role of lime-fly ash base layer. To conclusion, important strategies are to decrease the emissions of production of lime and cement, to controll the inefflecient movement of machinery, and to adopt cleaner

materials in the base layer. (C) 2020 Published by Elsevier Ltd.

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第 18 篇

标　　题： Short-Term Traffic Speed Prediction Method For Urban Road Sections Based On Wavelet Transform And Gated Recurrent Unit

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通讯作者： Luo, W (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： As a core component of the urban intelligent transportation system, traffic prediction is significant for urban traffic control and guidance. However, it is challenging to achieve accurate traffic prediction due to the complex spatiotemporal correlation of traffic data. A road section speed prediction model based on wavelet transform and neural network is, therefore, proposed in this article to improve traffic prediction methods. The wavelet transform is used to decompose the original traffic speed data, and then the coefficients obtained after the decomposition are used to reconstruct the high-frequency random sequences and the low-frequency trend sequence. Secondly, a GRU neural network is constructed to learn the trend of low-frequency sequence. The spatiotemporal correlation between input data is extracted by adjusting the input of the model. Meanwhile, an ARMA model is used to fit unstable random fluctuations of high-frequency sequences. Last of all, the prediction results of the two models are added together to obtain the final prediction result. The proposed prediction model is validated by using road section speed data based on the floating car data collected in Ningbo. The results show that the proposed model has high accuracy and robustness.

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WOS 号： 000539211700008

第 19 篇

标　　题： Monte Carlo Tree Search-Based Mixed Traffic Flow Control Algorithm For Arterial Intersections

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期　　刊： TRANSPORTATION RESEARCH RECORD

摘　　要： A model-free approach is presented, based on the Monte Carlo tree search (MCTS)

algorithm, for the control of mixed traffic flow of human-driven vehicles (HDV) and connected and autonomous vehicles (CAV), named MCTS-MTF, on a one-lane roadway with signalized intersection control. Previous research has often simplified the problem with certain assumptions to reduce computational burden, such as dividing a vehicle trajectory into several segments with constant speed or linear acceleration/deceleration, which was rather unrealistic. This study departs from the existing research in that minimum constraints on CAV trajectory control were required, as long as the basic rules such as safety considerations and vehicular performance limits were followed. Modeling efforts were made to improve the algorithm solution quality and the run time efficiency over the naive MCTS algorithm. This was achieved by an exploration-exploitation balance calibration module, and a tree expansion determination module to expand the tree more effectively along the desired direction. Results of a case study found that the proposed algorithm was able to achieve a travel time saving of 3.5% and a fuel consumption saving of 6.5%. It was also demonstrated to run at eight times the speed of a naive MCTS model, suggesting a promising potential for real-time or near real-time applications.

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WOS 号： 000539582300001

第 20 篇

标　　题： Prevalence Of Alternative Processing Rules In The Formation Of Daily Travel Satisfaction In The Context Multi-Trip, Multi-Stage, Multi-Attribute Travel Experiences

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期　　刊： TRANSPORTATION

摘　　要： Requesting respondents to provide satisfaction ratings for multi-stage trips or daily travel experiences implies they have to value each stage, respectively trip, based on memory recall and then cognitively integrate these judgments into the requested satisfaction rating. Our knowledge about the prevalence of alternate processing rules that may be used to arrive at trip satisfaction ratings is very limited. Research on this topic in travel behavior analysis is very scarce indeed. In contributing to the research on travel satisfaction, we therefore compare the performance of different processing rules using data on satisfaction with public transport trips from Xi'an, China. Based on the results of this study, we found the peak-end rule, except for the disjunctive rule, consistently had the lowest explained variance, also after controlling for socio-demographics, mood and personality traits. Rather, for all estimated models, the conjunctive processing rule had the highest associated explained variance. It suggests that the trip stage, respectively trip, with the lowest satisfaction dominates overall

satisfaction. Also, we did not find much evidence of a recency effect. Rather, the satisfaction of the first trip or stage has higher marginal effects on overall satisfaction than more recent trips or stages.

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WOS 号： 000533790800008

第 21 篇

标　　题： Research On Parking Sharing Strategies Considering User Overtime Parking

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期　　刊： PLOS ONE

摘　　要： A parking sharing strategy is proposed to solve the problems of parking difficulty caused by the imbalance between parking spaces and parking demand. The vacant parking spaces of residential area can be efficiently utilized to meet the parking demands of those who are working at nearby or come for other activities based on the parking sharing strategy. The paper analyzes the distribution of vehicle arrival numbers and parking durations, then establishes a shared parking allocation model aiming to maximize the parking benefit considering the overtime-parking behavior of the parking users. Simulation methods are used to the analyze the relationship among the parking benefit, proportion of reserved parking, numbers of parking demand, acceptance rate of parking demand and utilization of shared parking spaces. Then, based on the principle of maximum parking benefit, we can determine the optimal proportion of reserved parking, number of shared parking spaces that should be purchased from the residents. Taking the utilization of shared parking spaces as an indicator, the validity of the static allocation principle is proved to be effective. Some allocation rules for parking demand are proposed to guarantees the maximum parking revenue and minimum impact on residents simultaneously.

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WOS 号： 000542969500044

第 22 篇

标　　题： Influencing Factors On Vehicles Lateral Stability On Tunnel Section In Mountainous Expressway Under Strong Wind: A Case Of Xi-Han Highway

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通讯作者： Chen, XX (corresponding author), Changan Univ, Sch Highway, Xian 710064, Peoples R China.

期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： When a car is running at high speed, the canyon wind at the bridge-tunnel junction in the mountainous area brings along the acceleration effect. The aerodynamic lateral force will cause the vehicle sideslip and unsteady steering, which is extremely harmful

to driving safety. In this paper, Xi-Han Expressway is taken as the research object to analyze the influencing factors of vehicle's lateral stability by combining the theoretical research of the finite element method, automobile aerodynamics, and speed limit with field investigation and simulation test. CarSim software is used for simulation to explore the influence of different positions of the circular curve on vehicle lateral stability. The results show that the wind level affects the tunnel exit's unfavorable section on the circular curve. The larger the wind level, the larger the proportion of the tunnel exit's unfavorable section on the circular curve. The proportions of tunnel exit's unfavorable section on the circular curve under 6-9 wind levels are 33.33%, 38.89%, 55.56%, and 66.67%, respectively. In addition, the lateral stability of vehicles under level 6-8 wind scale is the worst when the tunnel exit is located at 5 degrees position on the circular curve. The results indicate the influence of strong wind on the lateral stability of vehicles in mountainous expressway. The research can optimize the design of the highway tunnel group and provide the basic theory and method basis for the quantitative management and scientific management of the road traffic management department.

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WOS 号： 000552369500001

第 23 篇

标　　题： An Advanced Local Calibration Method For Mechanistic-Empirical Pavement Design

作　　者： [Dong, Shi] Changan Univ, Coll Transportat Engn, Xian 710064, Shaanxi, Peoples R China; [Dong, Shi] Changan Univ, Engn Res Ctr Highway Infrastruct Digitalizat, Minist Educ PRC, Xian 710064, Shaanxi, Peoples R China; [Yuan, Xian-Xun] Ryerson Univ, Dept Civil Engn, 350 Victoria St, Toronto, ON M5B 2K3, Canada; [Hao, Peiwen] Changan Univ, Minist Commun PRC, Key Lab Rd Struct & Mat, Xian 710064, Shaanxi, Peoples R China

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期　　刊： COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING

摘　　要： Model calibration and validation is an important step of empirical modeling. The current local calibration (LC) method suggested by the AASHTOWare mechanistic-empirical pavement design guide (MEPDG) is defective and can result in a completely distorted prediction of pavement reliability in design. This paper proposes an advanced LC method that integrates a jackknife sampling procedure and an iteratively weighted least squares technique into one coherent LC process. The jackknife sampling method, which has been recommended by AASHTO for model validation, is now used for identifying outliers of the data in order to ensure a homogeneous population. Meanwhile, an iteratively weighted least squares method is proposed to simultaneously estimate the LC coefficients and the standard deviation functions. Two LC case studies for Ontario roads are presented: one for the bottom-up fatigue cracking models of asphalt concrete pavements and the other for the joint faulting models of Portland cement concrete pavements. The comparison with the traditional split-data method has shown the effectiveness and efficiency of the proposed

method. With little modification, the method can be introduced as a general calibration-validation process for all empirical and mechanistic-empirical models in engineering disciplines.

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WOS 号： 000542876300001

第 24 篇

标　　题： Aberrant Driving Behaviours On Risk Involvement Among Drivers In China

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通讯作者： Yin, J (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： The purpose of this study is to validate the version of Driver Behaviour Questionnaire (DBQ) by considering distractions, fatigue, and drunk driving, the main reasons for accidents in China, as independent parts of violations and errors and further explore the effects of demographic/driving variables and all factors on risk involvement (accident involvement and penalized points). 241 drivers filled in a self-completion questionnaire with 28 items conducted in Xi'an in August 2018. Exploratory factor analysis confirmed a five-factor structure, including violations, distracted driving, errors, drunk driving, and fatigued driving. The frequency of aberrant driving behaviours indicated that distractions were the most prevalent behaviours followed by fatigue. The results showed that drivers with lower education and longer annual mileages were positive with accident involvement while there was no significance in penalized points. Violations and distractions were important factors causing both accidents and penalized points. Therefore, it is effective to reduce accident involvement by establishing educational training and related laws or installing intelligent monitor vehicle equipment to warn drivers to improve safety.

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WOS 号： 000553053800001

第 25 篇

标　　题： Effects Of Vehicle Restriction Policies On Urban Travel Demand Change From A Built Environment Perspective

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通讯作者： Li, L (corresponding author), Changan Univ, Sch Elect & Control Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： License plate restriction (LPR) policy presents the most straightforward way to reduce road traffic and emissions worldwide. However, in practice, it has aroused great controversy. This policy broke the original structure of the urban transportation mode,

which needed some matching strategies to adapt to this change. Investigating this travel demand change is a challenging task because it is greatly influenced by features of the local built environment. Fourteen variables from four dimensions, location, land-use diversity, distance to transit, and street design, are used to depict the built environment; moreover, the severe collinearity underlies these feature variables. To solve the multicollinearity among the variables and high-dimensional problem, this study utilizes two different penalization-based regression models, the LASSO (least absolute shrinkage and selection operator) and Elastic Net regression algorithms, to achieve the variable selection and explore the impacts of the built environment on the change of travel demand triggered by the LPR policy. Travel demand changes are assessed by the relative variation in taxi ridership in each traffic analysis zone based on the taxi GPS data. Built environment variables are measured using the transportation network data and the Baidu Map Service points of interest (POI) data. The results show that regions with a higher level of public transportation service and a higher degree of the land mix have a stronger resilience to the vehicle restriction policy. Besides, the contribution rate of public transportation is stable as a whole, while the contribution rate of richness depends on specific types of land use. The conclusions in this study can provide in-depth insights into the influence of the LPR policy and underpin traffic complementary policies to ensure the effectiveness of LPR.

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WOS 号： 000556341000001

第 26 篇

标　　题： The Response Of Urban Travel Mode Choice To Parking Fees Considering Travel Time Variability

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通讯作者： Yang, X (corresponding author), Changan Univ, Sch Highway, South Erhuan Middle Sect, Xian 710064, Shaanxi, Peoples R China.; Yang, X (corresponding author), Monash Univ, Dept Civil Engn, Clayton, Vic 3800, Australia.

期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Increasing automobile use leads to higher costs for traveling associated with emissions, congestion, noise, and other impacts. One option to address this is to introduce high parking charges to reduce the demand for automobile use and encourage the travel mode switch to public transport. To estimate commuters' mode choice behavior in response to high parking fees, commuters from Nanjing completed an individually customized discrete choice survey in which they chose between driving and taking the bus or metro when choices varied in terms of time and cost attributes. Multinomial logit models were used to estimate commuters' responses to high parking charges. In the models, the variability of travel times is considered and analyzed in the stated mode choice models. The results suggest that increases in costs of driving will lead to a great reduction in driving demand. The travel time reliability ratio is 0.50 and the value of

each minute late is almost 5.0 times more than the average travel time with the restriction of the maximum allowed delays. The methods used in this study could be adopted to estimate the effect of variable pricing strategies on mode choice responses for different trip purposes. The high value given to travel time variability has implications for transport policy in terms of decision making with respect to new pricing strategies. Moreover, the valuation of travel time savings taken into account in this study would be helpful to better understand the effect of high parking fees.

DOI： 10.1155/2020/8969202

WOS 号： 000561235800006

第 27 篇

标　　题： Modeling And Prediction Of Bus Operation States For Bunching Analysis

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通讯作者： Hu, XB (corresponding author), Missouri Univ Sci & Technol, Dept Civil Architectural & Environm Engn, 1401 N Pine St, Rolla, MO 65409 USA.

期　　刊： JOURNAL OF TRANSPORTATION ENGINEERING PART A-SYSTEMS

摘　　要： Bus bunching deteriorates transit service quality and passengers' experience. The modeling and prediction of bus operation states are essential for improving the quality of transit service. Due to the nature of traffic evolution and state transition, bunching-oriented modeling based on bus operation state is more intuitive when compared with the headway-based modeling approach. This work explicitly predicted bus operation state by modeling the dynamic evolution of different states. Five different bus operation states were defined and classified by the K-means algorithm, and the dynamic state evolution was formulated as a Markov chain model. Finally, a multinomial logistic model was developed to predict the bus operation state. A case study was designed to test the performance of the proposed model based on the Global Positioning System (GPS) trajectory data collected from four bus routes in Xi'an, China. The results showed that the proposed model was able to accurately predict the bus operation states.

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WOS 号： 000556556100014

第 28 篇

标　　题： Map Matching Based On Multi-Layer Road Index

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期　　刊：TRANSPORTATION RESEARCH PART C-EMERGING TECHNOLOGIES

摘　　要：This study develops a new map matching algorithm targeting off-line applications. The algorithm takes a holistic view of the entire GPS trajectory and finds its match by first dividing it into several segments. This segmentation is made possible through creating a multi-layer road index system for the original road network. For each segment, a global map matching strategy is employed to identify the best match. The algorithm is compared against three state-of-the-art map matching algorithms from the literature. To get ground truth data, we design and perform numerous test drives with predefined paths that have a total length of 234 km. GPS trajectories recorded during the test drives are used to evaluate the algorithms. Our numerical experiments show the proposed algorithm improves match efficiency by up to two order of magnitude compared to the benchmark algorithms. Importantly, it achieves this remarkable speedup with negligible losses in matching accuracy.

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WOS 号：000565576600003

第 29 篇

标　　题：Direction Of Groove Detection For Wear Image Of Four-Ball Friction Test Based On Gray Difference Of Inclination Angle

作　　者：[Xiao, Mei; Zhang, Ying; Wang, Haiming] Changan Univ, Coll Transportat Engn, Xian 710064, Shaanxi, Peoples R China; [Zhang, Lei] Changan Univ, Lab & Equipment Management Dept, Xian 710064, Shaanxi, Peoples R China

通讯作者：Xiao, M (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Shaanxi, Peoples R China.

期　　刊：ADVANCES IN MATERIALS SCIENCE AND ENGINEERING

摘　　要：In order to avoid subjective estimation of the direction of groove by using a tester in the four-ball friction test, an automatic wear angle detection method based on gray difference of inclination angle is proposed in this paper. First, the gray difference between the pixel and itsW x 2Wneighborhood pixels is acquired, in which each neighborhood pixel corresponds to an inclination angle. Second, a row's grayscale difference of inclination angle is calculated, which is the sum of grayscale difference of all pixels in the same row with the same inclination angle. Third, the inclination angle corresponding to the minimum row's grayscale difference is defined as the approach angles. Finally, the firsttapproaching angles with the highest frequency determine the wear angles. Compared with true angles determined manually, the simulation results of 200 samples show that the average absolute error is 2.1238 degrees and the average running time is 1.3 s per frame. The influence of the algorithm parameters on detection precision is also analyzed.

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第 30 篇

标　　题：Study On Benefit Distribution Of Multimodal Transport Dynamic Alliance Based On

The Shapely Value Method

作　　者：[Zhu, Wenying; Zhang, Jinxi] Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China; [Zhang, Xiaheng] Northwest Univ Polit Sci & Law, Business Sch, Xian 710122, Peoples R China; [Yuan, Huazhi] Lanzhou Univ Technol, Sch Civil Engn, Lanzhou 730050, Peoples R China

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期　　刊：JOURNAL OF COASTAL RESEARCH

摘　　要：The key to the development of multimodal transport dynamic alliance is the distribution of benefits. The distribution of benefits must be fairly and reasonably. Considering the dynamic nature of the multimodal transport alliance, it is necessary to add penalty factors into the benefit distribution model, and combining the proportion of the contribution degree and risk degree of the dynamic alliance enterprises, the comprehensive benefit distribution model can be obtained, which will better promote the development of the dynamic multimodal transport alliance.

DOI：10.2112/JCR-SI110-025.1

WOS 号：000576681900025

第 31 篇

标　　题：Heterogenous Trip Distance-Based Route Choice Behavior Analysis Using Real-World Large-Scale Taxi Trajectory Data

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Most early research on route choice behavior analysis relied on the data collected from the stated preference survey or through small-scale experiments. This manuscript focused on the understanding of commuters' route choice behavior based on the massive amount of trajectory data collected from occupied taxicabs. The underlying assumption was that travel behavior of occupied taxi drivers can be considered as no different than the well-experienced commuters. To this end, the DBSCAN algorithm and Akaike information criterion (AIC) were first used to classify trips into different categories based on the trip length. Next, a total of 9 explanatory variables were defined to describe the route choice behavior, and and the path size (PS) logit model was then built, which avoided the invalid assumption of independence of irrelevant alternatives (IIA) in the commonly seen multinomial logit (MNL) model. The taxi trajectory data from over 11,000 taxicabs in Xi'an, China, with 40 million trajectory records each day were used in the case study. The results confirmed that commuters' route choice behavior are heterogenous for trips with varying distances and that considering such heterogeneity in the modeling process would better explain commuters' route choice behaviors, when compared with the traditional MNL model.

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WOS 号： 000574407200001

第 32 篇
标　　题： Efficiency Evaluation Of Bus Transport Operations Given Exogenous Environmental Factors
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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION
摘　　要： As a mode of green transport that can effectively alleviate urban traffic congestion and improve air quality, bus transport is highly subsidized by governments at all levels in China. Thus, measuring efficiency in the bus transport sector is particularly important. However, few reports in the literature have taken exogenous environmental factors into consideration to evaluate public transport operation efficiency. This may lead to inaccurate evaluation results. This study employs the three-stage DEA model, which can eliminate the impacts of exogenous environmental factors on public bus transport operation to gain real efficiency results. Meanwhile, to further explore how exogenous environmental factors affect bus transport operations, a tobit model is used to analyse the results. The main results of this paper reveal the following: first, exogenous environmental factors have a significant impact on the operational efficiency of bus transport. It is reasonable and necessary to select the three-stage method to eliminate environmental factors for real bus operation efficiency. Second, the fluctuations of the bus transport efficiency of 30 cities decreased during 2010-2016. The western region has the highest operation efficiency, followed by the eastern and the middle regions. Third, the economic, taxi transport, and urban rail transport have a marked impact on the operational efficiency of bus transport. This paper confirms the important influence of exogenous environmental factors on the efficiency of public transport operations. In addition, this article could help improve the efficiency of urban public transport operations and promote the attractiveness of urban public transport and the amount of green travel.
DOI： 10.1155/2020/8899782
WOS 号： 000582220600002

第 33 篇
标　　题： Application Of Big Data Optimized Clustering Algorithm In Cloud Computing Environment In Traffic Accident Forecast
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期　　刊： PEER-TO-PEER NETWORKING AND APPLICATIONS

摘　　要： As the usage rate of cars is getting higher and higher, the injuries and losses caused by traffic accidents are also getting bigger and bigger. If some traffic accidents can be predicted, then such losses can be greatly solved. Although there are abundant research results on intelligent transportation, there are not many research results on how to predict traffic accidents. For this issue, the main aim of this paper is to propose a continuous non-convex optimization of the K-means algorithm in order to solve the model problem in the traffic prediction process. First, this paper uses clustering algorithm for feature analysis and big data for the establishment of simulation model in cloud environment. Through this paper an equivalent model, using matrix optimization theory to analyze and process K-means problem, and design efficient and theoretically guaranteed algorithms for big data. By simulating the traffic situation in Shanghai city within three years, the outcomes display that the model endorsed in the given paper can predict traffic accidents at a rate of 93.88% and the accuracy rate of traffic accident processing time is 78%, which fully illustrates the effectiveness of the model established in this paper.

DOI： 10.1007/s12083-020-00994-3

WOS 号： 000574117400002

第 34 篇

标　　题： Angle-Awareness Based Joint Cooperative Positioning And Warning For Intelligent Transportation Systems

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期　　刊： SENSORS

摘　　要： In future intelligent vehicle-infrastructure cooperation frameworks, accurate self-positioning is an important prerequisite for better driving environment evaluation (e.g., traffic safety and traffic efficiency). We herein describe a joint cooperative positioning and warning (JCPW) system based on angle information. In this system, we first design the sequential task allocation of cooperative positioning (CP) warning and the related frame format of the positioning packet. With the cooperation of RSUs, multiple groups of the two-dimensional angle-of-departure (AOD) are estimated and then transformed into the vehicle's positions. Considering the system computational efficiency, a novel AOD estimation algorithm based on a truncated signal subspace is proposed, which can avoid the eigen decomposition and exhaustive spectrum searching; and a distance based weighting strategy is also utilized to fuse multiple independent estimations. Numerical simulations prove that the proposed method can be a better alternative to achieve sub-lane level positioning if considering the accuracy and computational complexity.

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WOS 号： 000585680300001

第 35 篇
标　　题： Multiple Utility Analyses For Sustainable Public Transport Planning And Management: Evidence From Gps-Equipped Taxi Data In Haikou
作　　者： [Gui, Jiawei] Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China; [Gui, Jiawei; Wu, Qunqi] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China; [Gui, Jiawei; Wu, Qunqi] Changan Univ, Ctr Comprehens Transportat Econ Management, Xian 710064, Peoples R China
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期　　刊： SUSTAINABILITY
摘　　要： The transportation utility values calculated by traditional utility methods are not comprehensive. Some objects and factors are ignored in traditional utility methods, and this narrow perspective is their primary drawback. In intelligent transportation systems, it is necessary to calculate transportation utility for promoting public traffic planning and management. To build a sustainable intelligent transportation system, modified utility methods are essential to analyze transportation utility in a comprehensive way with innovative technologies and efficient communication systems. To solve the disadvantages of traditional utility methods, it is necessary to establish a new method to build sustainable public transport in the future. In this study, the Multiple Utility Method and Transportation Utility Method are proposed for public transport planning and management from multiple perspectives. A sample is presented to provide a better description, and 69,174 GPS-equipped taxi data in Haikou are adopted for the application of the Transportation Utility Method. The results show that the transportation utility values calculated by the Transportation Utility Method are more comprehensive than the transportation utility calculated by traditional utility methods. This indicates that it is necessary to calculate transportation utility from multiple perspectives based on the Transportation Utility Method. Future directions could include improving the methods, considering more factors, expanding the data used, and extrapolating this research to other cities around the world with similar urban metrics and urban form.
DOI： 10.3390/su12198070
WOS 号： 000586652400001

第 36 篇
标　　题： Data-Driven Real-Time Online Taxi-Hailing Demand Forecasting Based On Machine Learning Method
作　　者： [Liu, Zhizhen; Chen, Hong; Sun, Xiaoke; Chen, Hengrui] Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China

通讯作者： Chen, H (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China.

期　　刊： APPLIED SCIENCES-BASEL

摘　　要： Featured Application This research provides a valuable data-driven method on forecasting the online taxi-hailing demand, and it could be potentially applied to developing multi-modes transportation prediction. The development of the intelligent transport system has created conditions for solving the supply-demand imbalance of public transportation services. For example, forecasting the demand for online taxi-hailing could help to rebalance the resource of taxis. In this research, we introduced a method to forecast real-time online taxi-hailing demand. First, we analyze the relation between taxi demand and online taxi-hailing demand. Next, we propose six models containing different information based on backpropagation neural network (BPNN) and extreme gradient boosting (XGB) to forecast online taxi-hailing demand. Finally, we present a real-time online taxi-hailing demand forecasting model considering the projected taxi demand (PTX). The results indicate that including more information leads to better prediction performance, and the results show that including the information of projected taxi demand leads to a reduction of MAPE from 0.190 to 0.183 and an RMSE reduction from 23.921 to 21.050, and it increases R-2 from 0.845 to 0.853. The analysis indicates the demand regularity of online taxi-hailing and taxi, and the experiment realizes real-time prediction of online taxi-hailing by considering the projected taxi demand. The proposed method can help to schedule online taxi-hailing resources in advance.

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WOS 号： 000586551700001

第 37 篇

标　　题： Research On Pm2.5 Concentration Based On Dissipative Structure Theory: A Case Study Of Xi'An, China

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通讯作者： Chen, H (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： SCIENTIFIC REPORTS

摘　　要： PM2.5 pollution has become a serious urban environmental problem, especially in developing countries with increasing urbanization. Understanding the proportion of PM2.5 generation sources has laid a foundation for better PM2.5 concentration reduction This paper used Point of Interesting (POI)data, building profile data of Xi'an, PM2.5 concentration and wind monitoring data of five provinces near Xi'an as the basic data. And this paper studied the spatial distribution of various buildings in Xi'an, the temporal and spatial distribution of PM2.5 in Xi'an and the five provinces, and found that the spatial distribution of PM2.5 concentration in Xi'an and the building distribution in Xi'an does not match. Based on this, a quantitative model of PM2.5 concentration in Xi'an, energy consumption, wind, and other factors is established through the qualitative and quantitative analysis of PM2.5 concentration in Xi'an.

Entropy theory and dissipative structure theory are applied to analyze this phenomenon. The results show PM2.5 in Xi'an mainly comes from the spread of PM2.5 in the five provinces. The PM2.5 generated by energy consumption in Xi'an is not enough to cause serious PM2.5 pollution. And further suggestions on how to reduce PM2.5 concentration in Xi'an are put forward.

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WOS 号： 000577151500030

第 38 篇

标　　题： A Discretionary Lane-Changing Decision-Making Mechanism Incorporating Drivers' Heterogeneity: A Signalling Game-Based Approach

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通讯作者： Zhang, MR (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： This paper attempts to propose a discretionary lane-changing decision-making model based on signalling game in the context of mixed traffic flow of autonomous and regular vehicles. The effects of the heterogeneity among different drivers and the endogeneity of same drivers in lane-changing behaviours, e.g., aggressive or conservative, are incorporated through the specification of different payoff functions under different scenarios. The model is calibrated and validated using the NGSIM dataset with a bilevel calibration framework, including two kinds of methods, genetic algorithm and perfect Bayesian equilibrium. Comparative results based on simulation show that the signalling game-based model outperforms the traditional space-based lane-changing model in the sense that the proposed model yields relatively stable reciprocal of time to collision and higher success rate of lane-changing under different traffic densities. Finally, a sensitivity analysis is performed to test the robustness of the proposed model, which indicates that the signalling game-based model is stable to the varying ratios of driver type.

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WOS 号： 000583194500003

第 39 篇

标　　题： Trip Cost Estimation Of Connected Autonomous Vehicle Mixed Traffic Flow In A Two-Route Traffic Network

作　　者： [Liu, Zhizhen; Chen, Hong; Chen, Hengrui; Sun, Xiaoke; Zhang, Qi] Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： With the advancement of connected autonomous vehicle (CAV) technology, research on future traffic conditions after the popularization of CAVs needs to be resolved urgently.

Bounded rationality of human drivers is essential for simulating traffic flow precisely, but few studies focus on the traffic flow simulation considered bounded rationality in CAV mixed traffic flow. In this study, we introduce random bounded rationality into the hybrid feedback strategy (HFS) under CAV mixed traffic flow to explore the impacts of CAV penetration rate on the trip cost of vehicles. First, we investigated the bounded rationality of drivers, and we found that it follows normal contribution. Then, we proposed HFS considering random bounded rationality and the CAV penetration rate to simulate the traffic condition. The numerical results show that the enhancement of the CAV penetration rate could reduce total trip cost. The research could help us to simulate the CAVs mixed traffic flow more precisely and realistically.

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WOS 号： 000583197800001

第 40 篇

标　　题： Analyzing Drivers' Perceived Service Quality Of Variable Message Signs (Vms)

作　　者： [Ma, Zhuanglin; Luo, Mingjie; Chien, Steven I-Jy; Hu, Dawei] Changan Univ, Coll Transportat Engn, Xian, Peoples R China; [Chien, Steven I-Jy] New Jersey Inst Technol, John A Reif Jr Dept Civil & Environm Engn, Newark, NJ 07102 USA; [Zhao, Xue] Xian Shiyou Univ, Sch Sci, Xian, Peoples R China

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期　　刊： PLOS ONE

摘　　要： Recent advance in VMS technology has made it viable to ease traffic congestion and improve road traffic efficiency. However, the drivers' low compliance with the posted information may limit its performance to ease traffic congestion and improve traffic safety. This paper explores drivers' attitude to the service quality of VMS system resulted from the identified predominant influencing factors. A questionnaire is developed and used for surveying 9,600 drivers in Beijing, China. The collected data are analyzed with a multiple indicators and multiple causes (MIMIC) model considering different driver categories (e.g., private car driver, office car driver, taxi driver). The results show that the causal relationships between latent variables and socio-demographic characteristic is significant. Driving frequency, attitude towards contents of VMS, drivers' decision-making and the effectiveness of VMS message can directly and indirectly affect driver's perceived quality of service. The attitude towards formats of VMS indirectly affect their QoS resulting from the effectiveness of VMS message, while there is no indirect impact for taxi drivers. Besides, the drivers' decision-making directly affects the perceived quality of service for private car drivers and office car drivers, but there is no impact for taxi drivers. The findings of this study can provide guidance and reference for urban authorities to perform the relevant actions required to meet user expectations.

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第 41 篇

标　　题：Cfd Simulation Study On Wind Load Of Perforated Traffic Sign Board

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期　　刊：PLOS ONE

摘　　要：Traffic sign boards are often blown away by strong winds, seriously endangering the safety of vehicles and pedestrians. To increase their resistance to strong winds, sign boards are perforated. Using computational fluid dynamics simulations, the wind load resistance of traffic signs with holes was optimised. By comparing the solutions to different turbulence models with empirical results, it was found that the simulation results of the re-normalisation group (RNG) model have the smallest error. Therefore, the RNG model is used to simulate the wind load of traffic sign boards with different perforation diameters and different hole spacings under different wind speeds. By analysing the wind pressure distribution on the surface of the perforated traffic sign board, the perforation scheme for different regions of the sign board under different wind loads was obtained. The results show that reasonable perforation diameters and hole spacings can reduce the wind load and improve the wind load resistance of sign boards. This study provides decision-makers with useful information for installing traffic signs in areas affected with strong winds, thereby improving the wind resistance of traffic signs and ensuring traffic safety.

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第 42 篇

标　　题：Optimizing Wireless Charging Locations For Battery Electric Bus Transit With A Genetic Algorithm

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期　　刊：SUSTAINABILITY

摘　　要：Electrifying bus transit has been deemed as an effective way to reduce the emissions of transit vehicles. However, some concerns about on-board battery hinder its further development. Recently, dynamic wireless power transfer (DWPT) technologies have been developed, which enable buses to charge in-motion and overcome the drawback (short service range) with opportunity charging. This paper proposes a mathematic model which optimizes the locations for DWPT devices deployed at stops and size of battery capacity for battery electric buses (BEB) in a multi-route network, which

considers the battery's service life, depth of discharge and weight. A tangible solution algorithm based on a genetic algorithm (GA) is developed to find the optimal solution. A case study based on the bus network from Xi'an China is conducted to investigate the relationship among optimized costs, greenhouse gas (GHG) emissions, battery service life, size of the battery capacity and the number of DWPT devices. The results demonstrated that a bus network powered by DWPT shows better performance in both costs (a 43.3% reduction) and emissions (a 14.4% reduction) compared to that with stationary charging at bus terminals.

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WOS 号： 000589199500001

第 43 篇

标　　题： Origin-Destination-Based Travel Time Reliability Under Different Rainfall Intensities: An Investigation Using Open-Source Data

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通讯作者： Chen, H (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Origin-destination- (O-D-) based travel time reliability (TTR) is fundamental to next-generation navigation tools aiming to provide both travel time and reliability information. While previous works are mostly focused on route-based TTR and use either ad hoc data or simulation in the analyses, this study uses open-source Uber Movement and Weather Underground data to systematically analyze the impact of rainfall intensity on O-D-based travel time reliability. The authors classified three years of travel time data in downtown Boston into one hundred origin-destination pairs and integrated them with the weather data (rain). A lognormal mixture model was applied to fit travel time distributions and calculate the buffer index. The median, trimmed mean, interquartile range, and one-way analysis of variance were used for quantification of the characteristics. The study found some results that tended to agree with the previous findings in the literature, such that, in general, rain reduces the O-D-based travel time reliability, and some seemed to be unique and worthy of discussion: firstly, although in general the reduction in travel time reliability gets larger as the intensity of rainfall increases, it appears that the change is more significant when rainfall intensity changes from light to moderate but becomes fairly marginal when it changes from normal to light or from moderate to extremely intensive; secondly, regardless of normal or rainy weather, the O-D-based travel time reliability and its consistency in different O-D pairs with similar average travel time always tend to improve along with the increase of average travel time. In addition to the technical findings, this study also contributes to the state of the art by promoting the application of real-world and publicly available data in TTR analyses.

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WOS 号： 000594632000001

第 44 篇

标　　题： Fuzzy Social Force Model For Pedestrian Evacuation Under View-Limited Condition

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期　　刊： MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要： Pedestrian evacuation dynamics in a classroom is always a complex process influenced by many fuzzy factors. It is very difficult and inappropriate to quantify the impact of these fuzzy factors by using the mathematical formula. Existing microscopic simulation models have made many efforts to use accurate mathematical method to model the fuzzy interaction behaviors between pedestrians under the view-limited condition. This study tries to fill this gap by establishing a microscopic simulation model which can represent the fuzzy behaviors of pedestrians under view-limited condition. The developed fuzzy social force model (FSFM) combines fuzzy logic into conventional social force model (SFM). Different from existing models and applications, FSFM adopts fuzzy sets and membership functions to describe the pedestrian evacuation process. Seven fuzzy sets are defined for this process, such as stop/go, moving direction, desired force, force from obstacles, force from pedestrian, force from indicators, and acceleration. Membership function of each input factor is calibrated based on the observed data. Model performance is verified by comparing speed distribution, velocity-density relationship, and results of simulation and observation evacuation time. Besides, the proposed model is applied to assess the number and space distribution of exit indicators and stickers. By comparing simulation results with existing models, the paper concludes that FSFM is able to well reproduce pedestrian movement dynamics in real world under view-limited condition.

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WOS 号： 000595910800003

第 45 篇

标　　题： Critical Factors Analysis Of Severe Traffic Accidents Based On Bayesian Network In China

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通讯作者： Chen, H (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： (e purpose of this study is to minimize the negative influences of the severe traffic accidents in China by profoundly analyzing the complex coupling relations among

accident factors contributing to the single-vehicle and multivehicle traffic accidents with the Bayesian network (BN) crash severity model. The BN model was established by taking the critical factors identified with the improved grey correlation analysis method as node variables. The severe traffic accident data collected from accident reports published in China were used to validate this model. The model's efficiency was validated objectively by comparing the conditional probability obtained by this model with the actual value. The result shows that the BN model can reflect the real relations among factors and can be seen as the target network for the severe traffic accidents in China. Besides, based on BN's junction tree engine, five-factor combination sequences for the number of deaths and three-factor combination sequences for the number of injuries were ranked according to the severity degree to reveal the critical reasons and reduce the massive traffic accidents damage.

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WOS 号： 000600046800004

第 46 篇

标　　题： Analysis Of Factors Affecting The Severity Of Automated Vehicle Crashes Using Xgboost Model Combining Poi Data

作　　者： [Chen, Hengrui; Chen, Hong; Liu, Zhizhen; Sun, Xiaoke; Zhou, Ruiyu] Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China
通讯作者： Chen, H (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710000, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： The research and development of autonomous vehicle (AV) technology have been gaining ground globally. However, a few studies have performed an in-depth exploration of the contributing factors of crashes involving AVs. This study aims to predict the severity of crashes involving AVs and analyze the effects of the different factors on crash severity. Crash data were obtained from the AV-related crash reports presented to the California Department of Motor Vehicles in 2019 and included 75 uninjured and 18 injured accident cases. The points-of-interest (POI) data were collected from Google Map Application Programming Interface (API). Descriptive statistics analysis was applied to examine the features of crashes involving AVs in terms of collision type, crash severity, vehicle movement preceding the collision, and degree of vehicle damage. To compare the classification performance of different classifiers, we use two different classification models: eXtreme Gradient Boosting (XGBoost) and Classification and Regression Tree (CART). The result shows that the XGBoost model performs better in identifying the injured crashes involving AVs. Compared with the original XGBoost model, the recall and G-mean of the XGBoost model combining POI data improved by 100% and 11.1%, respectively. The main features that contribute to the severity of crashes include weather, degree of vehicle damage, accident location, and collision type. The results indicate that crash severity significantly increases if the AVs collided at an intersection under extreme weather conditions (e.g., fog and snow). Moreover, an accident resulting in injuries also had a higher probability of occurring in areas where land-use patterns are highly diverse. The knowledge gained from this

research could ultimately contribute to assessing and improving the safety performance of the current AVs.

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WOS 号： 000600046900003

第 47 篇

标　　题： Developing An Extenics-Based Model For Evaluating Bus Transit System

作　　者： [Liu, Yufeng; Chien, Steven; Hu, Dawei; Wang, Ning; Zhang, Rui] Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China; [Chien, Steven] New Jersey Inst Technol, Dept Civil & Environm Engn, Newark, NJ 07102 USA

通讯作者： Zhang, R (corresponding author), Changan Univ, Coll Transportat Engn, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： Evaluating bus transit performance periodically is a key step to improve service quality and system efficiency. An extenics-based model is developed with the real-world data. The performance indices employed for the evaluation are identified. The dependent function applied for measuring the correlation between the bus transit and the system performance is formulated. The hybrid weights associated with the indices are determined by subjective weights through analytic hierarchy process (AHP) and objective weights through the entropy method. The proposed extenics model is applied for evaluating a bus transit system of a medium-sized city in China. The model outcomes are informative, while the suggestions corresponding to the identified weakness are concluded for future planning and operation.

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WOS 号： 000600046900002

第 48 篇

标　　题： Methodology For Analyzing The Trade-Offs Associated With Multi-Objective Optimization In Transportation Asset Management Under Uncertainty

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期　　刊： COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING

摘　　要： Trade-off analysis, one of the key tenets of multi-objective optimization for the project selection problem in Transportation Asset Management (TAM), can help decision-makers quantify and comprehend the consequences of different resource allocations in terms of the multiple measures of system performance. In analyzing TAM trade-offs, it is vital to account duly for the uncertainties associated with these system-wide performance measures. In this paper, we present a methodology that integrates chance-constraint programming, the Lindeberg Central Limit Theorem, and a hybrid NSGA II method, to address the performance uncertainties associated with the TAM multi-objective optimization problem. Through analyzing the trade-offs between

expenditure and performance, and between different performance measures, we generate Pareto frontiers at different confidence levels using a hybrid NSGA II method. We demonstrate the proposed methodology using a case study involving real-life assets and the expected cost and performance benefits of projects associated with these assets. Regarding the trade-off between cost and performance, we determine the extent to which the strengths of these relationships vary across different confidence levels. We find that, generally, for a given network performance level, a higher expenditure is needed to achieve a high confidence level compared to the expenditure needed to achieve a low confidence level, and more importantly, measures these sensitivities. This is the Price of Confidence concept. Regarding the trade-off between different pairs of performance measures under budgetary constraints, we show how these relationships vary with the confidence level specified for the analysis, and we measure the extent to which higher confidence level requirements translate into lower levels of overall system-wide performance.

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第 49 篇

标　　题： Passenger Volume Prediction By A Combined Input-Output And Distributed Lag Model And Data Analytics Of Industrial Investment

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期　　刊： JOURNAL OF ADVANCED TRANSPORTATION

摘　　要： In order to sketch the transport infrastructure construction in an economy or a region, the government has to predict the passenger volume, under the local policy of industrial investment. In this paper, we propose a combined input-output and distributed lag prediction model of passenger volume in a province in P. R. China, under a certain policy of industrial investment called Silk Road Economic Belt. Specifically, the relationships between the passenger volume, GDP (gross domestic product), gross output, and transportation consumption are analyzed, and then the industrial development speed analysis and classification are used to calculate the average development speeds and the GDP contributions of 42 industries. Combining the input-output table, the provincial transportation consumption under the Silk Road Economic Belt policy is predicted, and the passenger volumes of the cities and the province in the future are predicted by the distributed lag models. Considering the uncertainty of the investment, the elastic ranges of the cities and the province's passenger volumes are determined. The results show that the correlation between the passenger volume and transportation consumption is the highest, and it is equal to 0.975. In 2020, the passenger volume in Shaanxi is 1,641,305 thousands, and the error between the predicted value and the value obtained by summing the cities' passenger volumes is smaller than 0.002%.

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WOS 号： 000597953600002

第 50 篇
标　　题： An Active Preventive Maintenance Approach Of Complex Equipment Based On A Novel Product-Service System Operation Mode
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期　　刊： JOURNAL OF CLEANER PRODUCTION
摘　　要： The product-service system (PSS) business model has received increasing attention in equipment maintenance studies, as it has the potential to provide high value-added services for equipment users and construct ethical principles for equipment providers to support the implementation of circular economy. However, the PSS providers in equipment industry are facing many challenges when implementing Industry 4.0 technologies. One important challenge is how to fully collect and analyse the operational data of different equipment and diverse users in widely varied conditions to make the PSS providers create innovative equipment management services for their customers. To address this challenge, an active preventive maintenance approach for complex equipment is proposed. Firstly, a novel PSS operation mode was developed, where complex equipment is offered as a part of PSS and under exclusive control by the providers. Then, a solution of equipment preventive maintenance based on the operation mode was designed. A deep neural network was trained to predict the remaining effective life of the key components and thereby, it can pre-emptively assess the health status of equipment. Finally, a real-world industrial case of a leading CNC machine provider was developed to illustrate the feasibility and effectiveness of the proposed approach. Higher accuracy for predicting the remaining effective life was achieved, which resulted in predictive identification of the fault features, proactive implementation of the preventive maintenance, and reduction of the PSS providers' maintenance costs and resource consumption. Consequently, the result shows that it can help PSS providers move towards more ethical and sustainable directions. (C) 2020 The Author(s). Published by Elsevier Ltd.
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第 51 篇
标　　题： Can I Trust You? Estimation Models For E-Bikers Stop-Go Decision Before Amber

Light At Urban Intersection

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：Electric bike (e-bike) riders' inappropriate go-decision, yellow-light running (YLR), could lead to accidents at intersection during the signal change interval. Given the high YLR rate and casualties in accidents, this paper aims to investigate the factors influencing the e-bikers' go-decision of running against the amber signal. Based on 297 cases who made stop-go decisions in the signal change interval, two analytical models, namely, a base logit model and a random parameter logit model, were established to estimate the effects of contributing factors associated with e-bikers' YLR behaviours. Besides the well-known factors, we recommend adding approaching speed, critical crossing distance, and the number of acceleration rate changes as predictor factors for e-bikers' YLR behaviours. The results illustrate that the e-bikers' operational characteristics (i.e., approaching speed, critical crossing distance, and the number of acceleration rate change) and individuals' characteristics (i.e., gender and age) are significant predictors for their YLR behaviours. Moreover, taking effects of unobserved heterogeneities associated with e-bikers into consideration, the proposed random parameter logit model outperforms the base logit model to predict e-bikers' YLR behaviours. Providing remarkable perspectives on understanding e-bikers' YLR behaviours, the predicting probability of e-bikers' YLR violation could improve traffic safety under mixed traffic and fully autonomous driving condition in the future.

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第 52 篇

标　　题：Heterogeneity Reproductive Ability Promotes Cooperation In Spatial Prisoner'S Dilemma Game

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期　　刊：CHAOS SOLITONS & FRACTALS

摘　　要：Heterogeneity which widely exists in human society and the biological world, has been proved to be one of the cases that can promote the level of cooperation. For example, the level of cooperation in a heterogeneous network is relatively high when compared

with that in a homogeneous network. Recent research has revealed that the effect of heterogeneity in evolutionary game theory depends on the specific definition of heterogeneity and updating rule. In this paper we explore how heterogeneity reproductive ability affects the evolution of cooperation. In this paper we associate reproductive ability with the payoff. A player with a higher payoff and a better environment is more reproductive, which is a common phenomenon existing from human society to bacterial systems. Excitingly, we find that our new constructed rule can dramatically promote cooperation in evolutionary prisoner's dilemma game. From our numerical result, we also find that moderate heterogeneity can better promote the level of cooperation. Several figures are drawn to explain why heterogeneity reproductive ability can promotes the level of cooperation. Our work finds a new mechanism to promote cooperation in spatial prisoner's dilemma game and reveals why cooperation mushrooms with heterogeneity reproductive ability.

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经济与管理学院

第 1 篇

标　　题： Spatial Characteristics And Influencing Factors Of Carbon Emissions From Energy Consumption In China'S Transport Sector: An Empirical Analysis Based On Provincial Panel Data

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期　　刊： POLISH JOURNAL OF ENVIRONMENTAL STUDIES

摘　　要： This paper examines the CO2 emissions from energy consumption in China's transport sector, conducting an empirical investigation into the spatial distribution characteristics and influencing factors of transport CO2 emissions. This study, which is based on province-level panel data covering the 30 provincial regions during the period 2001-2016, used the methods of exploratory spatial data analysis (ESDA) and the extended STIRPAT model (examined by the method of system-generalized method of moments (Sys-GMM) regression). The results indicated that the amount of CO2 emissions in China's transport sector has increased steadily during the observation period, but there was a noticeable disparity across the provinces and regions. From the perspective of spatial dimension, the spatial agglomeration characteristics of provincial transport CO2 emissions tended to be strengthened, and the pattern evolutions of spatial distribution presented a path-dependence effect to some extent. The scale of population was found to be the most important influencing factor of transport CO2 emissions, and followed by the per-capita GDP. Further, the improvement of energy efficiency was the key factor to controlling transport CO2 emissions. Compared to freight transportation,

passenger transportation was more important in transport CO2 emissions reduction due to its lower efficiency of energy utilization and rapid growth. Meanwhile, electrification played an important inhibitory effect on transport CO2 emissions because of its high fuel efficiency and less pollution. Importantly, we could not support the existence of the environmental Kuznets curve (EKC) hypothesis in China's transport sector during the observation period, which describes the relationship between the environmental pressures and economic development. These findings contain some meaningful implications for policy makers: confirm the priority transport CO2 emissions reduction areas, improve transport energy efficiency, strengthen passenger transportation decarburization policy, and highlight the model shift of fuel consumption.

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WOS 号： 000492020300022

第 2 篇

标　　题： Temporal-Spatial Pattern And Influencing Factors Of China'S Province-Level Transport Sector Carbon Emissions Efficiency

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期　　刊： POLISH JOURNAL OF ENVIRONMENTAL STUDIES

摘　　要： The transport sector, as an industry with high energy consumption and high carbon emissions, plays an increasing role in achieving the goal of carbon emissions reduction in China. Understanding the situation of the transport sector's carbon emissions efficiency and the relevant dominating driving forces is an important prerequisite for formulating carbon emissions reduction polices. This study evaluated the transport sector carbon emissions efficiency of 30 provinces in China from 2004 to 2016 using the Super slacks-based measure (Super-SBM) model,which employs Moran's I indexand spatial econometric approaches to examine its spatial dependence and the dominating driving factors. The results are shown as follows. Firstly, the transport carbon emissions efficiency had a noticeable disparity across the provinces and regions, and the spatial distribution characteristic of transport sector carbon emissions efficiency could be described as high in the east and low in the west. Secondly, transport sector carbon emissions efficiency presented significant spatial dependence and clustering characteristics, and the pattern evolutions of spatial distribution presented a path-dependence effect to some extent. Thirdly, the regression results of the spatial Durbin model (SDM) indicated that the per-capita GDP and transportation energy consumption structure had significantly positive effects on transport sector carbon emissions efficiency, whereas the urbanization, transportation intensity, transportation energy intensity, and transportation service structure hada negative effect on transport sector carbon emissions efficiency.

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WOS 号： 000492020300023

第 3 篇

标　　题：Assessing The Vulnerability Of Urban Rail Transit Network Under Heavy Air Pollution: A Dynamic Vehicle Restriction Perspective

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期　　刊：SUSTAINABLE CITIES AND SOCIETY

摘　　要：With the sharp increase of vehicle emissions in urban areas, some cities in China have launched dynamic vehicle restriction policies to reduce carbon emissions by limiting the use of private cars. The dynamic vehicle restriction policies include One-Day-Per-Week (ODPW) and Odd-And-Even (OAE). The implementation of these policies can cause private car users to switch to public transport. This adds tremendous pressure on urban public transportation systems, especially the rail transport network (RTN). In this study, we examine the impact of dynamic restriction policies on RTN's vulnerability. An evaluation indicator system for RTN's vulnerability is first constructed using the average shortest path, congestion degree, and average passenger flow intensity. Thereafter, we simulate the cascading failure process of the RTN using a load capacity model. The simulation results show that implementing dynamic vehicle restriction policies will lead to cascading failure of the RTN and increase its vulnerability. According to the simulation results, it was found that when the restriction policy changes from ODPW to OAE, the RTN is more likely to cause cascading failure and its vulnerability increases sharply. Consequently, transport operators should adopt various measures to prevent the cascading failures of RTN and reduce its vulnerability according to different restriction policies.

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第 4 篇

标　　题：Low-Carbon Development Of The Construction Industry In China'S Pilot Provinces

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期　　刊：POLISH JOURNAL OF ENVIRONMENTAL STUDIES

摘　　要：The construction industry in China has developed rapidly. However, the development has been accompanied by a large amount of energy consumption and carbon emissions. Thus, the formulation of policies is complex, and research on the impact of emission reduction policies on carbon reduction in the construction industry, especially in China, has become necessary as it has massive regions with uneven development. Combined with the coefficient in the 2012 Intergovernmental Panel on Climate Change (IPCC)

guidelines for national greenhouse gas inventories and China's calorific value, this study took the first batch of low-carbon pilot provinces (Guangdong, Hubei, Liaoning, Shaanxi, and Yunnan) announced by China's State Commission for Reform and Development in 2010 as the research object and separated the construction carbon emissions into direct and indirect categories to improve the accuracy of calculations at the provincial level. The EKC (environmental Kuznets curve) and Tapio model were employed to study the relationship between economic growth and carbon emissions of the construction industry, then the decoupling of major influencing factors of carbon emissions in the low-carbon pilot province in China from 2005 to 2014 based on the features of different regions and the economic policy planning in China were comparatively analyzed. The results showed that the construction industry carbon emissions and economic growth had a non-significant decoupling state in underdeveloped regions such as Shaanxi, Liaoning, and Yunnan, which would be better with low carbon development in potential, whereas they were significant decoupling states in well-developed regions such as Guangdong and Hubei. Then, this study revealed that the evolving trends of the decoupling of major influencing factors varied in different provinces; therefore, the results and insights support the policy and decisions to minimize construction carbon emissions.

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第 5 篇

标　　题： Modeling The Optimal Maintenance Scheduling Strategy For Bridge Networks

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期　　刊： APPLIED SCIENCES-BASEL

摘　　要： An optimal maintenance scheduling strategy for bridge networks can generate an efficient allocation of resources with budget limits and mitigate the perturbations caused by maintenance activities to the traffic flows. This research formulates the optimal maintenance scheduling problem as a bi-level programming model. The upper-level model is a multi-objective nonlinear programming model, which minimizes the total traffic delays during the maintenance period and maximizes the number of bridges to be maintained subject to the budget limit and the number of crews. In the lower-level, the users' route choice following the upper-level decision is simulated

using a modified user equilibrium model. Then, the proposed bi-level model is transformed into an equivalent single-level model that is solved by the simulated annealing algorithm. Finally, the model and algorithm are tested using a highway bridge network. The results show that the proposed method has an advantage in saving maintenance costs, reducing traffic delays, minimizing makespan compared with two empirical maintenance strategies. The sensitivity analysis reveals that traffic demand, number of crews, availability of budget, and decision maker's preference all have significant effects on the optimal maintenance scheduling scheme for bridges including time sequence and job sequence.

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第 6 篇

标　　题： Collaborative Intermodal Freight Transport Network Design And Vehicle Arrangement With Applications In The Oil And Gas Drilling Equipment Industry

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期　　刊： TRANSPORTMETRICA A-TRANSPORT SCIENCE

摘　　要： Decentralized freight decision making has been proven to be one of the barriers to achieve the optimal cost-saving freight transportation network. This study presents a collaborative intermodal freight network for the transportations of oil and gas drilling equipment, where a freight forwarder serves as a centralized decision-maker to coordinate transportation activities. We formulate the problem as a minimum intermodal transport cost model with a nonlinear objective function. Also, novel path-based decision variables instead of arc-based decision variables are used to formulate the selections of transportation services. A hybrid genetic algorithm and particle swarm optimization algorithm (GA-PSO) in combination with a batch strategy is designed. The experimental results show that the proposed hybrid GA-PSO method has a better performance compared with existing algorithms in terms of the solution quality, and computational time. Furthermore, the proposed approach is applied to real-world instances of O&G drilling equipment in the 'China Railway Express' network.

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第 7 篇

标　　题：Two-Echelon Vehicle-Routing Problem: Optimization Of Autonomous Delivery Vehicle-Assisted E-Grocery Distribution

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期　　刊：IEEE ACCESS

摘　　要：The last mile problem of E-grocery Distribution comprises one of the most costly and highest polluting components of the supply chain in which companies deliver goods to end customers. To reduce transport cost and fuel emissions, a new element of ground-based delivery services, autonomous delivery vehicles (ADVs), is included in the E-grocery distribution system for improving delivery efficiency. Thus, the objective of this study is to optimize a two-echelon distribution network for efficient E-grocery delivery, where conventional vans serve the delivery in the first echelon and ADVs serve delivery in the second echelon. The problem is formulated as a two-echelon vehicle routing problem with mixed vehicles (2E-VRP-MV) with a nonlinear objective function, in which the total transport and emission costs are optimized. This optimization is based on the flow assignment at each echelon and to realize routing choice for both the van and ADV. A two-step clustering-based hybrid Genetic Algorithm and Particle Swarm Optimization (C-GA-PSO) algorithm is proposed to solve the problem. First, the end customers are clustered to the intermediate depots, named satellites, based on the minimized distance and maximized demand. To enhance the efficiency of resolving the 2E-VRP-MV-model, a hybrid GA-PSO algorithm is adopted to solve the vehicle routing problem. Computational results of up to 21, 32, 50, and 100 customers show the effectiveness of the methods developed here. At last, the impacts of the layout of the depot-customer and customer density on the total cost are analyzed. This study sheds light on the tactical planning of the multi-echelon sustainable E-grocery delivery network.

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第 8 篇

标　　题：Method For Identifying Truck Traffic Site Clustering Using Weigh-In-Motion (Wim) Data

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期　　刊： IEEE ACCESS

摘　　要： The increasingly growing truck traffic volume data while limited truck weigh-in-motion weight data has posed great challenges for transport agencies to access the freight tonnage of all the truck traffic sites. By mapping a group of traffic sites with similar traffic patterns to a weigh-in-motion site, the clustered truck traffic data is expected to be smaller than the sum of all data from all traffic sites, and the cluster can be fully utilized in a period of time by transport agencies to evaluate the freight tonnage. This study developed a novel and implementable approach of integrating two complementary data, Weigh-in-Motion (WIM) weigh data and Telemetric Traffic Monitoring Sites (TTMSs) volume data, to produce truck traffic sites clustering. An improved k-means clustering with three attributes is fitted to the TTMS, which are the distances to the WIM sites (WIMSs), truck volumes in TTMS, and vehicle class distribution. The aforementioned methodology was tested in a case study in Florida using WIM data in 2012 and 2017. The proposed model might shed light on the statewide performance evaluation of freight traffic with low computing cost.

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第 9 篇

标　　题： Evaluation Framework For An Interdisciplinary Bim Capstone Course In Highway Engineering

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期　　刊： INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION

摘　　要： This study aims to develop an evaluation framework for improving interdisciplinary BIM (Building Information Modeling) education in highway engineering. The evaluation framework is designed based on the Context-Input-Process-Product (CIPP) model and applied in an interdisciplinary BIM capstone project at Chongqing Jiaotong University. Four project teams with a total of 52 students from 9 different majors were involved in the highway and its service area design after centralized training. Mixed research methods were used for data collection, including a questionnaire survey for students and semi-structured interviews for team leaders and instructors through

purposive sampling. The results indicate that: (1) all students have a deep awareness and interest in learning BIM and joint design; (2) BIM software training and its theoretical knowledge should be incorporated into BIM capstone courses; (3) BIM coordination meetings in the design process play an important role in reducing model collisions and redesign work while the instructor's performance has no significant impact on this aspect; and (4) prior knowledge of teamwork experience has the greatest correlation with performance of joint design. This evaluative study provides a paradigm to evaluate and improve BIM capstone projects in highway engineering. Educators who are interested in BIM education and highway engineering can refer to this capstone course and its evaluation process.

WOS 号： 000583207300015

第 10 篇

标　　题： Financial Leverage, Economic Growth And Environmental Degradation: Evidence From 30 Provinces In China

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： This study seeks to investigate the endogenous relationship between financial leverage, economic growth and environmental degradation in China by employing a the generalized moments method (GMM) panel vector autoregressive (PVAR) approach with a panel of data from China's 30 provinces over the period 1997-2016. Three key results arise. First, financial leverage can significantly lessen economic growth, while economic growth decreases financial leverage. Second, economic growth provides an important impetus to boost carbon emissions. Finally, carbon emissions have inversely pushed up financial leverage. These results reflect to some extent China's impressive rate of economic growth, which has been attained via continuously supporting inefficient state-owned enterprises and heavy and polluting industries through bank loans. The results are further supported by the variance decomposition. The findings provide valuable policy implications for deepening financial supply-side structure reform to transform and upgrade China's real economy. These policy implications are conductive to developing a low-carbon economy.

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第 11 篇

标　　题： Resilience-Based Restoration Model For Supply Chain Networks

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期　　刊： MATHEMATICS

摘　　要： An optimal restoration strategy for supply chain networks can efficiently schedule the repair activities under resource limits. However, a wide range of previous studies solve this problem from the perspective of cost-effectiveness instead of a resilient manner. This research formulates the problem as a network maximum-resilience decision. We develop two metrics to measure the resilience of the supply chain networks, i.e., the resilience of cumulative performance loss and the resilience of restoration rapidity. Then, we propose a bi-objective nonlinear programming model, which aims to maximize the network resilience under the budget and manpower constraints. A modified simulated annealing algorithm is employed to solve the model. Finally, a testing supply chain network is utilized to illustrate the effectiveness of the proposed method framework. The results show that the optimal restoration schedule generated by the proposed model is a tradeoff between the cumulative performance loss and the restoration rapidity. Additionally, the sensitivity analysis of parameters indicates that decision-maker's preference, tolerance factor of delivery time, number of work crews, and availability of budget all have significant impacts on the restoration schedule.

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第 12 篇

标　　题： Carbon Inequality In The Transportation Industry: Empirical Evidence From China

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期　　刊： ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要： Transportation has significantly contributed to carbon emissions, and concerns regarding emissions mitigation have become central research issues. To avoid a reversal of the reduction convergence in the environmental field, mitigation strategies should aim to reduce the environmental risks posed by carbon inequality. This article uses the Gini index and Theil index to examine carbon inequality in the transport sector in China and decomposes the per capita carbon inequality using Kaya factors. Then, the variations within and between regions are analyzed by decomposing the Theil index of

the carbon intensity by region. Our major findings are as follows. First, carbon inequality is relatively insignificant in the regional transport sector in China. Second, the main drivers of the per capita carbon inequality include the carbon intensity and per capita added value in the transport sector. Third, intra-regional components are major contributors to the heterogeneous spatial distribution of the carbon intensity, and the degree of carbon inequality in the eastern region is much greater than that in other regions. Moreover, the four economic regional components of the Theil index of the carbon intensity have had an obvious convergence effect since 2009. In addition, this study provides some suggestions for developing differentiated mitigation policies in different regions.

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第 13 篇

标　　题： Green Innovation Mode Under Carbon Tax And Innovation Subsidy: An Evolutionary Game Analysis For Portfolio Policies

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期　　刊： SUSTAINABILITY

摘　　要： Previous literature has shown that manufacturers' choices between radical and incremental green innovation modes can greatly impact the tradeoff between industry growth and carbon emission reduction. Yet, how the government can motivate manufacturers to implement radical green innovations to reduce carbon emission is unclear. In this paper, the researchers construct an evolutionary game model to analyze the joint impacts of carbon tax and innovation subsidy on manufacturers' choices of green innovation mode. We derive the conditions for manufacturers' stable strategies. Based on those results, we find that four factors-carbon tax, innovation subsidy, consumer green preference, and manufacturers' capabilities of absorbing and adopting new technologies-may facilitate the choice of radical innovation. Furthermore, we conduct numerical simulations to verify the theoretical results, and further illustrate how the synergy of carbon tax rate and subsidy level affects the evolution of the green innovation mode choices. Specifically, we demonstrate the superiority of portfolio policy in the early stage of green innovation over single policy. In contrast, in the later stage, it is carbon tax but not innovation subsidy that remains effective. We discuss the insights for the government to formulate appropriate environmental policies to effectively promote the adoption of green innovation and reduce carbon emission.

DOI： 10.3390/su12041385

WOS 号： 000522460200103

第 14 篇

标　　题：Assessing The Vulnerability Of Logistics Service Supply Chain Based On Complex Network

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期　　刊：SUSTAINABILITY

摘　　要：The reliable operation of a logistics service supply chain (LSSC) is a key factor for improving logistics efficiency and service level, and vulnerability is an important indicator of reliable LSSC operation. Based on complex network theory, we reconstructed the running mechanism of logistics service providers, integrators, and demanders. We constructed an improved structure model of LSSC. By observing the selected three indicators (clustering coefficient, maximum connectivity, and network connectivity efficiency), the influence caused by the problem will continue to spread to more subjects along the network when a problem exists in one part of the network. The results showed that the destructive power of deliberate attacks is far greater than the damage caused by random attacks, and the disruption of logistics service integrators will considerably increase the vulnerability of the LSSC. However, even if logistics service integrators are removed completely, the LSSC still can operate at low efficiency. Through a case analysis, we identified the vulnerable nodes in logistics service, clarify the vulnerable mechanism in LSSC, and provide guidance for the operation of LSSC in real life.

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第 15 篇

标　　题：Modeling Formation And Operation Of Collaborative Green Innovation Between Manufacturer And Supplier: A Game Theory Approach

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期　　刊：SUSTAINABILITY

摘　　要：Prior research has mainly emphasized the strategic importance of a collaborative green innovation (CGI) between the manufacturer and supplier in a supply chain, leading to an overlook at the decision-making mechanism and determinants of CGI. Guided by the transaction cost economics and social exchange theory, our study constructs a mathematical game model to incorporate the key dimensions of an effective inter-firm collaboration for green innovation. Applying the Nash game bargaining principles, our

evolutionary game model analysis provides an analytic system to understand the mechanisms of forming and operating a collaboration partnership between the manufacturer and supplier for green innovation. Based on various scenarios from the numerical simulation parameters for the involved influencing factors, our simulation has produced the Nash equilibrium solutions and identified the major determining factors for successfully forming and operating CGI. They are the trust level between the manufacturer and supplier as the CGI partners, value/profit sharing ratio between the partners, knowledge complementarity of the partners, and product type for the green innovation.

DOI： 10.3390/su12062209

WOS 号： 000523751400056

第 16 篇

标　　题： Reliability Evaluation Index For The Integrated Supply Chain Utilising Bim And Lean Approaches

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期　　刊： ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT

摘　　要： Purpose This research aims to develop an approach to assess the reliability of integrated construction supply chains via an integrated model of building information modelling (BIM) and the lean supply chain (LSC). It reflects the synergistic workflow between BIM and LSC as a novel approach to improve the reliability of construction projects. Design/methodology/approach This research evaluates the reliability of the BIM-LSC approach through a combination of entropy theory, set pair analysis (SPA), and Markov chains (EESM). An exploratory survey was conducted to collect data from 316 industry professionals experienced in BIM and LSC. Subsequently, multiple cycles of calculations were performed with indirect data inputs. Finally, a reliability evaluation index is established for the BIM-LSC approach and potential applications are identified. Findings The results show that the EESM model of BIM-LSC developed in this study can handle not only supply chain reliability evaluation at a given state but also the prediction of reliability in supply chain state transitions due to changing project conditions. This is particularly relevant to the current environment of the construction project, which is characterised by an increasing level of complexity in terms of labour, technology, and resource interactions. Research limitations/implications - Future research could consider the accuracy and validity of the proposed model in real-life scenarios with by considering both quantitative and qualitative data across the entire lifecycle of projects. Practical implications - The research offers a model to evaluate the reliability of the BIM-LSC approach. The accuracy of BIM supply chain reliability

analysis and prediction in an uncertain environment is improved. Originality/value The BIM-LSC reliability evaluation and prediction presented in this study provides a theoretical foundation to enhance understanding of the BIM-LSC in the construction project context.

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WOS 号： 000521058900001

第 17 篇

标　　题： The Impact Of Intelligent Transportation Points System Based On Elo Rating On Emergence Of Cooperation At Y Intersection

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期　　刊： APPLIED MATHEMATICS AND COMPUTATION

摘　　要： The construction of intelligent transportation system is of great benefit to the efficiency, safety and fairness of urban residents' travel. This paper focuses on a passing dilemma at Y intersection. An intelligent transportation points system (ITPS) based on Elo rating system is proposed to attempt to solve this dilemma. The drivers in the simulation system are given reinforcement learning ability based on Q-learning algorithm, by evaluating the benefits of each behavior. The conclusions are summarized as follows. For pure selfish drivers group, the application of ITPS has little impact on cooperation. For heterogeneous drivers group, the cooperation probability and passing efficiency of drivers can be improved by the regulation of the ITPS. Meantime, the fairness between drivers could be also maintained. It means that the application of ITPS can achieve the unity of fairness and efficiency. From a long-term perspective, the establishment of the ITPS will be a strong guarantee for the reciprocity of the travelers' efficiency and fairness. Therefore, this study is conducive to the future construction of more perfect urban traffic intelligent system.

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WOS 号： 000502588900022

第 18 篇

标　　题： The Influence Of Continuous Improvement Of Public Car-Sharing Platforms On Passenger Loyalty: A Mediation And Moderation Analysis

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要：Public car-sharing is a growing business model that contributes to sustainable transportation and urban development. The continuous improvement of public car-sharing platform to garner passenger loyalty is vital for a car-sharing platform's success. This study applied perceived value theory, trust theory, and transaction cost theory to construct a structural equation model in order to explain passenger loyalty. Data from 755 surveys were collected using stratified sampling in mainland China. The estimated results of the theoretical model show that the relationship between continuous improvement and passenger loyalty is mediated by passenger perceived value, passenger trust, and transaction costs. Consequently, a multi-group analysis is conducted to analyze the moderation effects of passenger's license and car-sharing experience on the theoretical model. The results show that some of the path coefficients are significantly different between these sub-groups. This indicates that platforms should provide differentiate services for passengers based on the purpose of using car-sharing and usage experience. This study provides new theoretical insights into understanding passenger loyalty with respect to public car-sharing and provides policy recommendations for the sustainable development of public car-sharing.

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WOS 号：000535744100141

第 19 篇

标　　题：Spatial-Temporal Evolution Of Urban Resilience And Its Influencing Factors: Evidence From The Guanzhong Plain Urban Agglomeration

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期　　刊：SUSTAINABILITY

摘　　要：Rapid urbanization places great pressure on the ecological environment and the carrying capacity of cities. Improving urban resilience has become an inherent requirement for the sustainable development of modern cities and urban agglomerations. This study constructed a comprehensive system to evaluate urban resilience from four perspectives: The ecological environment, economic level, social environment, and infrastructure services. As a case study, the extreme entropy method and panel data from about 16 cities from 2009 to 2016 were used to calculate resilience levels in the Guanzhong plain urban agglomeration (GPUA) in China. The spatial and temporal evolution of urban resilience characteristics in the GPUA were analyzed using ArcGIS. The influencing factors were further explored using a grey correlation analysis. The results showed that the urban resilience of GPUA experienced geographical

differentiation in the East-Central-Western area and a circle type evolution process. Most urban resilience levels were low. The resilience of the infrastructure and the ecological environment significantly impacted the city and became its development weaknesses. Economic considerations have become one of the main factors influencing fluctuations in urban resilience. In summary, this study explored the differences in resilience in the GPUA and provided a reference for improving the urban resilience of other cities located in underdeveloped regions. The study also provided a useful theoretical basis for sustainable urban development.

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WOS 号： 000531558100017

第 20 篇

标　　题： Dynamic Evolution Of Safety Regulation Of The Ridesharing Industry Under Social Media Participation

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期　　刊： SYMMETRY-BASEL

摘　　要： The emergence of ridesharing has spread against the background of the sharing economy. There have been a lot of controversies since the emergence of ridesharing, particularly regarding regulatory issues. The safety regulation of the ridesharing industry involves many parties, including governments, platform companies, and society at large. Currently, because of the influence of information asymmetry, it increases the uncertainty of governments' regulation effect and the difficulty of making regulation measures. Meanwhile, social media, one of the most important forces of social regulation, has not paid enough attention to playing an appropriate role in the safety regulation of the ridesharing industry. Therefore, this study constructs an evolutionary game model between governments and platform companies that concerns the safety regulations of ridesharing passengers under social media participation. The influence path of social media is explored by model solution and numerical simulation. Our results indicate that social media participation has a positive impact on this safety regulation. Specifically, social media participation could reduce governments' regulatory costs and encourage it to strictly regulate. The exposure of social media could bring losses to platform companies involved and promote platform companies' investments in improving passengers' safety. This study provides a decision basis for governments to introduce social media in the safety regulation of the ridesharing

industry.

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第 21 篇

标　　题： Measuring The Capacity Utilization Of China'S Regional Construction Industries Considering Undesirable Output

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： As most industries in developing countries still follow a relatively rough development model, relying on expansionary investment and paying high environmental costs to promote economic growth, they also face the predicament of excess capacity. Conducting capacity utilization (CU) measurement research is the core of dealing with excess capacity. However, most existing research into capacity utilization is concentrated in the manufacturing, coal, and other industries. The quantitative evaluation of the construction industry capacity utilization is very rare, and the environmental impact factors are neglected. This study aims to develop a capacity utilization measurement index system and use it for the measurement of the construction industry capacity utilization. In doing this, based on the undesirable output perspective, it establishes a capacity utilization measurement index system that considers energy consumption and undesirable output (CO2) for the measurement of construction industry capacity utilization. Two data envelopment analysis-based (DEA-based) difference methods (the no variable-link difference and the adding variable-link difference methods) are used to measure China's construction industry capacity utilization between 2011 and 2017. The findings indicate that using the adding variable-link difference method is more accurate than the no variable-link difference method. It is also shown that the underutilization of capacity in China's construction industry in 2011-2014 is more serious, but it has improved in the past three years. In addition, with the exception of the Jiangsu and Guangxi provinces, there is underutilization of capacity in the construction industry in other provinces and cities in China. This study extends the existing knowledge system of capacity utilization, including the evaluation system, measurement, and assessment of capacity utilization, and management implications. Based on the perspective of undesirable outputs, this study lays a foundation for research into the capacity utilization in various industries by considering environmental factors. This study has practical significance for China and other developing countries to establish a nationwide capacity monitoring system.

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第 22 篇

标　　题： T-Graphene And Its Boron Nitride Analogue As Versatile Drug Delivery Systems

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期　　刊： MOLECULAR PHYSICS

摘　　要： In recent years, drug delivery systems based on nanostructures have become some of the most interesting to be studied. In the present work, we have explored a new allotrope of carbon, which is tetragonal, known as T-graphene (TG) and its boron nitride analogue (TBN) as versatile drug delivery systems. The purpose of the present work is to study the interaction of TG and TBN nanosheets with 5-fluorouracil (F), 6-thioguanine (T) and 6-mercaptopurine (M) anticancer drugs using the density functional theory (DFT). We found that the higher value of adsorption energies (more negative) in the solvent phase reveals that the TG and TBN nanosheets can improve their solubility and change their interaction with the drugs in the aqueous phase. Also, our ultraviolet-visible analysis presents that the electronic spectra of the drug-nanosheet complexes show a red shift toward higher wavelengths (lower energies). To go further and gain insight into the binding features of considered systems with studied drugs, the Atoms in Molecules analysis was performed. Our results determine the electrostatic features of the drug-nanosheets bonding. Consequently, the results demonstrated that the TG and TBN could be used as potential carriers for the delivery of anticancer drugs. [GRAPHICS] .

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WOS 号： 000534263100001

第 23 篇

标　　题： Simulation Analysis Of Incentives On Employees' Acceptance Of Foreign Joint Venture Management Practices: A Case Study

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期　　刊： ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT

摘　　要： Purpose Cultural differences between employees of different nationalities are hindering the development of some transnational joint ventures. Describing and modelling the positive (or negative) factors that cause joint venture employees to accept (or reject) joint management business practices is of great value to all corporations operating abroad with locally sourced employees. Design/methodology/approach This study uses

a Sino-Japan construction joint venture project as a representative case study. First, structural equation modelling is used to identify the factors influencing Chinese employees' acceptance of joint venture management practices. Then, a system dynamics model is adopted to simulate the time-dependent effects of the incentives. Findings The study results (1) indicate which incentives strongly affect employee acceptance of joint venture management practices; (2) identify inefficient management practices in cross-cultural joint ventures; and (3) provide evidence that the employees' perceptions of clear purpose, good working relationships and helpful mechanisms positively and directly also support their acceptance of joint management practices. Originality/value -A dynamic simulation method is used to analyse the influence of various incentive factors on employee acceptance of joint management. This provides unprecedented information regarding how these factors interact with each other, hence how their effectiveness varies (both positively and negatively) over time. Further findings also provide new ideas for joint venture managers to adopt more effective management methods.

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WOS 号： 000531158000001

第 24 篇

标　　题： Evolution Of The Complex Partnerships Between Banks And B2B E-Trading Platforms: A Theoretical Interpretation From The Chinese Market

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期　　刊： COMPLEXITY

摘　　要： Based on the principal-agent theory, we give a theoretical interpretation on evolution of the complex partnerships between the online SCF (supply chain finance) providers in China. First, we describe the principal-agent relationships and analyze the optimal profit-sharing contracts between the banks and the B2B platforms. Then, from a dual perspective of leadership transfer and absolute benefit change, we explain the behavioral choices of the banks in the cooperation. Results show that, at the initial stage of growth of the platforms' abilities to rate online borrowers, the leadership and the absolute benefit of the banks will suffer a double decline, which explains why the leading banks in China divorced the B2B platforms during 2011 to 2013. However, as the platforms' rating abilities grow to maturity, the absolute benefit of the banks will finally exceed its original level, and then the rational banks would cooperate with the platforms again even at the expense of losing a portion of their leadership, which answers why the banks in China have come back to remarry the B2B platforms since

2014.
DOI： 10.1155/2020/9350253
WOS 号： 000537093400005

第 25 篇
标　　题： The Impact Of Environmental Regulations On Urban Green Innovation Efficiency: The Case Of Xi'An
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期　　刊： SUSTAINABLE CITIES AND SOCIETY
摘　　要： While balancing economic progress and environmental pollution, environmental regulation plays a vital role conditioning green innovation. However, most research focuses on the effect of such regulations at the industry-or regional-level, lacking city-level analysis. Using the city of Xi'an (China) as a case study, environmental regulations and their effect on urban green innovation are analysed. First, using a slacks-based measure of directional distance functions (SBM-DDF) model we measure the green innovation efficiency of Xi'an from 2003 to 2016. Regression analysis is then used to explore the green innovation effect under the implementation of three environmental regulations, including command-and-control, market-based, and voluntary. Results indicate that market-based and voluntary regulations are more efficient at stimulating green innovation than command-and-control environmental regulations. The environmental regulations and green innovation efficiency also have non-linear inverted U-shape relationships. The findings will help policy makers to design more effective environmental regulations.
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WOS 号： 000533518300001

第 26 篇
标　　题： Spatial Pattern Evolution And Influencing Factors Of Cold Storage In China
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期　　刊：CHINESE GEOGRAPHICAL SCIENCE

摘　　要：Cold storage is the vital infrastructure of cold chain logistics. In this study, we analyzed the spatial pattern evolution characteristics, spatial autocorrelation and influencing factors of cold storage in China by using kernel density estimation (KDE), spatial autocorrelation analysis (SAA), and spatial error model (SEM). Results showed that: 1) the spatial distribution of cold storage in China is unbalanced, and has evolved from 'one core' to 'one core and many spots', that is, 'one core' refers to the Bohai Rim region mainly including Beijing, Tianjin, Hebei, Shandong and Liaoning regions, and 'many spots' mainly include the high-density areas such as Shanghai, Fuzhou, Guangzhou, Zhengzhou, Hefei, Wuhan, urumqi. 2) The distribution of cold storage has significant global spatial autocorrelation and local spatial autocorrelation, and the 'High-High' cluster area is the most stable, mainly concentrated in the Bohai Rim; the 'Low-Low' cluster area is grouped in the southern China. 3) Economic developmenficit.

DOI：10.1007/s11769-020-1124-1

WOS 号：000547485800010

第 27 篇

标　　题：Exploring An Interdisciplinary Bim-Based Joint Capstone Course In Highway Engineering

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期　　刊：JOURNAL OF CIVIL ENGINEERING EDUCATION

摘　　要：Enhancing students' interdisciplinary design ability in a highway engineering context is important for the development of building information modeling (BIM). This paper proposes a new paradigm for highway engineering and its service areas based on the BIM platform, integrating road, bridge, tunnel, engineering costing; architecture; structure; water supply and drainage; heating and ventilation; and electrical engineering for a senior year capstone course. An overall and breakdown work system is constructed of the joint design process guided by the highway engineering discipline. BIM technology is utilized to integrate the design work content of nine majors, linking the originally separated design stages, and articulating the flow of interoperability information in highway engineering. A case study tests the course, evaluates the students' performance, and identifies improvements in software training, time schedule, technology connection, interoperability issues, as well as how BIM affects teamwork. In applying BIM in an interdisciplinary situation, a visualization tool is used to enrich the body of knowledge of BIM education as it relates to highway engineering.

DOI：10.1061/(ASCE)EI.2643-9115.0000017

WOS 号：000576931600006

第 28 篇

标　　题：Bilevel Optimization For The Hazmat Transportation Problem With Lane Reservation

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期　　刊：JOURNAL OF ADVANCED TRANSPORTATION

摘　　要：In this study, we investigate a bilevel optimization model for the hazmat transportation problem with lane reservation. The problem lies in selecting lanes to be reserved in the network and planning paths for hazmat transportation tasks. The trade-off among transportation cost, risk, and impact on the normal traffic is considered. By using the traffic flow theory, we quantify the impact on the normal traffic and modify the traditional risk measurement model. The problem is formulated as a multiobjective bilevel programming model involving the selection of reserved lanes for government and planning paths for hazmat carriers. Two hybrid metaheuristic algorithms based on the particle swarm optimization algorithm and the genetic algorithm, respectively, are proposed to solve the bilevel model. Their performance on small-scale instances is compared with exact solutions based on the enumeration method. Finally, the computational results on large-scale instances are compared and sensitivity analysis on the key parameters is presented. The results indicate the following: (1) Both algorithms are effective methods for solving this problem, and the method based on the particle swarm optimization algorithm requires a shorter computation time, whereas the method based on the genetic algorithm shows more advantages in optimality. (2) The bilevel model can effectively reduce the total risk of the hazmat transportation while considering the interests of hazmat carriers and ordinary travellers. (3) The utilization rate of reserved lanes increases with an increasing number of tasks. Nevertheless, once the proportion of hazmat vehicles becomes excessive, the advantage of reducing the risk of the reserved lanes gradually decreases.

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WOS 号：000553433500002

第 29 篇

标　　题：Evolutionary Game Of End-Of-Life Vehicle Recycling Groups Under Government Regulation

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通讯作者：Zhang, Y (corresponding author), Changan Univ, Sch Econ & Management, Xian, Peoples R China.

期　　刊：CLEAN TECHNOLOGIES AND ENVIRONMENTAL POLICY

摘　　要：This paper studies the competition between the illegal recycling group and the

legitimate recycling group in the recycling market of end-of-life vehicles, and we built an evolutionary game model of the competition process between the two groups. By constructing an evolutionary game model between illegal recycling and legitimate recycling strategy for end-of-life (EOL) vehicle recyclers, we investigate the long-term evolutionary characteristics of illegal recycling and legal recycling group in EOL vehicle recycling in different contexts. When there is government involving in the evolution game process of EOL vehicle recycling groups, we build our model to find out how its policies on EOL vehicle recycling change the legal recyclers' evolutionary stable state. Meanwhile, we explore how the government's different regulation policies affect its revenue from recycling EOL vehicles. Then, through a numerical simulation method, the influence of government policy in the evolutionary game model on the strategy choices on EOL vehicle recycling is tested and verified. With the research results, we find that it is very difficult to improve the evolutionary stable state when the government uses penalty policy only on the illegal EOL vehicle recycling, though the revenue of government can be guaranteed. Moreover, when the subsidy and penalty amount on legal and illegal EOL vehicle recycling increase to a certain extent, the revenue of government will start to decrease. [GRAPHICS] .

DOI： 10.1007/s10098-020-01898-9
WOS 号： 000551407200001

第 30 篇

标　　题： Transportation Co2 Emission Decoupling: Empirical Evidence From Countries Along The Belt And Road

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期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： The belt and road has developed into the most active economic corridor in the world, with its economic exchanges greatly stimulating the demand for transportation. Its development also poses greater challenges to those seeking to reduce the level of CO2 emissions within the transportation sector. This paper selects panel data from 51 countries along the belt and road over the 2000-2014 period. First, using the Theil model, we analyze the transportation sector CO2 emissions intensity trends from countries along the belt and road for the period under observation. The Tapio decoupling model is also conducted to better understand the relationship between the overall and regional CO2 emissions and transportation industry growth for countries along belt and road. Additionally, using ArcGIS, the significant evolving regions of CO2 emission intensity in the transportation sector is visualized, and a series of relevant policy suggestions are put forward. The empirical results indicate that the output value

and CO2 emissions of the transportation sector of all the countries along the belt and road increased, however the CO2 emissions intensity showed an overall decline with a polarization trend. This study also found that there are three states of decoupling: weak decoupling, recessive coupling and expansive negative decoupling over the period of analysis. Moreover, by offering different regions along the belt and road decoupling state, this study can provide a reference for governments by proposing carbon-reduction policies and promoting green developments within the transportation sector. (C) 2020 Elsevier Ltd. All rights reserved.

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WOS 号： 000537175800006

第 31 篇

标　　题： Coordinating The Supply Chain Finance System With Buyback Contract: A Capital-Constrained Newsvendor Problem

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期　　刊： COMPUTERS & INDUSTRIAL ENGINEERING

摘　　要： This paper studies the Capital-constrained Newsvendor (CCNV) problem in a Supply Chain Finance (SCF) system where the manufacturer offers a buyback (BB) contract to compensate the lender in the case of the retailer's default. Firstly, a three-level Stackelberg game in the SCF system is characterized with the bank acting as a leader, the manufacturer as a sub-leader and the retailer as a follower. Then, the equilibriums of the SCF game are investigated under a monopolistic bank market and a competitive bank market respectively. On that basis, the coordination strategies of the SCF system are analyzed. It is found that a buyback contract combined with a wholesale price contract fully coordinates the overall SCF system, and all the SCF members benefit from the coordination as long as the buyback price coefficient falls within a favorable range known as the Pareto Zone. Additionally, a conditional buyback (CBB) contract is studied in the SCF system, and the partial credit guarantee (PCG) contract of Yan, Sun, Zhang, and Liu (2016) is further compared with our BB/CBB contract, confirming the substitutability of these two contracts in an SCF system.

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WOS 号： 000548931200033

第 32 篇

标　　题：Measuring The Capacity Utilization Of China'S Transportation Industry Under Environmental Constraints

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期　　刊：TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT

摘　　要：The transportation industry is challenged by the need for capacity optimization, energy saving and decreasing emissions. Improving our understanding of capacity utilization is important for achieving a strong transportation system. This article analyzes the relationship between carbon dioxide emissions and final energy consumption in the transportation industry. The capacity utilization of China's transportation industry in the period 2011-2017 is explored by two improved DEA-based difference methods. They assess the status quo of China's capacity utilization and explores effective mechanisms to increase it. In addition, the rationale and accuracy of both measurement models are analyzed. Results show that: (1) the relationship between CO2 emissions and final energy consumption can be taken advantage of to improve the accuracy of capacity utilization measurements. (2) China's transportation industry has suffered from the underutilization of capacity, especially in the past three years. (3) Regional differences in capacity utilization are significant, being Southwestern China the region that has most seriously underutilized its capacity. (4) Promoting transportation technology innovation and more rational transportation resources planning are two key mechanisms to improve capacity utilization. This paper broadens our research knowledge of the transportation industry by proposing new measurement approaches for capacity utilization. These can be used to implement more effective and targeted policies, better allocate production resources, and closely monitor capacity utilization.

DOI：10.1016/j.trd.2020.102450

WOS 号：000558515200026

第 33 篇

标　　题：Carbon Mitigation By The Construction Industry In China: A Perspective Of Efficiency And Costs

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期　　刊：ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH

摘　　要：Evaluating carbon emission performance of the construction industry is a significant prerequisite for developing regional carbon mitigation plans. Taking environmental and technical heterogeneities into account, this paper employed a meta-frontier method to measure the carbon emission efficiency, carbon mitigation potential, and costs of the construction sector in different regions of China from 2005 to 2016. The empirical results show that substantial disparities in carbon emission efficiency exist in the construction industry. The total carbon mitigation potential of this sector was 206.76 million tons, with the Lower Yellow river area accounting for the largest proportion at 27%. Meanwhile, the carbon mitigation costs of this sector increased from 584.94 to 1273.30 yuan/ton during 2005-2016. The highest mitigation costs occur in the Lower Yangtze River area and the South Coastal area, indicating it was more costly in these areas to conduct additional carbon emissions mitigation. The results could facilitate the policy formulation on regional-oriented carbon emissions mitigation of the construction industry in China.

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WOS 号：000560952200011

第 34 篇

标　　题：Exploring The Robustness Of Public Transportation For Sustainable Cities: A Double-Layered Network Perspective

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通讯作者：Shi, WJ (corresponding author), Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China.

期　　刊：JOURNAL OF CLEANER PRODUCTION

摘　　要：The reliable and safe operation of an urban public transportation (UPT) system is of great significance to the sustainable development of a city. In-depth analyses of UPT network by exploring the topological structure and passenger travel features can help explain the mechanisms driving reliable UPT operations. Based on complex network theory, we proposed a robust model for a Bus-Subway double-layered network (BeS DLN) from the structural and functional perspectives. The following indicators were used to quantify the structural robustness of B-S DLN: average path length (APL), relative size of giant component (RSGC) and global network efficiency (GNE). The functional robustness was measured using the ratio of passenger flow loss (R). Using urban traffic data from the Xicheng District of Beijing, we analyzed the cascading failure of BeS DLN based on a nonlinear load-capacity model with two capacity control parameters: alpha and beta. The simulation results show that alpha and beta significantly impact the cascading failure process of BeS DLN. An increase in beta or decrease in a can enhance the network's ability to resist cascading failure. The parameter control method revealed that the B-S DLN achieves strong robustness when alpha = 0.2 and beta = 0.5. Comparing the network robustness under a random attack

and intentional attack, the B-S DLN is more robust under an intentional attack than in the random attack mode. This indicates that the robustness of B-S DLN can be significantly improved by rationally increasing station capacities. (c) 2020 Elsevier Ltd. All rights reserved.

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第 35 篇

标　　题： Experimental Investigation On The Mechanical Properties And Microstructure Of Basalt Fiber Reinforced Engineered Cementitious Composite

作　　者： [Du, Qiang; Wu, Jiao] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China; [Du, Qiang] Changan Univ, Ctr Green Engn & Sustainable Dev, Xian 710064, Peoples R China; [Cai, Changlu; Lv, Jing; Pan, Ting; Zhou, Jie] Changan Univ, Sch Civil Engn, Xian 710064, Peoples R China

通讯作者： Cai, CL (corresponding author), Changan Univ, Sch Civil Engn, Xian 710064, Peoples R China.

期　　刊： MATERIALS

摘　　要： This study investigated fundamental mechanical properties of a basalt fiber reinforced engineered cementitious composite (BF-ECC) with different volume fractions of basalt fiber (BF), water-binder ratio (W/B) and fly ash (FA) content. The compressive strength, splitting tensile strength, flexural strength and static modulus of BF-ECC were studied at 3, 28 and 56 days, respectively, to explore their development along the ages. Furthermore, the scanning electron microscopy (SEM) analysis was conducted to evaluate the microstructure of BF-ECC. Experiment results demonstrated that bond quality between the BF and the matrix is good, which leads to a significant increase in the flexural strength and splitting tensile strength. The pozzolanic effect of FA obviously improved the splitting tensile and flexural strength of BF-ECC after 56 days of curing, and the appropriate content of the FA content in the BF-ECC ranges from 50% to 60%.

DOI： 10.3390/ma13173796

WOS 号： 000569645200001

第 36 篇

标　　题： Transportation Co2 Emission Decoupling: An Assessment Of The Eurasian Logistics Corridor

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通讯作者： Wang, C; Li, Y (corresponding author), Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China.

期　　刊： TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT

摘　　要： The Eurasian logistics corridor is as important transportation hub delivering goods and

services to countries along the belt and road. While greatly promoting the economic and social development of countries in the region, the corridor also presents enormous energy consumption and CO2 emission challenges. In order to assess these demands, our study combines the Tapio decoupling model and the logarithmic mean divisia index (LMDI) to analyze the relationship between transportation sector development and CO2 emissions. Our study shows that transportation-intensity effect is the main driving force behind CO2 emission reductions in developed countries, while the energy-intensity effect is key to reducing transportation CO2 emissions in developing countries. Moreover, we demonstrated that carbonand transportation-intensity effects inhibit transportation CO2 emissions, while the factors of economic structure and population size help to increase transportation CO2 emission levels. Finally, our research provides an important reference for economies seeking to develop greener transportation sectors.

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WOS 号： 000569329000006

第 37 篇

标　　题： Co2 Emission In Transportation Sector Across 51 Countries Along The Belt And Road From 2000 To 2014

作　　者： [Wang, Chao; Wang, Yongjie; Geng, Xinrui] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China; [Wang, Chao; Wang, Yongjie] Changan Univ, Integrated Transportat Econ & Management Ctr, Xian 710064, Peoples R China; [Wood, Jacob] James Cook Univ Singapore, Dept Business, Singapore 387380, Singapore; [Long, Xingle] Jiangsu Univ, Sch Management, Zhenjiang 212013, Jiangsu, Peoples R China

通讯作者： Wang, C (corresponding author), Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China.; Long, XL (corresponding author), Jiangsu Univ, Sch Management, Zhenjiang 212013, Jiangsu, Peoples R China.

期　　刊： JOURNAL OF CLEANER PRODUCTION

摘　　要： The transportation sector is a key economic sector and an important source of CO2 emissions. Due to these environmental implications and a desire to reduce emission levels, the number of empirical analyses on the transportation sector have increased significantly in recent times. Given this pretext, our study examines the heterogeneity and spatial autocorrelation CO2 emissions of the transportation sector for 51 belt and road economies from 2000 to 2014. As part of analysis, we examine the heterogeneity of CO2 emissions in the transportation sector through the use of the Theil index and semi-variogram analysis. Furthermore, our study also analyzed the global and local spatial autocorrelation of transport sector CO2 emissions using the Moran index for participating countries. From the analysis, this study found that the transportation CO2 emission intensity of Central and Western Asia and North Africa is significantly higher than that of other regions along the belt and road, and there is a strong spatial correlation in Southeast Asian countries. Our research provides a key reference point for governments by proposing carbon-reduction policies and the promotion of greener developmental initiatives within the transportation sector.

DOI： 10.1016/j.jclepro.2020.122000
WOS 号： 000573461000004

第 38 篇
标　　题： The Innovation Of Management Policy And System Of Marine Economy
作　　者： [Li, Min] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China; [Li, Min] Changan Univ, Ctr Comprehens Transportat Econ Management, Xian 710064, Peoples R China
通讯作者： Li, M (corresponding author), Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China.; Li, M (corresponding author), Changan Univ, Ctr Comprehens Transportat Econ Management, Xian 710064, Peoples R China.
期　　刊： JOURNAL OF COASTAL RESEARCH
摘　　要： The ocean is an important strategic space for China to achieve sustainable development. Resource and environment constraints seriously affect the sustainable development of the marine industry. Institutional innovation is an important countermeasure for sustainable development. It is the institutional innovation of the marine economic management system to properly authorize different agents in the marine economic management. The marine ecosystem has the nature of public products. If it is damaged, it needs to establish the marine economic ecological compensation mechanism, which is the institutional innovation to realize the development of the marine economy. This paper reviews the current situation of marine economic development in the marine economic experimental area, and summarizes the research ideas of policy and institutional mechanism innovation to ensure the development of marine economy.
DOI： 10.2112/JCR-SI110-016.1
WOS 号： 000576681900016

第 39 篇
标　　题： Marine Transport Efficiency Evaluation Of Cross-Border Logistics Based On Ahp-Topsis Method
作　　者： [Li, Xiuping; Zhao, Xiyang; Bai, Dongling] Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China
通讯作者： Li, XP (corresponding author), Changan Univ, Sch Econ & Management, Xian 710064, Peoples R China.
期　　刊： JOURNAL OF COASTAL RESEARCH
摘　　要： Ocean transportation is one of the main means of cross-border logistics transportation. There are many factors that affect ocean transportation. How to find out the main factors is the key to improve the efficiency of cross-border logistics ocean transportation. Based on the AHP-TOPSIS method, an evaluation system of cross-border logistics marine transportation efficiency is constructed with port efficiency, port throughput, marine vessel efficiency, ocean port cooperation as the main level indicators, and it is applied to the empirical analysis of five representative ports in China, namely Dalian port, Tianjin port, Qingdao port, Shanghai Port and Guangzhou port. The results show that Shanghai port has the highest marine transportation efficiency. At the same time. Port handling and communication efficiency is the main

factor affecting the efficiency of marine transportation.

DOI： 10.2112/JCR-SI110-023.1

WOS 号： 000576681900023

第 40 篇

标　　题： Investigating The Effect Of Government Subsidies On End-Of-Life Vehicle Recycling

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期　　刊： WASTE MANAGEMENT & RESEARCH

摘　　要： To have a deeper understanding of the Chinese market reaction for different subsidy policies made by the government, we establish a game model of the competition between legal recyclers and illegal recyclers with government involved. Further, we consider the quality differentiation of end-of-life vehicles in every player's decision-making. With a numerical simulation, the researchers validated this study. Based on the results of this research, we found that compared with the strategy of subsidizing the legal recyclers, subsidizing the end-of-life vehicle owners is more effective, and the legal recyclers would get more business from end-of-life vehicle owners. The quality of end-of-life vehicles plays a vital role when the recyclers make decisions on their recycling behaviour. Moreover, the differential subsidy policy will probably be useless if most of the end-of-life vehicles in the market are in poor quality. So, the Chinese government should adjust its policies on end-of-life vehicle market development based on the quality distribution of end-of-life vehicles, and the quality management should be implemented in the end-of-life vehicle supply chain for the efficiency and effectiveness of subsidy policies.

DOI： 10.1177/0734242X20953893

WOS 号： 000578026500001

第 41 篇

标　　题： Optimal Financing Mode Selection For A Capital-Constrained Retailer Under An Implicit Bankruptcy Cost

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期　　刊：INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS

摘　　要：In the context of the capital-constrained newsvendor problem under an implicit bankruptcy cost, we explore how such a cost affects a capital-constrained retailer's financing mode selection decision between bank credit financing (BCF) and trade credit financing (TCF). We first study the problem in a single credit channel where the retailer can choose only one of the two financing modes. We find that the retailer prefers TCF to BCF only when the TCF interest rate (TCF-IR) is lower than a threshold, and the dominant area of TCF expands with increasing bankruptcy cost. We then study the problem in a dual credit channel where the retailer can choose a portfolio comprising BCF and TCF, and examine two repayment sequences, i.e., repaying BCF first, and vice versa. We propose two approaches to solve the problems. We find that if BCF is repaid first, as the TCF-IR increases from zero, the retailer first chooses only TCF, then a portfolio comprising BCF and TCF, and finally only BCF. On the other hand, if TCF is repaid first, the retailer always chooses the single credit channel (BCF or TCF) if the TCF-IR is not greater than a threshold or the bankruptcy cost is higher than a threshold; otherwise, a portfolio comprising BCF and TCF, or only BCF. Finally, we conduct numerical experiments to verify our main theoretical findings and examine the effects of the retailer's internal capital endowment on its financing mode selection decision, showing that a wealthier retailer is more likely to prefer BCF to TCF.

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WOS 号：000582585600002

第 42 篇

标　　题：Method Of Group Decision Making With Interval Grey Numbers Based On Grey Correlation And Relative Close Degree

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期　　刊：TEHNICKI VJESNIK-TECHNICAL GAZETTE

摘　　要：With the development of society, big data's concept is mentioned more and more. However, in the numerous and complex mass data, the effective information is often very limited, and the data often show the complex characteristics of close and orderly short-term correlation and large long-term disturbance, which is difficult to be expressed by a long sequence composed of a single real value. This paper takes the interval grey number as the research object for the uncertain system of less data and poor information. According to the multi-attribute group decisions problem with attribute's values of interval grey number and the weights of decision-makers and attributes that are completely unknown, a method of group decision making with interval grey numbers based on grey correlation and relative close degree is proposed. For the purpose of making effective decisions, the weights of decision-makers and attributes are calculated by correlation degree of decision information which is

measured by the model of grey correlation analysis based on interval grey number deviation degree. On this basis, the correlation degree between the scheme and the positive and negative ideal schemes are computed, and then the grey correlation and relative close degree of the scheme is calculated. Finally, the scheme is sorted according to the value of the grey correlation and relative close degree. The rationality and feasibility of the proposed method are verified by numerical examples.

DOI： 10.17559/TV-20200601165833

WOS 号： 000581774100029

第 43 篇

标　　题： An Adaptive Network Model To Simulate Consensus Formation Driven By Social Identity Recognition

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期　　刊： COMPLEXITY

摘　　要： Models of the consensus of the individual state in social systems have been the subject of recent research studies in the physics literature. We investigate how network structures coevolve with the individual state under the framework of social identity theory. Also, we propose an adaptive network model to achieve state consensus or local structural adjustment of individuals by evaluating the homogeneity among them. Specifically, the similarity threshold significantly affects the evolution of the network with different initial conditions, and thus there emerges obvious community structure and polarization. More importantly, there exists a critical point of phase transition, at which the network may evolve into a significant community structure and state-consistent group.

DOI： 10.1155/2020/1742065

WOS 号： 000583238500007

第 44 篇

标　　题： An Integrated Framework To Prioritize Blockchain-Based Supply Chain Success Factors

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期　　刊： INDUSTRIAL MANAGEMENT & DATA SYSTEMS

摘　　要： Purpose The purpose of this study is to identify and prioritize the factors that can positively influence the implementation of a blockchain-based supply chain via an integrated framework. To the best of the authors' knowledge, no previous study has focused on prioritizing these factors. Design/methodology/approach First, this study conducts a multivocal literature review, and a total of 48 success factors (SFs) are identified and mapped into 11 categories. Second, the identified success factors and their categories are further validated by industry practitioners using a questionnaire survey approach. Finally, this study applies an analytical hierarchy process to prioritize the identified SFs and their categories and to assess their importance for successful blockchain implementation in the supply chain management process. Findings The Accessibility category has the highest importance, and the Overall efficiency category has the second highest rank. As far as the success factors are concerned, Trackability and Traceability are considered to be the prime success factors of a blockchain-based supply chain. The taxonomy of the categories and their success factors provide an outline for supply chain organizations to establish a strategy to implement blockchain technology. Practical implications This technology can be practically applied in a sustainable supply chain. Another vital application of this blockchain technology is in banking and finance because of the blockchain's immutable data recording property. Originality/value To the best of the authors' knowledge, there is no previous study focused on building a taxonomic model that allows supply chain organizations to compare this paper's model with existing models and outline the necessary actions to improve supply chain activities. The questionnaire-based survey developed to validate the success factors in real-world practices and the factors' prioritization can help academic researchers and industrial practitioners to set their strategic goals accordingly.

DOI： 10.1108/IMDS-04-2020-0194

WOS 号： 000581185300001

第 45 篇

标　　题： Project Portfolio Resource Risk Assessment Considering Project Interdependency By The Fuzzy Bayesian Network

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期　　刊： COMPLEXITY

摘　　要： Resource risk caused by specific resource sharing or competition among projects due to resource constraints is a major issue in project portfolio management, which challenges

the application of risk analysis methods effectively. This paper presents a methodology by using a fuzzy Bayesian network to assess the project portfolio resource risk, determine critical resource risk factors, and propose risk-reduction strategies. In this method, the project portfolio resource risk factors are first identified by taking project interdependency into consideration, and then the Bayesian network model is developed to analyze the risk level of the identified risk factors in which expert judgments and fuzzy set theory are integrated to determine the probabilities of all risk factors to deal with incomplete risk data and information. To reduce the subjectivity of expert judgments, the expert weights are determined by combining experts' background and reliability degree of expert judgments. A numerical analysis is used to demonstrate the application of the proposed methodology. The results show that project portfolio resource risks can be analyzed effectively and efficiently. Furthermore, poor communication and cooperation among projects, capital difficulty, and lack of sharing technology among projects are considered the leading factors of the project portfolio resource risk. Risk-reduction strategic decisions based on the results of risk assessment can be made, which provide project managers with a useful method or tool to manage project risks.

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WOS 号： 000594123800005

第 46 篇

标　　题： Do Public-Private Partnerships Improve The Operational Efficiency Of Infrastructure In Mainland China?

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期　　刊： ADVANCES IN CIVIL ENGINEERING

摘　　要： Public-private partnerships (PPPs) are widely used to achieve sustainable infrastructure provision. The purpose of this research is to monitor the effects of PPPs in practice. This study calculated the operational efficiency of toll roads in Mainland China and examined the effect of the transformation from government operations to concession on their operational efficiency. The results showed that toll road operations were inefficient in terms of cost savings and that there were significant regional differences in the impact of concession on operational efficiency among three regions. Concession played a positive role in improving the operational efficiency in the eastern region; on the contrary, the influence was significantly negative in the western region. The effect on the central region was not significant. The results indicated that the efficiency advantages of concession were not given full play. The governments of economies in transition should pay more attention to the implementation environment of PPPs to

make infrastructure operations more sustainable.

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WOS 号： 000595825600004

第 47 篇

标　　题： Prediction Of Multiproject Resource Conflict Risk Via An Artificial Neural Network

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通讯作者： Bai, LB (corresponding author), Changan Univ, Xian, Peoples R China.

期　　刊： ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT

摘　　要： Purpose Inadequate balancing of resources often results in resource conflict in the multiproject management process. Past research has focused on how to allocate a small amount of resources optimally but has scarcely explored how to foresee multiproject resource conflict risk in advance. The purpose of this study is to address this knowledge gap by developing a model to predict multiproject resource conflict risk. Design/methodology/approach A fuzzy comprehensive evaluation method is used to transform subjective judgments into quantitative information, based on which an evaluation index system for multiproject resource conflict risk that focuses on the interdependence of multiple project resources is proposed. An artificial neural network (ANN) model combined with this system is proposed to predict the comprehensive risk score that can describe the severity of risk. Findings Accurately predicting multiproject resource conflict risks in advance can reduce the risk to the organization and increase the probability of achieving the project objectives. The ANN model developed in this paper by the authors can capture the essential components of the underlying nonlinear relevance and is capable of predicting risk appropriately. Originality/value The authors explored the prediction of the risks associated with multiproject resource conflicts, which is important for improving the success rate of projects but has received limited attention in the past. The authors established an evaluation index system for these risks considering the interdependence among project resources to describe the underlying factors that contribute to resource conflict risks. The authors proposed an effective model to forecast the risk of multiproject resource conflicts using an ANN. The model can effectively predict complex phenomena with complicated and highly nonlinear performance functions and solve problems with many random variables.

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WOS 号： 000592318500001

理学院

第 1 篇

标　　题： Uniqueness And Stability Of Time-Periodic Pyramidal Fronts For A Periodic Competition-Diffusion System

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期　　刊： COMMUNICATIONS ON PURE AND APPLIED ANALYSIS

摘　　要： The existence, non-existence and qualitative properties of time periodic pyramidal traveling front solutions for the time periodic Lotka-Volterra competition-diffusion system have already been studied in R-N with N >= 3. In this paper, we continue to study the uniqueness and asymptotic stability of such time-periodic pyramidal traveling front in the three-dimensional whole space. For any given admissible pyramid, we show that the time periodic pyramidal traveling front is uniquely determined and it is asymptotically stable under the condition that given perturbations decay at infinity. Moreover, the time periodic pyramidal traveling front is uniquely determined as a combination of two-dimensional periodic V-form waves on the edges of the pyramid.

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WOS 号： 000475504300014

第 2 篇

标　　题： Mathematical Analysis And Simulation Of A Hepatitis B Model With Time Delay: A Case Study For Xinjiang, China

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期　　刊： MATHEMATICAL BIOSCIENCES AND ENGINEERING

摘　　要： The incubation period for Hepatitis B virus (HBV) within the human is epidemiologically significant because it is typically of long duration (1.5 similar to 6 months) and the disease transmission possibility may be increased due to more contact from the patients in this period. In this paper, we investigate an SEICRV epidemic model with time delay to research the transmission dynamics of Hepatitis B disease. The basic reproductive number R-0 is derived and can determine the dynamics of the model. The disease-free equilibrium is globally asymptotically stable if R-0 < 1 and unstable if R-0 > 1. As R-0 > 1, the model admits a unique endemic equilibrium which is locally asymptotically stable. The endemic equilibrium is globally asymptotically stable when the vertical transmission is ignored. Numerically, we study the Hepatitis B transmission case in Xinjiang, China. Using the Hepatitis B data from Xinjiang, the basic reproductive number is estimated as 1.47 (95% CI: 1.34-1.50). By the end of 2028, the cumulative number of Hepatitis B cases in Xinjiang will be estimated about 700,000 if there is no more effective preventive measures. The sensitivity analysis of R-0 in terms of parameters indicates prevention and treatment for chronic patients are key measures in controlling the spread of Hepatitis B in Xinjiang.

DOI： 10.3934/mbe.2020092

WOS 号： 000503853000010

第 3 篇

标　　题： Synthesis And Structural Analysis Of A 3D Semi-Rigid Cd Coordination Polymer

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期　　刊： JOURNAL OF CLUSTER SCIENCE

摘　　要： A three dimensional semi-rigid coordination polymer {Cd-3(OH){cpta}(2)(bpe)(2)(H2O)center dot xSolvents}(n) (1) was solvothermal synthesized with a V-shaped semi-rigid carboxylic acid, H(3)cpta = 3-(3-carboxyphenoxy)phthalic acid (H(3)cpta) and auxiliary ligand, 1,2-di(pyridin-4-yl)ethene (bpe). Single crystal X-ray analysis shows that 1 features a P-1 space group with three crystal independent Cd(II) ions, which are connected by carboxylate ligands and auxiliary ligand. There is a porous metal-organic layer subunit constructed by carboxylate ligands and Cd ions, which shows porous coordination polymers could be synthesized by this type of semi-rigid organic spacers. However, reactions without auxiliary ligands were also investigated, but no product was obtained, which shows N-contained auxiliary ligands show important templates in the solvothermal synthesis condition of the semi-rigid coordination polymers. Besides, the luminescent and thermal properties were also studied. The CCDC number of 1 is 1894883.

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WOS 号： 000513242600017

第 4 篇

标　　题： Pairwise Matching For 3D Fragment Reassembly Based On Boundary Curves And Concave-Convex Patches

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通讯作者： Li, QH (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： We present a simple pairwise matching method for 3D fragment reassembly that uses boundary curves and concave-convex patches to accelerate and optimize the matching. Given the boundary curves of two fracture surfaces that completely or partially coincide, we can quickly exclude the fracture surface pairs with low boundary curve similarities, which can substantially reduce the computational cost of the subsequent patch matching, where we extract and delineate concave-convex patches of the selected fracture surfaces. A modified iterative closest point algorithm is applied on these concave-convex patches to refine the alignment. Finally, we determine the matched 3D fragments according to the overlap ratio of their fracture surfaces. The results of

experiments on real-world examples demonstrate that our proposed algorithm is both accurate and efficient.

DOI： 10.1109/ACCESS.2019.2961391

WOS 号： 000524682100032

第 5 篇

标　　题： Approaching The Limit: Molecular Design Of Dna Prisms And Pyramids With One Strand Based On Polyhedral Links

作　　者： [Duan, Jin-Wei; Cui, Lin; Wang, Ying; Zhang, Jin-Rong] Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China

通讯作者： Duan, JW; Zhang, JR (corresponding author), Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China.

期　　刊： MATCH-COMMUNICATIONS IN MATHEMATICAL AND IN COMPUTER CHEMISTRY

摘　　要： DNA polyhedra have been regarded as an ideal kind of drug delivery in vivo. DNA polyhedral links have been proposed to make fully understanding the mechanisms of these novel structures. In this paper, a series of n-order DNA prisms and pyramids are designed and optimized based on polyhedral link models. The strategies are put forward to design and reduce the number of strands of n-order DNA prisms and pyramids to the limit, which will provide some theoretical blueprints for laboratory synthesis.

WOS 号： 000529089500006

第 6 篇

标　　题： Mathematical Modeling For Schistosomiasis With Seasonal Influence: A Case Study In Hubei, China

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通讯作者： Zhang, TL (corresponding author), Changan Univ, Sch Sci, Dept Math & Informat Sci, Xian 710064, Shaanxi, Peoples R China.

期　　刊： SIAM JOURNAL ON APPLIED DYNAMICAL SYSTEMS

摘　　要： In this paper, we investigate a time-delayed differential model of the transmission dynamics of schistosomiasis with seasonality. In order to study the influence of water temperature on egg hatching into miracidia and the development from miracidia to cercariae, we incorporate time-dependent delays into the model to describe the maturation period and the extrinsic incubation period. We first introduce the basic reproduction number R-0 for this model and establish a threshold-type result on its global dynamics in terms of R-0. More precisely, we show that the disease is uniformly persistent when R-0 > 1, while the disease-free periodic solution is globally attractive when R-0 < 1. Then we choose parameters to fit the schistosomiasis epidemic data in Hubei province of China. Our numerical simulations indicate that the schistosomiasis will continue to prevail in the near future unless more effective control measures are taken. A further sensitive analysis demonstrates that the parameters with a strong impact on the outcome are baseline transmission rate, recovery rate, schistosome egg output

rate, contact rate between miracidia and snails, and cercariae output rate.

DOI： 10.1137/19M1280259

WOS 号： 000545964300023

第 7 篇

标　　题： Structural Protection Of Ancient Masonry Pagodas Based On Modified Epoxy Resin Infiltration

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期　　刊： JOURNAL OF NEW MATERIALS FOR ELECTROCHEMICAL SYSTEMS

摘　　要： Following the two principles of ancient pagoda protection (i.e. safety first and minimum intervention), this paper attempts to reinforce ancient masonry structures with organic polymer materials, and puts forward the modified epoxy resin (MER) infiltration, a nondestructive reinforcement method for ancient pagodas. A total of 12 specimens in 4 groups were prepared from sticky rice mortar (SRM), and used to test whether the MER infiltration could enhance the masonry structure of ancient pagodas, and explore the constitutive relation of MER-reinforced pagoda structure. The test results show that the MER-reinforced specimens were 40.5%, 11% and 26.7% greater than the original specimens in compressive strength, shear strength and elastic modulus, respectively. Therefore, the MER can effectively reinforce ancient masonry structures. To further verify the effectiveness of our method, the Small Wild Goose (SWG) Pagoda in Xi'an, China, was reinforced by the MER and subjected to vulnerability analysis. The analysis reveals that the MER-reinforced structure is less likely to fail under each level than the original structure. Therefore, the MER provides an effective tool and a good reference for nondestructive protection of ancient brick masonry pagodas.

DOI： 10.14447/jnmes.v23i1.a03

WOS 号： 000556365700003

第 8 篇

标　　题： Traveling Front Of Polyhedral Shape For A Nonlocal Delayed Diffusion Equation

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期　　刊： ELECTRONIC JOURNAL OF QUALITATIVE THEORY OF DIFFERENTIAL EQUATIONS

摘　　要： This paper is concerned with the existence and stability of traveling fronts with convex polyhedral shape for nonlocal delay diffusion equations. By using the existence and stability results of V-form fronts and pyramidal traveling fronts, we first show that there exists a traveling front V(x, y, z) with polyhedral shape of nonlocal delay diffusion

equation associated with z = h(x, y). Moreover, the asymptotic stability and other qualitative properties of such traveling front V(x, y, z) are also established.

DOI： 10.14232/ejqtde.2020.1.64

WOS 号： 000591737000001

第 9 篇

标　　题： Projective Binary Linear Codes From Special Boolean Functions

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期　　刊： APPLICABLE ALGEBRA IN ENGINEERING COMMUNICATION AND COMPUTING

摘　　要： Linear codes with a few weights have nice applications in communication, secret sharing schemes, authentication codes, association schemes, block designs and so on. Projective binary linear codes are one of the most important subclasses of linear codes for practical applications. The objective of this paper is to construct projective binary linear codes with some special Boolean functions. Four families of binary linear codes with three or four weights are derived and the parameters of their duals are also determined. It turns out that the duals of these codes are optimal or almost optimal with respect to the sphere-packing bound. As applications, the codes presented in this paper can be used to construct association schemes and secret sharing schemes with interesting access structures.

DOI： 10.1007/s00200-019-00412-z

WOS 号： 000505370700001

第 10 篇

标　　题： Generalized Cospectral Graphs With And Without Hamiltonian Cycles

作　　者： [Liu, Fenjin] Changan Univ, Sch Sci, Xian 710046, Shaanxi, Peoples R China; [Liu, Fenjin; Wang, Wei; Yu, Tao] Xi An Jiao Tong Univ, Sch Math & Stat, Xian 710049, Shaanxi, Peoples R China; [Lai, Hong-Jian] West Virginia Univ, Dept Math, Morgantown, WV 26506 USA

通讯作者： Liu, FJ (corresponding author), Changan Univ, Sch Sci, Xian 710046, Shaanxi, Peoples R China.

期　　刊： LINEAR ALGEBRA AND ITS APPLICATIONS

摘　　要： The spectrum sigma(G) of a graph G consists of all the eigenvalues (together with their multiplicities) of its adjacency matrix A(G). Two graphs G and H are called generalized cospectral if both sigma(G) = sigma(H) and sigma((G) over bar) = sigma((H) over bar), where (G) over bar((H) over bar) is the complement of G (H). In this paper, we generalize the notion cospectrally-rooted to k-cospectrally-rooted, and obtain two equivalent statements for k-(generalized) cospectrally-rooted graphs. Furthermore, we have constructed two families of generalized cospectral graphs such that graphs in one of these two families are Hamiltonian and graphs in the other family are not

Hamiltonian. (C) 2019 Elsevier Inc. All rights reserved.

DOI： 10.1016/j.laa.2019.10.001

WOS 号： 000496865600013

第 11 篇

标　　题： Propagation Phenomena For Partially Degenerate Nonlocal Dispersal Models In Time And Space Periodic Habitats

作　　者： [Bao, Xiongxiong] Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China; [Li, Wan-Tong] Lanzhou Univ, Sch Math & Stat, Lanzhou 730000, Gansu, Peoples R China

通讯作者： Li, WT (corresponding author), Lanzhou Univ, Sch Math & Stat, Lanzhou 730000, Gansu, Peoples R China.

期　　刊： NONLINEAR ANALYSIS-REAL WORLD APPLICATIONS

摘　　要： This paper is concerned with propagation phenomena of a general class of partially degenerate nonlocal dispersal cooperative systems in time and space periodic habitats. We first show that such system has a finite spreading speed interval in any direction and there is a spreading speed for the partially degenerate system under certain conditions. Next, we prove that if the wave speed is greater than the spreading speed, there exists a time and space periodic traveling wave solution connecting the stable positive time and space periodic steady state and O. Finally, we apply these results to two species partially degenerate competition systems and a partially degenerate epidemic model with nonlocal dispersal in time and space periodic habitats. (C) 2019 Elsevier Ltd. All rights reserved.

DOI： 10.1016/j.nonrwa.2019.102975

WOS 号： 000488994500012

第 12 篇

标　　题： Injective Stability For Odd-Dimensional Unitary K-1

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通讯作者： Yu, WB (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊： JOURNAL OF GROUP THEORY

摘　　要： In this paper, under the usual stable range condition, a decomposition theorem for the elementary subgroup is obtained, and the injective stability theorem for odd-dimensional unitary K-1 is proved.

DOI： 10.1515/jgth-2019-0099

WOS 号： 000517936600006

第 13 篇

标　　题： Rational Design Of Dna Platonic Polyhedra With The Minimal Components Number From Topological Perspective

作　　者： [Duan, Jinwei; Cui, Lin; Wang, Ying] Changan Univ, Coll Sci, Dept Chem & Mat Sci, Xian 710064, Shaanxi, Peoples R China

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期　　刊：BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS

摘　　要：DNA has been considered an ideal raw material to build nanostructures. However, the majority of known DNA branched polyhedra are composed of multiple components. In this research, we propose a rational approach to design and analyze DNA Platonic branched polyhedra with two components according to the topological view. The results show that the fragments number and the strand configurations give a great impact on the minimal number of components. Insights from our research can provide practical benefits for the design and synthesis of DNA polyhedra or other highly complex polyhedral structures in labs. (C) 2020 Elsevier Inc. All rights reserved.

DOI：10.1016/j.bbrc.2019.12.113

WOS 号：000526786900012

第 14 篇

标　　题：Effect Of Twin Boundary Spacing On The Deformation Behaviour Of Au Nanowire

作　　者：[Hou, Zhaoyang; Xiao, Qixin; Wang, Zhen; Wang, Jinguo] Changan Univ, Sch Sci, Xian 710064, Peoples R China; [Liu, Rangsu] Hunan Univ, Sch Phys & Microelect Sci, Changsha 410082, Hunan, Peoples R China; [Wang, Chun] Xian Shiyou Univ, Coll Sci, Xian 710065, Peoples R China

通讯作者：Hou, ZY (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊：PHYSICA B-CONDENSED MATTER

摘　　要：The deformation behaviour of Au twinned nanowire is investigated by molecular dynamic simulation. It is found that the relationship of yield strength with twin boundary spacing (TBS) can be divided into three ranges. The deformation mechanism of Au twinned nanowire is revealed according to the dislocation-twin interactions. For those with large and medium softening TBS ranges, some Shockley partial dislocations and stair-rod dislocations are formed, and a small step is left on the TBs during the dislocation-twin interactions. But the amount of dislocations in the nanowire with medium TBS is remarkably larger than that with large TBS, and more different {111} slip planes are activated. For that with small strengthening TBS range, lots of Shockley partial dislocations are formed, and they form highly-localized shear zone at the middle of nanowire. TBs undergo a destruction and following recovery process during the dislocation-twin interactions, and the TBS is enlarged during this process.

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WOS 号：000517949300011

第 15 篇

标　　题：A Theoretical Study Of 8-Azaguanine Radical Cation Deprotonation

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期　　刊： ACTA CHIMICA SINICA

摘　　要： Due to the lower redox potential comparing with guanine, it is the 8-azaguanine (8-AG) as the hole trap to form 8-azaguanine radical cation (8-AG(center dot+)) after one-electron oxidation of DNA containing 8-azaguanine. In generally, the 8-AG(center dot+) may suffer from deprotonation to generate 8-AG(-H)(center dot). In this text, we were stimulated to investigate the deprotonation reaction of 8-AG(center dot+) generating by one-electron oxidation at M06-2X/6-31 +G(d) level with explicit water molecules and polarized continuum model (PCM) to simulate the solvent effect. By building deprotonation model with different number of explicit water molecules, we found that these four water molecules locating around N(1)-H, O(6), N(2)-H of 8-AG(center dot+) as well as the one locating in the second water shell which was hydrogen-bonding with the water around O(6) were necessary. If the water in the second water shell was not included, the imino proton (N(1)-H) would not transfer into the bulk water. In parallel, the N(1)-H would transfer to the O(6) of 8-AG(center dot+) by intramolecular proton transfer. If the water molecule locating around N(2)-H was removed, the 8-AG(center dot+) deprotonation would continue but the energy barrier would be lowered from 24.8 kJ/mol to 16.3 kJ/mol. In addition, the site of the water molecule in the second water shell was also studied. If putting the water in the second water shell around N(2)-H of 8-AG(center dot+), the proton would be stabilized between the N(1) of 8-AG(center dot+) and the oxygen of water molecule around N(1)-H meaning the proton would not be transferred into bulk water. Further, in order to test the influence of water number on 8-AG(center dot+) deprotonation, the fifth water molecule, which is hydrogen-bonding with the water molecule around N(2)-H and another N(2)-H, was added. The potential energy surface with 5H(2)O revealed that it is almost no effect on the deprotonation pathway and energy barrier (25.5 kJ/mol). Lastly, so as to obtain the exact energy bather of 8-AG(center dot+) deprotonation, the deprotonation model with more explicit water molecules (9H 2 0) was proposed, where the additional water molecules were placed around N(2)-H, N(3), O(6), N(7) and N(8). From the potential energy surface, the deprotonation energy barrier of 8-AG(center dot+) was confirmed to be 19.5 kJ/mol. These theoretical results provide valuable dynamics information and mechanistic insights for further understanding the properties of nucleic acid base analogues and one-electron oxidation of DNA.

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WOS 号： 000522816700008

第 16 篇

标　　题： Energy Absorption Behaviors Of Foam-Filled Holed Tube Subjected To Axial Crushing: Experimental And Theoretical Investigations

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期　　刊： MECHANICS OF ADVANCED MATERIALS AND STRUCTURES

摘　　要： In the present research, the axial crushing behaviors of foam-filled holed tube are investigated by performing quasi-static compression tests. The possible deformation modes are obtained. The experimental results show that the energy absorption performance of empty holed tube can be greatly enhanced by filling aluminum foam. Furthermore, a novel theoretical model for concertina mode of foam-filled holed tube is proposed based on super folding element method, and validated by present and previous experimental results. The interaction between the tube wall and foam filler, normalized mean crushing force and specific energy absorption are obtained theoretically and discussed in detail.

DOI： 10.1080/15376494.2020.1745968

WOS 号： 000524221700001

第 17 篇

标　　题： Static And Dynamic Magnetic Properties Of Fega/Feni (Feni/Fega) Bilayer Structures

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通讯作者： Cao, DR (corresponding author), Qingdao Univ, Coll Phys, Natl Demonstrat Ctr Expt Appl Phys Educ, Qingdao 266071, Peoples R China.

期　　刊： COATINGS

摘　　要： FeGa/FeNi bilayer structures with different deposition order were fabricated by the electrodeposition method on indium tin oxide (ITO) substrates. The structure, morphology, static and dynamic magnetic properties of FeGa/FeNi (FeNi/FeGa) films were investigated. The bilayer structures exhibit extremely various magnetic properties with different deposition order which could be attributed to the different coupling interaction in the interface. When FeGa is on top, the bilayer structures show lower coercivity than when FeNi is on top. Meanwhile, increase of the proportion of FeNi in the bilayer structure could affect the H-c and M-r/M-s. The ferromagnetic resonance peak of FeGa on top moves to a high field compared with FeNi on top. Moreover, FeGa on top shows improved complex permeability and a clear resonant phenomenon of the magnetization. These properties make FeGa/FeNi bilayer structure a potential candidate for high-frequency application.

DOI： 10.3390/coatings10040383

WOS 号： 000534630600080

第 18 篇

标　　题： Subharmonic And Combination Resonance Of Rotating Pre-Deformed Blades

Subjected To High Gas Pressure

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通讯作者：Chen, LQ (corresponding author), Harbin Inst Technol, Sch Sci, Shenzhen 518055, Peoples R China.

期　　刊：ACTA MECHANICA SOLIDA SINICA

摘　　要：The present paper deals with the investigation of dynamic responses of a rotating pre-deformed blade in four cases of resonance, including two subharmonic resonances and two combination resonances. The dimensionless gas excitation amplitude is assumed to share the same order with the dimensionless vibration displacement. Four cases of resonance are confirmed by examining the secular terms. The theoretical analysis framework is established for each resonance case based on the method of multiple scales. The original dynamic system is integrated numerically by the Runge-Kutta method. The frequency components and phases obtained from fast Fourier transform of the numerical response are used to verify the theoretical results. For the purpose of contrast, modulation equations are also integrated numerically. In all four resonance cases, the theoretical results agree well with the numerical simulation. Parameter studies are conducted to clarify the effects of system parameters on the perturbation curves. Various results are obtained for the rotating blade. A quasi-saturation phenomenon occurs in both combination resonances of summed type and difference type, and the corresponding limit value of the second-mode response can be reduced by decreasing the external detuning parameter. The quasi-saturation phenomenon of rotating blade only appears with high gas pressure. The subharmonic resonance of second mode and the combination resonance of summed type are hard to excite in practice compared with the other two cases.

DOI：10.1007/s10338-020-00168-x

WOS 号：000530978400001

第 19 篇

标　　题：Porous Effects On Heat Transfer And Ions Distribution In Ysz Using Molecular Dynamics Simulation

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期　　刊：CHEMICAL PHYSICS LETTERS

摘　　要：The mutual effects of heat transfer and ions distribution on YSZ with porous structures have been investigated in this paper. Various of porous YSZ microstructures were

simulated to elucidate the relationships of ions spacial distribution and heat transfer from atomic perspective. Typical ion movement and the phonon vibrational density of state were investigated in various porous systems. The simulation results show that thermal transport behavior bonds close to the ions distribution in porous systems. The ions distribution nearby pores in the system have a predictable reduction effects on thermal transport behavior, which could lead to a decrease in thermal conductivity.

DOI： 10.1016/j.cplett.2020.137339

WOS 号： 000528934200023

第 20 篇

标　　题： Stability Of Traveling Waves For Partially Degenerate Nonlocal Dispersal Models In Periodic Habitats

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期　　刊： APPLIED MATHEMATICS LETTERS

摘　　要： Recently, the spreading speeds and periodic traveling wave solutions for a general class of partially degenerate nonlocal dispersal cooperative systems in time and space periodic habitats have been investigated. In this paper, we continue to study the stability and convergence rate for such time and space periodic traveling waves. We show that if the initial function perturbation is uniformly bounded with respect to a weighted maximum norm, the periodic traveling wave solution is globally exponentially stable when the wave speed is greater than the spreading speed.

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WOS 号： 000521510800034

第 21 篇

标　　题： An Approach To Generate Dna Polyhedral Links Of One/Two Strands

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期　　刊： JOURNAL OF MOLECULAR GRAPHICS & MODELLING

摘　　要： Scientists can change programmed DNA strands to adjust edge length and vertex junction to control the 3D structures with precision space signatures. The number of strands plays an important role in sequence design, synthesis and constitutive property. However, the majority of DNA branched polyhedra comprise a number of single strands. Therefore, it is crucial to make the number of strands to be calculated as less as possible. DNA polyhedral links are regarded as ideal templates of DNA polyhedra. In this research, we introduce odd-half turn edges and pseudo-surrounded vertexes to build DNA polyhedral links and reduce the strands number of them to one or two. Compare

to the known strategies, our strategy is well established to generate the DNA polyhedral links of one/two DNA strands easier and faster. All Platonic, pyramid and prism polyhedral links may provide candidates for DNA polyhedra synthesis. (C) 2020 Elsevier Inc. All rights reserved.

DOI： 10.1016/j.jmgm.2020.107565

WOS 号： 000528634500003

第 22 篇

标　　题： Recent Climate Changes In The Northwestern Qaidam Basin Inferred From Geothermal Gradients

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通讯作者： Liu, J (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊： EARTH SCIENCE INFORMATICS

摘　　要： Temperature perturbations under the ground surface are a direct thermal response to temperature changes on the ground surface. Thus, borehole temperature measurements can be used to reconstruct the temperature history of the ground surface using borehole Paleothermometry. In this study, we use seven borehole temperature profiles to reconstruct the ground surface temperature variation for the past 514 years in the Qaidam Basin, northwestern China. Borehole transient temperature measurements from seven sites in the northwestern Qaidam Basin were separated from the geothermal gradients and analyzed using the functional space inversion method to determine the ground surface temperature variation history of the region. All of the temperature profiles show the effects of recent climatic disturbances. The inversion reveals that during the last 514 years, the ground surface temperature has increased by an average of 1.2 degrees C (-0.11 to 2.21 degrees C). Clear signs of a cold period between 1500 and 1900 A.D. were found, which corresponds to the Little Ice Age. The coldest period occurred between 1780 and 1790 A.D. with a ground surface temperature of 5.4 degrees C. The reconstructed ground surface temperature shows an increasing trend during the 19th and the 20th centuries, but the temperature began to decrease in the late twentieth century. However, during the past 514 years, the highest temperature occurred in the 1990s. This reconstructed ground surface temperature variation history is verified by the simulated annual surface air temperature computed using EdGCM, while the cooling trend is confirmed by reconstructions of the winter half-year minimum temperatures from tree rings on the northeastern Tibetan Plateau.

DOI： 10.1007/s12145-019-00425-9

WOS 号： 000533083300004

第 23 篇

标　　题： Cartesian Closedness Of A Category Of Non -Frame Valued Complete Fuzzy Orders

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期　　刊： FUZZY SETS AND SYSTEMS
摘　　要： Let H={0, 1/2, 1} with the natural order and p&q= max{p+ q- 1, 0} for all p, q is an element of H. We know that the category of liminf complete H-ordered sets is Cartesian closed. In this paper, it is proved that the category of conically cocomplete H-ordered sets with liminf continuous functions as morphisms is Cartesian closed. More importantly, a counterexample is given, which shows that the function spaces consisting of liminf continuous functions of complete H-ordered sets need not be complete. Thus, the category of complete H-ordered sets with liminf continuous functions as morphisms is not Cartesian closed. (c) 2020 Elsevier B.V. All rights reserved
DOI： 10.1016/j.fss.2020.02.004
WOS 号： 000535181800005

第 24 篇
标　　题： On The Generalized Characteristic Polynomial Of A Graph
作　　者： [Liu, Shunyi] Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China
通讯作者： Liu, SY (corresponding author), Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China.
期　　刊： ARS COMBINATORIA
摘　　要： Let G be a graph on n vertices, and let A(G') and D(G') denote respectively the adjacency matrix and the degree matrix of G. The generalized characteristic polynomial of G is defined as F-G(lambda, mu) = det(lambda I-n, - (A(G) - mu D(G))), where I-n is the identity matrix of size n.. We can write F-G(lambda, mu) in the coefficient form Sigma(n)(i=0) c(mu i)(G)lambda(n-i). In this paper, we give combinatorial expressions for the first five coefficients of F-G(lambda, mu). The eigenvalues of the matrix A(G) - mu D(G) of some graphs are obtained. Furthermore, we compute the generalized characteristic polynomials for all graphs on at most 10 vertices, and count the number of such graphs for which there is another graph with the same generalized characteristic polynomial. The present data show that the generalized characteristic polynomial is quite efficient to characterize graphs.
WOS 号： 000635710500006

第 25 篇
标　　题： Evaluation Of Biosynthesis Parameters, Stability And Biological Activities Of Silver Nanoparticles Synthesized Bycornus Officinalisextract Under 365 Nm Uv Radiation
作　　者： [Wang, Yinghui; Wang, Kang; Duan, Jinwei; Cui, Lin; Zheng, Huayu; Wang, Ying; Wang, Shanshan] Changan Univ, Coll Sci, Xian 710064, Peoples R China; [Wei, Simin; Wang, Zhe] Shaanxi Univ Chinese Med, Shaanxi Innovat Drug Res Ctr, Shaanxi Collaborat Innovat Ctr Chinese Med Resour, State Key Lab Res & Dev Characterist Qin Med Reso, Xianyang 712083, Peoples R China
通讯作者： Wei, SM (corresponding author), Shaanxi Univ Chinese Med, Shaanxi Innovat Drug Res Ctr, Shaanxi Collaborat Innovat Ctr Chinese Med Resour, State Key Lab Res & Dev Characterist Qin Med Reso, Xianyang 712083, Peoples R China.
期　　刊： RSC ADVANCES

摘　　要：Since silver nanoparticles (AgNPs) synthesized by using plant extracts revealed varied biological activities, the green synthesis of AgNPs has attracted considerable attention. Although the green synthesis of AgNPs have been accomplished by using the extracts ofCornus Officinalis, which is a traditional Chinese medicine and exhibits a wide spectrum of phytochemicals. The effects of biosynthesis parameters on reducing reaction, stability and more broad biological activities of so-prepared AgNPs did not been evaluated. In this paper, we firstly assessed the effects of UV radiation, pH, material proportion and radiation times on the green synthesis of AgNPs under 365 nm UV radiation by UV-visible spectrum and dynamic light scattering (DLS) analysis. The results showed that UV radiation could accelerate the formation of AgNPs and influence the average size below pH 7.0, and the size of so-prepared AgNPs were sensitive to the pH and material proportion, but no obvious changes to UV radiation times, offering a size-controlled synthetic method for AgNPs. The further X-ray diffraction (XRD), transmission electron microscopy (TEM) and DLS studies showed AgNPs synthesized at pH 7.0, extract: AgNO3= 1 : 1 and after 4 h UV radiation were a face-centered cubic (fcc) structure and both spherical and polygonal in shape with average particle size of 64.5 +/- 0.3 nm existed in a monodispersed form. Subsquently, the stability of AgNPs was analyzed by zeta potential (-24.8 mV) and the average size measurement after 30 days storage (63.3 +/- 0.4 nm), revealing a high degree of stability. Lastly, the investigation of biological activities showed that the biosynthesized AgNPs had potent antioxidant activity, antimicrobial activity against bothS. aureusandE. colias well as anticancer activity against HCT116 and HepG2 cell lines but negligible cytotoxicity against SW620. And the internalization of biosynthesized AgNPs inside the bacterial cell was evaluated by flow cytometric analysis, where the SSC values have significant increase after treating with nanoparticles. These results confirmed that the biosynthesis parameters on the green synthesis of AgNPs by usingCornus Officinalisextract also played pivotal roles and so-prepared AgNPs would be useful for the development of new alternative antioxidant, antimicrobial and anticancer agents in biomedicine.

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WOS 号：000555612200059

第 26 篇

标　　题：A Fourth Order Weno Scheme For Hyperbolic Conservation Laws

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通讯作者：Cheng, XH (corresponding author), Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China.

期　　刊：ADVANCES IN APPLIED MATHEMATICS AND MECHANICS

摘　　要：In this work, a fourth order weighted essentially non-oscillatory (WENO) scheme is developed for hyperbolic conservation laws. The new reconstruction is a convex combination of three linear reconstructions. To keep high order accuracy in smooth regions and maintain non-oscillatory near discontinuities, the nonlinear weights are carefully designed. The main advantage of the proposed scheme is that the scheme

achieves one order of improvement in accuracy in smooth regions compared with the classical third order scheme when using the same spatial nodes. Several benchmark examples are presented to verify the scheme's fourth order accuracy and capacity of dealing with problems containing complicated structures.

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WOS 号： 000538166100007

第 27 篇

标　　题： Dependence Space Models To Construct Concept Lattices

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期　　刊： INTERNATIONAL JOURNAL OF APPROXIMATE REASONING

摘　　要： Concept lattice is a kind of efficient mathematical tools for data analysis and knowledge discovery. In this paper, dependence space models are constructed to obtain a concept lattice. For a formal context, a congruence relation is first defined based on a sufficiency operator on the power set of the attribute set. A dependence space is generated. By using the dependence space, we introduce a closure operator. Related properties of the operator are discussed. It is also proved that any closed element of the closure operator is the maximum element in the attribute granule generated by the element. Further, the closed element is just the intension of some formal concept. Similarly, we define a congruence relation on the basis of a sufficiency operator, and introduce a dependence space on the power set of the object set. A closure operator is proposed for the subset of objects. The corresponding closed element of the closure operator is the maximum element in each object granule. All maximum elements generate the set of all extensions of the concept lattice. An example is used to show the validity of the approach to obtain all intensions. Finally, we introduce a dominance congruence relation, which is used to produce a closure operator. The dependence of attributes is defined based on the closure operator. The related decision rules are discussed.

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WOS 号： 000540209500001

第 28 篇

标　　题： Face Clustering Via Learning A Sparsity Preserving Low-Rank Graph

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通讯作者： Song, XL (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R

China.

期　　刊：MULTIMEDIA TOOLS AND APPLICATIONS

摘　　要：Face clustering aims to group the face images without any label information into clusters, and has recently attracted considerable attention in machine learning and data mining. Many graph based clustering methods have been proposed and among which sparse representation (SR) and low-rank representation (LRR) are two representative methods for affinity graph construction. The clustering result may be inaccurate if the affinity graph is constructed with low quality. In this paper, we propose a novel face clustering method via learning a sparsity preserving low-rank graph (LSPLRG), where the initial affinity graph is derived on the sparse coefficients without any a priori graph or similarity matrix. In addition, an adaptive weighted matrix is imposed on the data reconstruction errors to enhance the role of important features, while a constraint on the representation matrix is to reduce the redundant features. By integrating the local distance regularization term into LRR, LSPLRG could exploit the global and local structures of data simultaneously. These appealing properties allow LSPLRG to well capture the intrinsic structure of data, and thus has potential to improve clustering performance. Experiments conducted on several face image databases demonstrate the effectiveness and robustness of LSPLRG compared with several state-of-the-art subspace clustering methods.

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WOS 号：000557749700001

第 29 篇

标　　题：Existence And Stability Of Traveling Waves For A Competitive-Cooperative Recursion System

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期　　刊：ELECTRONIC JOURNAL OF DIFFERENTIAL EQUATIONS

摘　　要：This article concerns the existence and global stability of bistable traveling waves for a competitive-cooperative recursion system. We first show that the spatially homogeneous system associated with the competitive-cooperative recursion system admits a bistable structure. Then using the theory of bistable waves for monotone semiflows and a dynamical system approach, we prove that there exists an unique and global stable traveling wave solution connecting two stable equilibria for such recursion system under appropriate conditions.

WOS 号：000559953600001

第 30 篇

标　　题：Optimal Binary Linear Codes From Maximal Arcs

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通讯作者： Heng, ZL (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊： IEEE TRANSACTIONS ON INFORMATION THEORY

摘　　要： The binary Hamming codes with parameters [2(m) - 1, 2(m) - 1- m, 3] are perfect. Their extended codes have parameters [2(m), 2(m) - 1- m, 4] and are distance-optimal. The first objective of this paper is to construct a class of binary linear codes with parameters [2(m+s) + 2(s) - 2(m), 2(m+s) + 2(s) - 2(m) - 2m- 2, 4], which have better information rates than the class of extended binary Hamming codes, and are also distance-optimal. The second objective is to construct a class of distance-optimal binary codes with parameters [2(m) +2, 2(m)- 2m, 6]. Both classes of binary linear codes have new parameters.

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WOS 号： 000562052000007

第 31 篇

标　　题： Analytical Model Of Circular Tube With Wide External Circumferential Grooves Under Axial Crushing

作　　者： [Yao, Ru-Yang; Yin, Guan-Sheng; Zhang, Bei] Changan Univ, Sch Sci, Xian, Peoples R China; [Hao, Wen-Qian] Northwestern Polytech Univ, Dept Engn Mech, Xian, Peoples R China

通讯作者： Yao, RY; Yin, GS (corresponding author), Changan Univ, Sch Sci, Xian, Peoples R China.

期　　刊： INTERNATIONAL JOURNAL OF CRASHWORTHINESS

摘　　要： As an energy absorber, circular tube with wide external circumferential grooves has excellent mechanical properties, and it has been defined as 'Type B' grooved tube. In the present work, a novel analytical model of 'Type B' grooved tube is proposed by considering the curvature of plastic hinge. In addition, the fitting equation of the maximum angular displacement of a thin-walled section is obtained. The theoretical methodology indicated that both the total energy absorption and mean crushing force depend on the geometric ratiosR/handh/t. Based on axisymmetric assumption, a numerical model is established and the corresponding results are validated by a previous research. The theoretical and simulation results of total energy absorption and mean crushing force are compared with research results of previous studies. The conclusion shows that the present analytical model is more accurate to predict the energy absorption and mean crushing force of 'Type B' grooved tube under quasi-static condition. The energy absorption performance of 'Type B' grooved tube under quasi-static crushing can be improved by designing the thin-walled section as a stocky shape. Moreover, the model can also predict the response of 'Type B' grooved tube under dynamic condition when the strain rate sensitivity of material is introduced.

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第 32 篇

标　　题：Strongly Reciprocally P-Convex Functions And Some Inequalities
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通讯作者：Saleem, MS (corresponding author), Univ Okara, Dept Math, Okara, Pakistan.
期　　刊：JOURNAL OF MATHEMATICS
摘　　要：In this paper, we generalize the concept of strong and reciprocal convexity. Some basic properties and results will be presented for the new class of strongly reciprocally p-convex functions. Furthermore, we will discuss the Hermite-Hadamard-type, Jensen-type, and Fejer-type inequalities for the strongly reciprocally p-convex functions.
DOI：10.1155/2020/4957141
WOS 号：000572084300001

第 33 篇
标　　题：The Effects Of Interface Layer In Lz/Ysz Coupled System During Thermal Transportation At Elevated Temperatures: A Molecular Dynamics Simulation Study
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通讯作者：Wang, XZ (corresponding author), Changan Univ, Dept Appl Phys, Xian 710064, Peoples R China.
期　　刊：CHEMICAL PHYSICS LETTERS
摘　　要：This paper investigates the effects of interface layer on thermal transport behavior of LZ/YSZ coupled system at various temperatures. Thermal transport behavior of LZ/YSZ coupled system was studied at atomic level. Trajectories of atoms near the interface layer in both LZ and YSZ unit were simulated at various temperatures between 1273 and 1473 K. Spatial distribution of atoms near the interface layer was illustrated at elevated temperatures. Radial distribution function of Y3+ ions was used to analyze changes in this spatial distribution, as it was affected by thermal transport inside the coupled system. Distances of typical atomic pairs close to the interface layer were used to describe the vibrational intensity in coupled system. Simulation results show that thermal transport behavior was influenced by the interface layer in LZ/YSZ systems with different LZ:YSZ ratio. The vibrational intensity of atoms and distance between atoms reflected heat flow inside the system from an atomic perspective.
DOI：10.1016/j.cplett.2020.137788
WOS 号：000563755200013

第 34 篇
标　　题：Stability Of Periodic Traveling Waves For Nonlocal Dispersal Cooperative Systems In

Space-Time Periodic Habitats

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期　　刊：ZEITSCHRIFT FUR ANGEWANDTE MATHEMATIK UND PHYSIK

摘　　要：The current paper is devoted to the study of the stability of space-time periodic traveling wave solutions and positive space-time periodic entire solutions of nonlocal dispersal cooperative systems in space-time periodic habitats. We first show the existence, uniqueness and stability of positive space-time periodic entire solution u*(t, x) for such nonlocal dispersal cooperative system. The existence of space-time periodic traveling wave solution connecting 0 and positive spacetime periodic entire solution u*(t, x) has been established by Bao, Shen and Shen (Commun. Pure Appl. Anal. 18: 361-396, 2019). In this paper, by using comparison principle and a weight function, we further show that the space-time periodic traveling wave solution for nonlocal dispersal cooperative system is asymptotically stable, as long as the initial value is uniformly bounded in a weighted space.

DOI：10.1007/s00033-020-01396-4

WOS 号：000576379600002

第 35 篇

标　　题：Polarization-Induced Anisotropic Damping In Co/[Pb (Mg1/3Nb2/3)O-3](0.7)-[Pbtio3](0.3) (011) Heterostructure

作　　者：[Wang, Fenglong; Wang, Zhen; Xu, Chunlong; Zhao, Xiaogang; Hou, Zhaoyang] Changan Univ, Dept Appl Phys, Xian 710064, Peoples R China

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期　　刊：APPLIED PHYSICS LETTERS

摘　　要：This study investigates the magnetic dynamics of a ferroelectric/ferromagnetic heterostructure mediated by a charge/strain-induced magnetoelectric interaction that exhibits a pronounced dynamic magnetic response to an electric field. In the experimental process, the epitaxial strain gave rise to electrically tunable uniaxial magnetic anisotropy, and spin accumulation at the interface led to large anisotropic damping with a C 2 upsilon symmetry. The results show the significant potential for applications of composite multiferroics and provide a feasible approach for high-performance devices that rely on electrically controlled magnetism.

DOI：10.1063/5.0020497

WOS 号：000577125200006

第 36 篇

标　　题：Impact Of Media Reports On The Early Spread Of Covid-19 Epidemic

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通讯作者：Tang, SY (corresponding author), Shaanxi Normal Univ, Coll Math & Informat Sci,

Xian 710062, Peoples R China.

期　　刊：JOURNAL OF THEORETICAL BIOLOGY

摘　　要：Media reports can modify people's knowledge of emerging infectious diseases, and thus changing the public attitudes and behaviors. However, how the media reports affect the development of COVID-19 epidemic is a key public health issue. Here the Pearson correlation and cross-correlation analyses are conducted to find the statistically significant correlations between the number of new hospital notifications for COVID-19 and the number of daily news items for twelve major websites in China from January 11th to February 6th 2020. To examine the implication for transmission dynamics of these correlations, we proposed a novel model, which embeds the function of individual behaviour change (media impact) into the intensity of infection. The nonlinear least squares estimation is used to identify the best-fit parameter values in the model from the observed data. To determine impact of key parameters with media impact and control measures for the later outcome of the outbreak, we also carried out the uncertainty and sensitivity analyses. These findings confirm the importance of the responses of individuals to the media reports, and the crucial role of experts and governments in promoting the public under self-quarantine. Therefore, for mitigating epidemic COVID-19, the media publicity should be focused on how to guide people's behavioral changes by experts, and the management departments and designated hospitals of the COVID-19 should take effective quarantined measures, which are critical for the control of the disease. (C) 2020 Elsevier Ltd. All rights reserved.

DOI：10.1016/j.jtbi.2020.110385

WOS 号：000551687300010

第 37 篇

标　　题：Energy Absorption Characteristics Of Multi-Cell Tubes With Different Cross-Sectional Shapes Under Quasi-Static Axial Crushing

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通讯作者：Yin, GS (corresponding author), Changan Univ, Sch Sci, Xian, Peoples R China.

期　　刊：INTERNATIONAL JOURNAL OF CRASHWORTHINESS

摘　　要：Energy absorption characteristics of polygonal multi-cell tubes with different cross-sectional shapes under quasi-static axial crushing are investigated systematically. Based on the SSFE theory and CE method, theoretical models for predicting mean crushing force of tubes are proposed, and theoretical expressions of normalized mean crushing force (NFm) and normalized special energy absorption (NSEA) of tubes are derived. Numerical models for predicting the energy absorption characteristics also are established using the software ABAQUS/Explicit. The results of theoretical predictions and numerical simulations about 36 design conditions are in good agreement with experimental results those obtained by previous authors. Adding inner panels can improve the energy absorption characteristics of thin-walled tubes. And adding Cross-type inner panels in S, H and O single-cell tubes has more remarkable

improvement than that of adding X-type and Y-type inner panels. The NFm increases with the increase of wide-thickness ratio, and NSEA decreases with the increase of wide-thickness ratio.

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WOS 号： 000576701300001

第 38 篇

标　　题： Theoretical Study Of The Adsorption Behaviors Of Gas Molecules On The Au-Functionalized Mos2 Nanosheets: A Search For Highly Efficient Gas Sensors

作　　者： [Xu, Shiqiang] Changan Univ, Sch Sci, Xian 710064, Shaanxi, Peoples R China; [Zhang, Yong] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Shaanxi, Peoples R China; [Xu, Fu; Chen, Chaoran] Changan Univ, Sch Highway, Xian 710064, Shaanxi, Peoples R China; [Shen, Zhihao] Changsha Univ, Hunan Key Lab Appl Environm Photocatalysis, Changsha 410022, Peoples R China

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期　　刊： COMPUTATIONAL AND THEORETICAL CHEMISTRY

摘　　要： Using the density functional theory calculations, we explored the electronic, and magnetic properties of Au and Pt adsorbed MoS2 systems. We examined the binding of some gas molecules (CO, CO2, NH3, NO, NO2, and O-3) on these noble metal adsorbed structures. Stability analysis based on binding energy calculations indicate that both Au-adsorbed and Pt-adsorbed MoS2 monolayers are energetically stable and can be considered as a promising nanostructure media for gas sensing and capturing. The binding strength of gas molecules over the Au-adsorbed structures was found to be higher than that over the non-adsorbed systems, being attributed to their higher adsorption energies. Band structure calculations reveal a metallic characteristics for Au-adsorbed MoS2 systems, while Pt-adsorbed ones show semiconductor nature. The substantial overlaps of the local density of states of the Au atom and substrate's interacting atoms are an indication of a covalent interaction and consequently chemisorption process at the interface.

DOI： 10.1016/j.comptc.2020.112935

WOS 号： 000566785400004

第 39 篇

标　　题： Three To One Internal Resonances Of A Pre-Deformed Rotating Beam With Quadratic And Cubic Nonlinearities

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期　　刊： INTERNATIONAL JOURNAL OF NON-LINEAR MECHANICS

摘　　要： The primary resonances of a pre-deformed rotating beam model including the quadratic

and cubic nonlinearities are investigated in the presence of the 3:1 internal resonance. The steady state responses of the beam are analyzed in two cases of the primary resonance with the method of multiple scales. The original dynamic equation is integrated numerically in two frequency sweep directions. The theoretical results are consistent with those obtained in the numerical simulation. The contributions of quadratic nonlinearities and cubic nonlinearities to the primary resonances behavior of the rotating beam are clarified. The frequency response curves are discussed by considering different model parameters such as the thermal gradient, the rotating speed, the damping coefficient and the gas pressure. The stability regions of coupled mode solutions are compared between the models with different nonlinearities in the case of the primary resonance of the second mode. A series of interesting findings are presented.

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WOS 号： 000568179400009

第 40 篇

标　　题： Two Families Of Optimal Linear Codes And Their Subfield Codes

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期　　刊： IEEE TRANSACTIONS ON INFORMATION THEORY

摘　　要： In this paper, a family of [q(2) - 1, 4, q(2) - q - 2] cyclic codes over F-q meeting the Griesmer bound is presented. Their duals are [q(2) - 1, q(2) - 5, 4] almost MDS codes and are optimal with respect to the sphere-packing bound. The q(0)-ary subfield codes of this family of cyclic codes are also investigated, where q(0) is any prime power such that q is power of q(0). Some of the subfield codes are optimal and some have the best known parameters. It is shown that the subfield codes are equivalent to a family of primitive BCH codes and thus the parameters of the BCH codes are solved. The duals of the subfield codes are also optimal with respect to the sphere-packing bound. A family of [q(2), 4, q(2) - q - 1] linear codes over Fq meeting the Griesmer bound is presented. Their duals are [q(2), q(2) - 4, 4] almost MDS codes and are optimal with respect to the sphere-packing bound. The q(0)-ary subfield codes of this family of linear codes are also investigated, where q(0) is any prime power such that q is power of q(0). Five infinite families of 2-designs are also constructed with three families of linear codes of this paper.

DOI： 10.1109/TIT.2020.3006846

WOS 号： 000583513400018

第 41 篇

标　　题： The Finite Element Numerical Investigation Of Free Surface Newtonian And Non-Newtonian Fluid Flows In The Rectangular Tanks

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通讯作者：Gao, PY (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：In this paper, we develop a new computational framework to investigate the sloshing free surface flow of Newtonian and non-Newtonian fluids in the rectangular tanks. We simulate the flow via a two-phase model and employ the fixed unstructured mesh in the computation to avoid the mesh distortion and reconstruction. As for the solution of Navier-Stokes equation, we utilize the SUPG finite element method based on the splitting scheme. The same order interpolation functions are then used for velocity and pressure. Moreover, the moving interface is captured via the concise level set method. We take advantage of the implicit discontinuous Galerkin method to handle the solution of level set and its reinitialization equations. A mass correction technique is also added to ensure the mass conservation property. The dam break-free surface flow is simulated firstly to demonstrate the validity of our mathematical model. In addition, the sloshing Newtonian fluid in the tank with flat and rough bottoms is considered to illustrate the feasibility and robustness of our computational scheme. Finally, the development of free surface for non-Newtonian fluid is also studied in the two tanks, and the influence of power-law index on the sloshing fluid flow is analyzed.

DOI：10.1155/2020/7548192

WOS 号：000594637500003

第 42 篇

标　　题：Data-Based Reconstruction Of Chaotic Systems By Stochastic Iterative Greedy Algorithm

作　　者：[Xiao, Yuzhu; Dong, Guoli; Song, Xueli] Changan Univ, Appl Math & Informat Sci, Xian 710064, Peoples R China; [Xiao, Yuzhu] Univ Oklahoma, Dept Math, Norman, OK 73019 USA

通讯作者：Xiao, YZ; Song, XL (corresponding author), Changan Univ, Appl Math & Informat Sci, Xian 710064, Peoples R China.; Xiao, YZ (corresponding author), Univ Oklahoma, Dept Math, Norman, OK 73019 USA.

期　　刊：MATHEMATICAL PROBLEMS IN ENGINEERING

摘　　要：It is challenging to reconstruct a nonlinear dynamical system when sufficient observations are not available. Recent study shows this problem can be solved by paradigm of compressive sensing. In this paper, we study the reconstruction of chaotic systems based on the stochastic gradient matching pursuit (StoGradMP) method. Comparing with the previous method based on convex optimization, the study results show that the StoGradMP method performs much better when the numerical sampling period is small. So the present study enables potential application of the reconstruction method using limited observations in some special situations where limited observations can be acquired in limited time.

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WOS 号：000594637500006

第 43 篇

标　　题：Boundary Effect And Dynamic Response Study For The Penetration Of Rigid Projectiles Into Thick, Finite-Radius, Metallic Targets

作　　者：[Wang, Juan; Zhou, Yuan] Changan Univ, Coll Sci, Xian 710064, Peoples R China; [Zhao, Junhai; Sun, Shanshan] Changan Univ, Sch Civil Engn, Xian 710061, Peoples R China

通讯作者：Wang, J (corresponding author), Changan Univ, Coll Sci, Xian 710064, Peoples R China.

期　　刊：SHOCK AND VIBRATION

摘　　要：This study uses the unified strength theory to analyse the elastoplastic stage and plastic stage of a linear strain-hardening target material while considering the effects of the intermediate principal stress and the free lateral boundaries of the target. In this investigation, analytical solutions of the radial stress in the cavity wall are obtained, and a unified penetration model of the target material is built. On this basis, penetration resistance formulas and penetration depth formulas for rigid projectiles with various nose shapes penetrating into thick, finite-radius, metallic targets are deduced, the solutions of which are obtained by utilizing the Simpson method. Accordingly, the proposed method offers a broader scope of application and higher accuracy than previous methods. Through this method, a series of analytical solutions based on different criteria can be obtained, and the penetration depth ranges of targets under different striking velocities can be effectively predicted. Moreover, penetration processes under different conditions are numerically simulated using the software ANSYS/LS-DYNA to study the motion law of the projectiles and the dynamic response of the targets. From the theoretical and numerical approaches, a list of influencing factors for terminal ballistic effects are analysed, including the strength criterion differences, the strength parameter b, the striking velocity v0, the projectile nose shape, and the target radius-to-projectile radius ratio r(t)/a. The results indicate that, as b changes from 1 to 0, the penetration depth D-max increases by 22.45%. Additionally, D-max increases by 40.76% when r(t)/a changes from 16 to 4; hence, it cannot be calculated as an unlimited-size target anymore when r(t)/a <= 16. In weapons field tests, the radius of the metallic target can be conservatively designed to be greater than 28 times the projectile radius to ignore the effect from the free lateral boundaries of the target.

DOI：10.1155/2020/8832925

WOS 号：000595609300007

第 44 篇

标　　题：Modeling Analysis Of The Upper Limit Water Level Mechanism In The Upstream Reservoir Of A Dam Embankment

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710064, Shaanxi, Peoples R China.

期　　刊：ADVANCES IN CIVIL ENGINEERING

摘　　要：The dam embankment (DE) is a highway structure used in the Loess Plateau to integrate the functions of a highway embankment and a dam. This paper studies the upper limit water level mechanism of the reservoir in the upstream of the DE to determine the criterion for setting upper culverts on the DE. A reservoir model is first established, and then the replenishment and loss of the reservoir water is simulated. The principle of water balance is employed to obtain water level formulas for the reservoir. Finally, an engineering example is used to verify the upper limit water level mechanism. The results show that the water level of the reservoir fluctuates near an ideal balance water level and an upper limit water level exists. Moreover, the upper limit water level has no relation to the water storage time, and is only related to the reservoir shape with big upper and small bottom, the small amount of water entering the reservoir each year, and the large water loss caused by evaporation and leakage. The upper culvert setting criterion is obtained through the upper limit water level mechanism, and it will provide important reference significance for the necessity of the DE culvert setting.

DOI：10.1155/2020/8850681

WOS 号：000598588200011

第 45 篇

标　　题：Study Of Cut-Set Distributions In The Fuzzy Reliability Evaluation Models

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通讯作者：Zhang, M (corresponding author), Changan Univ, Sch Sci, Xian 710064, Peoples R China.

期　　刊：APPLIED MATHEMATICAL MODELLING

摘　　要：The performances of the cut-set distributions in the fuzzy reliability evaluation are studied based on cut-set method. Firstly, a theorem is proved to indicate the convergence defect of the model with the three commonly used cut-set distributions, including uniform distribution, linear distribution and truncated normal distribution. Secondly, a general method is proposed to construct a new family of cut-set distributions named intrinsic cut set distributions, and three specific intrinsic cut-set distributions are obtained based on this method, including modified truncated normal distribution, truncated lognormal distribution and truncated Weibull distribution. Thirdly, numerical examples are carried out to verify the above theoretical results. It is shown that, compared with the three commonly used cut-set distributions, the proposed intrinsic cut-set distributions make the evaluation more stable and the fuzzy reliability model achieve good convergence at the boundary cases, which could effectively improve the evaluation accuracy and broaden the application of the model. Finally, some recommendations are given to show how to choose a suitable cut-set distribution

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WOS 号： 000568745900009

第 46 篇

标　　题： Multiple Reversals Of Vortex Ratchet Effects In A Superconducting Strip With Inclined Dynamic Pinning Landscape*

作　　者： [He, An] Changan Univ, Coll Sci, Xian 710064, Peoples R China; [He, An] Northwestern Polytech Univ, Sch Aeronaut, Xian 710072, Peoples R China; [Xue, Cun] Northwestern Polytech Univ, Sch Mech Civil Engn & Architecture, Xian 710072, Peoples R China

通讯作者： Xue, C (corresponding author), Northwestern Polytech Univ, Sch Mech Civil Engn & Architecture, Xian 710072, Peoples R China.

期　　刊： CHINESE PHYSICS B

摘　　要： Using time-dependent Ginzburg-Landau formalism, we investigate the multiple reversals of ratchet effects in an unpatterned superconducting strip by the tilted dynamic pinning potential. In the case of collinear sliding potential and Lorentz force, vortices are always confined in the channels induced by sliding potential. However, due to the inclination angle of sliding pinning potential with respect to the Lorentz force, vortices could be driven out of the channels, and unexpected results with multiple reversals of vortex rectifications are observed. The mechanism of multiple reversals of vortex rectifications is explored by analyzing different vortex motion scenarios with increasing ac current amplitudes. The multiple reversals of transverse and longitudinal ratchet effects can be highly controlled by ac amplitude and dynamic pinning velocity. What's more, at certain large current the ratchet effect reaches strongest within a wide range of pinning sliding velocity.

DOI： 10.1088/1674-1056/abbbe5

WOS 号： 000597116900001

第 47 篇

标　　题： Mechanism Of Bubble Sinking In Vertically Vibrating Water

作　　者： [Zhao Xiao-Gang; Yang Hao-Ran; Cheng Lin; Zhang Xiang-Yu; Wang Feng-Long; Duan Cheng-Bo; Zhuo Wei; Xu Chun-Long; Hou Zhao-Yang] Changan Univ, Coll Sci, Xian 710064, Peoples R China; [Zhang Qi] Changan Univ, Sch Mat Sci & Engn, Xian 710064, Peoples R China

通讯作者： Zhao, XG; Yang, HR (corresponding author), Changan Univ, Coll Sci, Xian 710064, Peoples R China.

期　　刊： ACTA PHYSICA SINICA

摘　　要： When a container filled with water is subjected to vertical vibration, bubbles in the water may sink. This phenomenon exists widely in the field of engineering, and has a non-negligible influence on aerospace engineering and ship engineering. Therefore, it is of great significance to study the movement of bubble sinking in order to reduce the adverse effect caused by bubble sinking in the project. In previous papers, the effect of Basset force on bubble motion was usually ignored. In this paper, the bubble motion

model based on the ideal gas equation is built for spherical bubbles, and the influence of the Basset force on the bubble motion is considered in the model. In the process of solving Basset force, the motion is directly separated and the convergence factor is introduced in theoretical solution. The equal step composite trapezoid formula is applied to the numerical solution. The results of numerical calculation show that the added mass force is important for bubble sinking. We find that the Basset force has no effect on the stable oscillation position of bubble, but it can accelerate the later trajectory of bubble motion. Importantly, we demonstrate that the bubble is hindered by the following component forces: buoyancy, viscous resistance, and flow thrust (which are ordered from large to small value). The movement of the bubble is observed to be in the form of oscillation, and there exists a depth, i.e. a critical depth: the bubble oscillate steadily at this depth, specifically, the bubble rises above this depth and sinks below this depth. When the vibration pressure changes, the location of the bubble's stable oscillation will also be affected. The origin can be ascribed to the change of added mass force caused by the change of vibration pressure. Meanwhile, on the basis of digital image processing method, denoising, filtering, local stretching, image binarization and image filling are used to extract the characteristic dimension of bubbles. The theoretical value of the critical depth of bubble sinking matches the experimental result and their relative error is less than 5%. These new findings enrich the understanding of the moving bubbles in liquid materials used in nuclear reactors, rocket propulsion fuels and chemical experiments.

DOI： 10.7498/aps.69.20200571

WOS 号： 000601261600014

建筑学院

第 1 篇

标　　题： Operating Efficiency-Based Data Mining On Intensive Land Use In Smart City

作　　者： [Duan, Ya-Qiong; Fan, Xiao-Yang; Hou, Quan-Hua] Changan Univ, Sch Architecture, Xian 710061, Peoples R China; [Liu, Jia-Chen] CWAG, Xian 710061, Peoples R China

通讯作者： Hou, QH (corresponding author), Changan Univ, Sch Architecture, Xian 710061, Peoples R China.

期　　刊： IEEE ACCESS

摘　　要： The discordance between the operation of rail transit and surrounding land use is highlighted with the rapid construction of rail transit in China. The related research on coupling relationship is well needed. Taking 13 typical commercial service rail transit stations in Xi & x2019;an as the example, this article established the evaluation indicator of coordinated relationship between rail transit station operating efficiency and land use, and a data envelopment analysis (DEA)model was used to evaluate the coupling degree between them. According to the research results, the coupling development between operating efficiency and land use in Xi & x2019;an commercial service rail transit station is at a low level and there exists a huge difference between the two. Moreover, this research identified the key indexes that influence the coupling

development of the two, namely Class-A, Class-B, and Class-R land use proportion, plot ratio, land use mixture and parking facility control, and determined the reasonable control range of these four indices. The research promotes the intensive use of land around Xi & x2019;an rail transit station and better supports the sustainable operation of rail transit.

DOI： 10.1109/ACCESS.2020.2967437

WOS 号： 000524753200061

第 2 篇

标　　题： Safety Evaluation System Of Urban Traffic Network Based On Topological Genetic Algorithm

作　　者： [Yu, Kanhua; Wang, Yalun; Zhao, Wei] Changan Univ, Sch Architecture, Xian, Peoples R China

通讯作者： Yu, KH (corresponding author), Changan Univ, Sch Architecture, Xian, Peoples R China.

期　　刊： JOURNAL OF INTELLIGENT & FUZZY SYSTEMS

摘　　要： With the rapid development of rail transit, it puts forward higher requirements for safety. Once a safety accident occurs, it is highly destructive. It is of crucial significance and value to ensuring the safety of urban rail transit network by constructing an effective safety evaluation system. For purpose of this study, an urban transit network safety evaluation system based on topological genetic algorithm was constructed with an example of urban rail transit networking. Four indexes of urban rail transit safety were determined with the literature analysis method in combination with expert scoring method, including network heterogeneity, travel efficiency vulnerability, connection reliability and network capacity vulnerability. Besides, on the basis of some freeway networks and some freeway collecting toll data of Xi'an city, and the result of road network vulnerability, an index weight computing framework based on topological genetic algorithm was constructed. The result of simulation test shows that freeway manager should strengthen protection over nodes of large probability betweenness, and the urban transit network safety evaluation system based on topological genetic algorithm is of high feasibility and rationality.

DOI： 10.3233/JIFS-179760

WOS 号： 000558628900010

第 3 篇

标　　题： The Ecological Afforestation Project Benefit Evaluation Of Regional Sustainable Development: Example Of The Southeast Region Of China

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通讯作者： Zhang, WT (corresponding author), Changan Univ, Architecture Sch, Xian 710061, Shaanxi, Peoples R China.

期　　刊： FRESENIUS ENVIRONMENTAL BULLETIN

摘　　要： Forest resources are an important asset to ensure sustainable social and economic

development. In order to evaluate the benefits of ecological afforestation project and obtain a clear I/O situation. In this paper, the regional ecological afforestation project based on the guidance of green sustainable development was studied, and Fujian Province of China was taken as an example to evaluate the benefits. In which, several perspectives such as economic, water conservation, soil conservation and carbon sink were considered comprehensively. The two major indicators of water regulation and water treatment were used to measure the benefits of water conservation, and the benefits were calculated according to the perspective of soil conservation. In addition, the investment benefits of the project was evaluated to determine the complex income and value of the project. The results revealed that the initial input-output ratio of the three interest rates is very low, the conservation soil value of camphor and Taxus is not obvious in the early stage, the I/O ratio increases rapidly with the increase of years, and the input-output ratio is low in the initial stage. It has practical significance for the sustainable and healthy development of ecological afforestation projects.

DOI：

WOS 号： 000629180800058

第 4 篇

标　　题： Study On Coupling Degree Of Rail Transit Capacity And Land Use Based On Multivariate Data From Cloud Platform

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期　　刊： JOURNAL OF CLOUD COMPUTING-ADVANCES SYSTEMS AND APPLICATIONS

摘　　要： The study of exploring the internal connection between rail transit and land use is of great significance for the coordinated development of urban space and rail transit construction, and it is also important for the intensive use of land affected by rail transit stations. The land use structure and population density surrounding the stations of Line 1.2.3 of Xi'an Rail Transit were clustered by SPSS for identifying the rail transit stations with high population density. Subsequently, We have established an indicator system of urban land use and rail transit operation capabilities based on multivariate data, and explored the coordinated relationship between rail transit and land use through data envelopment analysis (DEA) evaluation methods at high population density stations. Besides, the coupling degree of land use in rail transit stations with high population density was evaluated, and the key indicators affecting the coupling degree were further analyzed in Xi'an. In conclusion, this study finds that the relationship between rail transit capacity and land use of high population density rail transit stations is unbalanced. Hence, to promote the sustainable development of rail transit capacity and surrounding land, it is suggested that we should confine the development of land use intensity around the station, improve the service functions of small-scale living areas, and optimize the travel environment intended for short-distance travel. For

residents, they are encouraged to choose the mode of rail transit for their long-distance travel. At the same time, the peak passenger flow at the stations should be evacuated accordingly.

DOI： 10.1186/s13677-020-0151-x

WOS 号： 000520156800001

第 5 篇

标　　题： Intelligent Urban Planning On Smart City Blocks Based On Bicycle Travel Data Sensing

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期　　刊： COMPUTER COMMUNICATIONS

摘　　要： The block is an important spatial unit of urban built-up areas. The investigation of the relationship between bicycle travel mode and land use characteristics at the scale of the block can effectively address the contradiction between the supply and demand for transportation under the background of stock characteristics. Herein, 21 typical blocks in Xi'an are applied as the research object, Mobike bicycle data, mobile phone signaling data and traditional survey data are employed. The correlation analysis and multiple linear regression analysis methods are used to identify the relationship between bicycle travel and land use. As a result, land use characteristics under the influence of bicycle travel are obtained. The results show that the land use indicators significantly related to street bicycle travel are composed of building mixing degree, floor area ratio and riding connectivity. Each index has a positive effect on street bicycle travel. The building mixing degree has the greatest impact on bicycle travel, followed by the floor area ratio and riding connectivity. In different periods, the impact of three indicators on bicycle travel varies. Especially, the impact on weekend bicycle travel is more obvious. This study can provide a reference for the optimization and transformation of land use in blocks under the influence of bicycle travel.

DOI： 10.1016/j.comcom.2020.01.066

WOS 号： 000527272900003

第 6 篇

标　　题： Performance Of Different Urban Design Parameters In Improving Outdoor Thermal Comfort And Health In A Pedestrianized Zone

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期　　刊：INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要：Global climate change and urban heat islands have generated heat stress in summer, which does harm to people's health. The outdoor public commercial pedestrianized zone has an important role in people's daily lives, and the utilization of this space is evaluated by their outdoor thermal comfort and health. Using microclimatic monitoring and numerical simulation in a commercial pedestrianized zone in Tai Zhou, China, this study investigates people's outdoor thermal comfort in extreme summer heat. The final results provide a comprehensive system for assessing how to improve outdoor human thermal health. Under the guidance of this system, local managers can select the most effective strategy to improve the outdoor thermal environment.

DOI：10.3390/ijerph17072258

WOS 号：000530763300090

第 7 篇

标　　题：Smart City Oriented Optimization Of Residential Blocks On Intensive Urban Sensing Data Based On Fuzzy Evaluation Algorithm

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期　　刊：JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING

摘　　要：The unreasonable planning of land use in residential blocks affects the quality of the city and the comfort and convenience of urban residents. How to improve the vitality of the street from the source is an urgent problem to be solved in urban and rural planning disciplines. This paper selects 18 residential districts in Xi'an, and uses a multivariate linear stepwise regression to establish a relationship model between street vitality and intensive land use indices in three different periods of non-commuting, weekly commuting, and weekend. Using fuzzy evaluation techniques, the degree of land use intensification in different residential blocks was analyzed. Using the relational model and evaluation conclusions, the appropriate range of street vitality in residential blocks was determined, and the constructed model was used to obtain the suitable index range for intensive land use under street vitality. The results show that the street vitality and building density, the proportion of commercial space along the street and the red line width of the street are most affected during the non-commuting period during the week. The street vitality during the commute period is most closely related to the building density, building mix and street network density. Street dynamics are most closely related to building density, building mix, and street red line width during weekends. The conclusions of the study provide theoretical support and data support for the optimization and transformation of land use in residential blocks, and ultimately aim to stimulate street vitality and promote the realization of intensive land use in residential blocks.

DOI： 10.1007/s12652-020-02104-w
WOS 号： 000534655900004

第 8 篇
标　　题： How Does Parking Availability Interplay With The Land Use And Affect Traffic Congestion In Urban Areas? The Case Study Of Xi'An, China
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通讯作者： Liu, JP (corresponding author), Xian Univ Arch & Tech Univ, Sch Archicture, 13 Middle Sect Yanta Rd, Xian 710065, Peoples R China.
期　　刊： SUSTAINABLE CITIES AND SOCIETY
摘　　要： Strategic development of parking spaces is considered as one of the leading solutions to alleviate urban congestion. However, few studies have quantified the interactions between land use and parking to investigate their emission impacts on traffic congestion. This study introduced a novel dimensionless ratio, the Extra Carbon Emission Index (ECEI) which estimates carbon dioxide (CO2) increments in the congestion condition of free-flowing traffic. Using a publicly accessible web-mapping service application, we collected the traffic speed data from dynamic urban road networks during peak hours of Xi'an city, China in 2017. A multiple regression model was applied to analyse the tripartite relationship among land use, parking availability and the ECEI. The results suggest that 1) supply-demand ratio of parking spaces, density and land use mix are negatively correlated to congestion; 2) parking availability is positively associated with spatial-temporal distribution of traffic flows, and this land use differentiates congestion in time and throughout the built environment; and 3) low-density parking lots and high-density parking spaces increase traffic congestion in residential districts, while adversely affect the compact land use towards sustainability. Compared to the reconstruction of land use, parking reform provides a more efficient way to alleviate congestion by coordinating the density of lots and spaces in residential districts.
DOI： 10.1016/j.scs.2020.102126
WOS 号： 000533520900001

第 9 篇
标　　题： An Evaluation System For Sustainable Urban Space Development Based In Green Urbanism Principles-A Case Study Based On The Qin-Ba Mountain Area In China
作　　者： [Yu, Xiaohui; Ma, Sai; Cheng, Kang] Changan Univ, Sch Architecture, Xian 710061, Peoples R China; [Kyriakopoulos, Grigorios L.] Natl Tech Univ Athens, Sch Elect & Comp Engn, Elect Power Div, Photometry Lab, Athens 15780, Greece
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& Comp Engn, Elect Power Div, Photometry Lab, Athens 15780, Greece.
期　　刊：SUSTAINABILITY
摘　　要：Since the 20th century, the deterioration of the ecological environment around the world has challenged urban space construction. With the development of urbanization, the consumption of resources and energy has increased, the level of biodiversity has decreased, environmental pollution is approaching the critical level, and the contradiction between human habitat activity and ecological environment has become increasingly prominent. The sustainable development of urban space along with its economic and social benefits, taking into account the quality of life and ecological environment, has become a new and important subject that needs to be explored. In this study, the indices of the evaluation system for sustainable urban spatial development in regions with underdeveloped economies but rich in ecological resources are arranged in sequence through the systematic coupling analysis of collaborative evaluation information and a quantitative analysis. The influences of urban space elements on sustainable urban development are disclosed. On the basis of the generated data, an evaluation system for sustainable urban spatial development with a complete set of information is proposed. The proposed system is applicable to urban spatial development evaluation in regions in China with underdeveloped economies but rich in ecological capital. First, the basic concept of system coupling is introduced, and a coupling relationship between urban sustainable development and urban space is proposed. Second, the elements of urban space and the sustainable development in the Qin-Ba mountain area are extracted, and the precedence diagram method is used to construct a sustainable evaluation system for urban space development in the Qin-Ba mountain area. Third, the sustainable evaluation process of urban spatial development is proposed. Finally, the sustainable evaluation system for urban spatial development in the Qin-Ba mountain area is applied to evaluate the urban spatial development in Shangluo, Qin-Ling Mountains, China. The results show that, among the investigated 14 indicators, the proportion of industrial land use mainly influences sustainable urban spatial development. As for the rest of the index factors, per capita green land area and green coverage ratio of built-up areas, per capita urban construction land area, proportion of forestry area, greening rate of built-up areas, total industrial dust emission density, proportion of cultivated area, and average volume fraction of residential areas are the secondary influencing factors of sustainable urban spatial development. The evaluation system in this research is constructed with the three aspects of green coordination, green development, and green sustainability of sustainable urban spatial development, and it complements the evaluation contents of urban-rural ecological space coordination, land resource protection, and green development community, and so on. The conclusion of this study not only can provide a useful reference for urban spatial development planning for underdeveloped ecological capital areas of China but also can provide a theoretical basis for the management and control policy of sustainable urban spatial development.
DOI：10.3390/su12145703
WOS 号：000555959000001

第 10 篇

标　　题：Smart City Oriented Ecological Sensitivity Assessment And Service Value Computing Based On Intelligent Sensing Data Processing

作　　者：[Duan, Yaqiong; Zhang, Lingda; Fan, Xiaoyang; Hou, Quanhua] Changan Univ, Sch Architecture, Xian 710061, Peoples R China; [Hou, Xinmeng] Univ Calif Los Angeles, Coll Letters & Sci, Los Angeles, CA 90095 USA

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期　　刊：COMPUTER COMMUNICATIONS

摘　　要：As an important means to promote the territorial spatial planning system, the control of rural ecological space at watershed scale is of great significance for rural revitalization aimed at sustainable development and ecological environmental protection. Taking Sanshui River Basin in Xunyi as the research area, the paper applies the redline zoning method which integrates ecological sensitivity with ecosystem service, and collects remote sensing image data, DEM data, soil data, and also ecological environment characteristics and human activity intensity factors for a comprehensive analysis on the ecological function zone, ecological corridor and rural settlement in the river basin. The ultimate objective of the research is to propose a rural ecological space control system centered around regionalization-network-stationing. As suggested by the research results, in Sanshui River Basin, the area of suitable development zone, ecological control buffer zone, and ecological conservation zone is 467.35 km(2), 538.86 km(2) and 317.34 km(2), accounting for 35.31%, 40.74% and 23.95% of the basin respectively; a basin rural ecological corridor network structure featuring one core, one vertical line and three horizontal lines has been constituted; approximately 387 villages are based in suitable construction development zone, 169 in ecological control buffer zone, and 82 in ecological conservation zone. The research is expected to provide scientific evidence for sustainable rural development and rational use of ecological environmental resources in Sanshui River Basin, afford specific technical support to territorial spatial planning, and reinforce space control scientificity and practicability.

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WOS 号：000575724000001

第 11 篇

标　　题：Seismic Behavior Of Steel Reinforced High-Strength Concrete Composite Walls

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期　　刊：JOURNAL OF EARTHQUAKE ENGINEERING

摘　　要：Eight steel reinforced high-strength concrete composite walls were manufactured and quasi-statically tested. The testing objective was to investigate the seismic behavior of composite walls, including the failure mode, hysteresis curve, deformation, energy dissipation, and stiffness degradation. The results showed that all specimens failed

during the flexural mode. The lateral load-resisting capability and deformation capability significantly increased with increasing steel ratio and stirrup characteristic value. In addition, formulations were proposed to evaluate the lateral load-resisting capability of steel reinforced concrete (SRC) composite walls, and the evaluated results exhibited good agreement with the test results.

DOI： 10.1080/13632469.2018.1458665

WOS 号： 000547103200005

第 12 篇

标　　题： Analysis Of The Characteristics Of Ecological Security Zoning And Its Dynamic Change Pattern: A Case Study Of The Weibei Area

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通讯作者： Zhang, LY (corresponding author), Changan Univ, Sch Water & Environm, Xian 710061, Peoples R China.

期　　刊： SUSTAINABILITY

摘　　要： The development pattern of agriculture and energy exploitation in the southern marginal area of the Loess Plateau is widespread in the northern part of China. As a typical example, the fragile ecological area in the Weibei region is greatly affected by human factors, which makes the local ecological environment and social sustainability disturbed to varying degrees. Taking the Weibei region as the study area, through the comprehensive analysis of social, economic, and climate data, an index system suitable for the ecological security assessment of the Weibei region was constructed. The ecological security of this region was quantitatively evaluated by spatial principal component analysis (SPCA), and its ecological security partition was divided and analyzed. There were five zones at different levels, and I to V represented the development of ecological security from a low level to a high level. The results showed that from 1997 to 2017, the ecological security of different districts and counties in the Weibei region showed different trends. For example, the ecological security index of Tongguan County, Chengcheng County, and Pucheng County continued to decrease, but the overall index value was still high, and the ecological security index of Dali County, Fuping County, and Hancheng County increased. During this period, the ecological security of regions I and II continued to increase, while regions IV and V first decreased and then increased. At the same time, the area of the ecological security buffer region increased year by year. This study can provide a feasible method for assessing ecological security of the current regional model of mixed agriculture and energy extraction industry.

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第 13 篇

标　　题： The Ecological Protection And Tourism Exploitation Of Coast Resources In Macau

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期　　刊： JOURNAL OF COASTAL RESEARCH

摘　　要： With the support of the Chinese government, the marine area of Macau has been further defined and enlarged, resulting in the rich and premium coast resources. Correspondingly, the Macau government should not only attach crucial importance to the coast resources, but also promote the ecological protection and exploit tourism. Based on the features of Macau's coast resources, the authors of this essay propose that in order to protect the coast resources and ecological environment successfully, the Macau government should create the landscape ecology texture between city and coast, keep full control of pollution sources as well as perfect integrated monitoring system, conduct research on the ecological protection of natural reserves and wetland park, and enhance the education of environment conservation. It is suggested that based on ecological protection and in order to make full use of the opportunity to change Macau into 'the center of tourism and entertainment in the world', top-level design is required and the tourism projects and products that integrates gambling industry, shopping, and cultural heritage should be created. In the meantime, the government, enterprises and relevant organizations should launch more projects and programs of leisure vacations and study travels, develop its tourism by cooperating fully with Hong Kong and other cities around Macau. In the future, the 'win-win' goal of protecting and exploiting coast resources could be achieved.

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第 14 篇

标　　题： Dynamic Mechanical Properties Of Variable Friction Damper Based On New Piezoelectric Ceramic Tubular Actuator

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通讯作者： Fan, YJ (corresponding author), Changan Univ, Sch Architecture, Xian 710061, Peoples R China.

期　　刊： JOURNAL OF MATERIALS RESEARCH AND TECHNOLOGY-JMR&T

摘　　要： Based on ANSYS finite element software and combined with the physical properties of piezoelectric materials, the actuating properties of the new piezoelectric ceramic tubular actuator was simulated. In addition, the maximum displacement, output and response frequency characteristics of the actuator were obtained. The results shown that the actuator was suitable for the development of structural vibration control device. The intelligent damper for adjusting friction in real-time was proposed by using the above-mentioned new actuator. In addition, the dynamic mechanical properties of the intelligent damper were analyzed, the constitutive relationship under the sinusoidal

simple harmonic action and the calculation formula of the energy consumed in one cycle were obtained. (C) 2020 The Author(s). Published by Elsevier B.V.

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第 15 篇

标　　题： Research On The Building Energy Efficiency Design Strategy Of Chinese Universities Based On Green Performance Analysis

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期　　刊： ENERGY AND BUILDINGS

摘　　要： China has a large number of existing public buildings and rapidly growing energy demand of public buildings. For this reason, the government and the relevant administrative sections have issued many policies, regulations, and incentives to decelerate the growth of the energy consumption of public build-ings. However, the diverse types of buildings, as well as different design standards and construction tech-nologies, create large differences in the energy consumption rules and energy efficiency standards of different buildings. The total number of universities in China is approximately 2845, with 13 types of buildings. The annual energy consumption is nearly 30 million tons of standard coal, and the water con-sumption is nearly 4 million tons. The total energy consumption accounts for 8% of the total social energy consumption. The energy and water consumption of each student are 4 times and 2 times that of the average Chinese resident, respectively, and show with a rigid growth trend. Based on the concept of green performance proposed by the Evaluation Standard for Green Buildings (GB/T50378-2019), this study takes the most representative building types of libraries and dormitories as examples. The prob-lems of these building types are systematically analyzed in terms of planning layout, lighting, ventilation, thermal comfort, system energy consumption and equipment energy consumption through on-site inves-tigation, thermal environment testing, energy consumption data analysis, and environment, shape and structure design simulation. Finally, the energy efficiency design strategy model of university buildings based on green performance analysis is established, including planning and design strategy, form design strategy, construction design strategy, system design strategy, and equipment use strategy, especially the sub-items of form design and space division in the formal design strategy. This strategy is the best response to the need to advance the energy efficiency design of these buildings. From the beginning of the design, energy efficiency should be combined with architectural planning and layout, functional design, construction design, system design and other noumenon elements. On the one hand, the strategy considers the relationship between the sub items and energy efficiency such as shape design and spatial division related to the building function; on the other hand, it also considers the relationship between the system design and energy efficiency of

large-scale buildings, to meet the requirements of 65% energy con-servation in The Design Standard for Energy Efficiency of Public Buildings (GB 50189-2015).These con-siderations are all representative of a design strategy that incorporates green performance characteristics. The research results show that the existing buildings can be retrofitted to fully tap their energy efficiency potential, and new buildings should incorporate energy efficiency from the stage of architectural design, to allow technology to serve the design; achieve the efficiency, health and applicability goals of green buildings; and achieve the energy efficiency design goal based on green performance analysis. (C) 2020 Elsevier B.V. All rights reserved.

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WOS 号： 000570251400004

第 16 篇

标　　题： Spatial Distribution Characteristics Of Pm2.5 And Pm10 In Xi'An City Predicted By Land Use Regression Models

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期　　刊： SUSTAINABLE CITIES AND SOCIETY

摘　　要： PM2.5 and PM10, could increase the risk for cardiovascular and respiratory diseases in the general public and severely limit the sustainable development in urban areas. Land use regression models are effective in predicting the spatial distribution of atmospheric pollutants, and have been widely used in many cities in Europe, North America and China. To reveal the spatial distribution characteristics of PM2.5 and PM10, in Xi'an during the heating seasons, the authors established two regression prediction models using PM2.5 and PM10, concentrations from 181 monitoring stations and 87 independent variables. The model results are as follows: for PM2.5, R-2 = 0.713 and RMSE = 8.355 mu g/m(3); for PM10, R-2 = 0.681 and RMSE = 14.842 mu g/m(3). In addition to the traditional independent variables such as area of green space and road length, the models also include the numbers of pollutant discharging enterprises, restaurants, and bus stations. The prediction results reveal the spatial distribution characteristics of PM2.5 and PM10, in the heating seasons of Xi'an. These results also indicate that the spatial distribution of pollutants is closely related to the layout of industrial land and the location of enterprises that generate air pollution emissions. Green space can mitigate pollution, and the contribution of traffic emission is less than that of industrial emission. To our knowledge, this study is the first to apply land use regression models to the Fenwei Plain, a heavily polluted area in China. It provides a scientific foundation for urban planning, land use regulation, air pollution control, and public health policy making. It also establishes a basic model for population exposure

assessment, and promotes the sustainability of urban environments.

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WOS 号： 000573583800002

第 17 篇

标　　题： Distribution Of Rural Tourism Development In Geographical Space: A Case Study Of 323 Traditional Villages In Shaanxi, China

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通讯作者： Xu, J (corresponding author), Changan Univ, Architecture Sch, Xian 701165, Peoples R China.

期　　刊： EUROPEAN JOURNAL OF REMOTE SENSING

摘　　要： Spatial distribution of traditional village is the key factor for the sustainable development of rural tourism. Analyzing distribution characteristics and development conditions of traditional villages have profound implications for rural revitalization and all-for-one tourism. Firstly, this research introduced the characteristics and historic value of traditional villages in each region of Shaanxi province. Secondly, this paper analyzed the spatial distribution characteristics of 323 provincial-level traditional villages by using the method of quantitative geography through geographic information systems (GIS). Then, according to spatial type division, this research divided the spatial distribution of rural tourism in Shaanxi province into five areas, including linear tourist area, facial health area, distributed leisure area, low-density scenic area, self-driving tourist area. Finally, this paper summarized the development conditions of rural tourism in Shaanxi's traditional villages and took case studies. The natural environment, social economy, and historical culture are crucial conditions for the sustainable development of traditional villages, influencing the spatial distribution of these villages. This paper summarized the spatial distribution of rural tourism development and proposed a guide for future space planning and construction for all-for-one tourism in other areas through empirical research on spatial distribution. Meanwhile, this research provides new ideas for rural revitalization.

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WOS 号： 000577026700001

土地工程学院

第 1 篇

标　　题： Estimating Soil Arsenic Content With Visible And Near-Infrared Hyperspectral Reflectance

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期　　刊： SUSTAINABILITY

摘　　要： Soil arsenic (AS) contamination has attracted a great deal of attention because of its detrimental effects on environments and humans. AS and inorganic AS compounds have been classified as a class of carcinogens by the World Health Organization. In order to select a high-precision method for predicting the soil AS content using hyperspectral techniques, we collected 90 soil samples from six different land use types to obtain the soil AS content by chemical analysis and hyperspectral data based on an indoor hyperspectral experiment. A partial least squares regression (PLSR), a support vector regression (SVR), and a back propagation neural network (BPNN) were used to establish a relationship between the hyperspectral and the soil AS content to predict the soil AS content. In addition, the feasibility and modeling accuracy of different interval spectral resampling, different spectral pretreatment methods, feature bands, and full-band were compared and discussed to explore the best inversion method for estimating soil AS content by hyperspectral. The results show that 10 nm + second derivative (SD) + BPNN is the optimum method to predict soil AS content estimation; R-v(2) is 0.846 and residual predictive deviation (RPD) is 2.536. These results can expand the representativeness and practicability of the model to a certain extent and provide a scientific basis and technical reference for soil pollution monitoring.

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第 2 篇

标　　题： Quantifying The Spatial Association Between Land Use Change And Ecosystem Services Value: A Case Study In Xi'An, China

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期　　刊： SUSTAINABILITY

摘　　要： The impact of land use and land cover (LULC) change on ecosystem services value (ESV) varies in different spatial locations. Although many studies have focused on

quantifying the effect of LULC change on ESV, few have considered the spatial heterogeneity of the relationship between LULC change and ESV. Therefore, this study examines the relationship between ESV and LULC change from a spatial perspective in Xi'an City. We divide the study area into 10,522 grid cells, based on land cover data from 2000 to 2018, and we identify the spatial-temporal dynamics of LULC change. Next, we employ the Benefits Transfer Method (BTM) to evaluate the ESV, and the ESV is corrected by the normalized difference vegetation index (NDVI). A geographically weighted regression (GWR) model and ordinary least squares (OLS) regression model are used to assess the spatial association of LULC change and ESV. The results show that the total ESV loss is 6.57 billion yuan (Chinese yuan), and the loss rate is 12.18%. The distribution of ESV shows an obvious spatial heterogeneity, and the low-value area of ESV expands eastward from the main urban area. More than 50% of total ESV is provided by woodland. From 2000 to 2018, the land use pattern in Xi'an underwent a significant change with the developed land increasing by 64.09%, whereas farmland decreased by 12.49%. Based on the GWR model, the relationship between LULC change and ESV in Xi'an showed a significant negative association and spatial heterogeneity. Our study results provide a new way to effectively identify the relationship between LULC change and ESV, and in turn, to fully understand the ecological trends at the regional scale, laying a foundation for regional sustainable development.

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第 3 篇

标　　题： Hydrogeochemistry And Quality Assessment Of Groundwater In Jinghui Canal Irrigation District Of China

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期　　刊： HUMAN AND ECOLOGICAL RISK ASSESSMENT

摘　　要： This study was carried out to investigate the hydrogeochemical characteristics, processes, and factors that control the groundwater chemistry in Jinghui canal irrigation district of China. Water quality was assessed by comparing with the Chinese national guidelines and World Health Organization (WHO) guidelines for drinking and irrigation. Impacts of Cr(6+)on human health were also quantified using the health risk assessment model. The results show that groundwater in the study area is brackish, hard and slightly alkaline. The groundwater quality is generally very poor with excessive

Na+, SO42-, Cl-, total dissolved solids, and total hardness in most samples. Of the groundwater samples, 72.3% are unsuitable for drinking with excessive NO3--N comparing the WHO guidelines. The non-carcinogenic risks caused by Cr(6+)through drinking-water intake are low and acceptable for children and adults in most parts of the study area, while, both children and adults face unacceptable carcinogenic risks of Cr(6+)in the whole study area. Over 80% of the sampling sites are not permissible to irrigate by groundwater due to the alkalinity hazard. Long-term groundwater irrigation in the study area will result in the formation of saline, alkaline soil and the decreasing of crop yield. The results of this study may help to set up the suitable management strategies to guarantee water supply and health safety for local residents.

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第 4 篇

标　　题： Spatiotemporal Dynamics And Driving Forces Of Ecosystem Changes: A Case Study Of The National Barrier Zone, China

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期　　刊： SUSTAINABILITY

摘　　要： It is of great significance to study the spatiotemporal dynamics of the ecosystem and explore the driving forces that affect change in the ecosystem in the National Barrier Zone (NBZ). Based on multi-source remote sensing data, this paper analyzed the change in the ecosystem in the NBZ from 2000 to 2015. Natural and social economic factors were selected as the driving factors, and the change mechanism of the ecological system in the NBZ area was analyzed by means of redundancy analysis and other methods. The results showed the following: (1) Between 2000 and 2015, the ecosystem changes in the NBZ are obvious. It is important to note that the grassland and urban ecosystem increased by 13,952 and 6720 km(2), respectively; at the same time, the desert ecosystem significantly decreased by 4544 km(2). (2) The human activity represented by gross domestic product (GDP) is the main factor in the change of ecosystem change in the NBZ with a contribution of 75%, especially in the ecological barrier of the Sichuan-Yunnan-Loess plateau with a GDP contribution rate of 83%. (3) The changes in the ecosystems are significantly influenced by multifactorial interactions, such as the joint contribution rate of the drought index (PDSI) and GDP reaching 0.11 in the ecological barrier of Qinghai-Tibet plateau. (4) The ecological

protection projects, such as the Green for Grain Project in the NBZ, play a positive role, and the ecological environment is improving. The conclusions of this paper will be used as a basic theory to contribute to subsequent research on ecosystem services, policy making, and other aspects in the NBZ.

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第 5 篇

标　　题： Tectonomagmatic Setting And Cu-Ni Mineralization Potential Of The Gayahedonggou Complex, Northern Qinghai-Tibetan Plateau, China

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期　　刊： MINERALS

摘　　要： The Gayahedonggou magmatic Cu-Ni sulfide deposit was recently discovered in the East Kunlun orogenic belt (Northern Tibetan Plateau, China). The mineralization in this region is associated with mafic-ultramafic intrusions. To date, the formation age and metallogenic model of these ore-bearing intrusions have not been studied systematically. In this paper, the petrology, zircon U-Pb chronology, and geochemistry of ore-bearing wehrlite and quartz diorite are investigated. The results show that the zircon U-Pb isotopic age of wehrlite is 419.9 +/- 1.5 Ma with an average epsilon Hf(t) value of 3.0, indicating that wehrlite originated from a depleted mantle or the asthenosphere. The (La/Yb)(N), (La/Sm)(N), (Gd/Yb)(N), Nb/U, and Ce/Pb ratios of wehrlite are between 3.01-7.14, 1.69-3.91, 1.36-1.51, 2.07-2.93, and 0.55-1.42, respectively, indicating that the parent magma of the wehrlite had been contaminated by the upper crust. The zircon U-Pb isotopic age of quartz diorite is 410.2 +/- 3.5 Ma with an average epsilon Hf(t) value of 8.0, and the A/CNK and A/NK ratio of quartz diorites ranges from 1.02 to 1.04 and from 2.13 to 2.23, respectively. These features are similar to those of the type I granite, and the quartz diorite was likely derived from the lower crust. Combined with the regional geological evolution, the Gayahedonggou complex formed in a post-collision extensional environment. The pyroxene in the Gayahedonggou complex is mainly clinopyroxene, which is enriched in the CaO content, indicating that the CaO content of the parent magma of the Gayahedonggou complex is high or that the complex has been contaminated by Ca-rich surrounding rocks, which hinders Cu-Ni mineralization.

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体育部（体育系、体育运动研究所）

第 1 篇

标　　题：Application Of Biomedical Signal Acquisition Equipment In Human Sport Heart Rate Monitoring

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期　　刊：JOURNAL OF MEDICAL IMAGING AND HEALTH INFORMATICS

摘　　要：Aiming at exploring biomedical signal acquisition equipment used in human motion heart rate monitoring, the research on the related hardware design and signal processing method was carried out. A biomedical signal acquisition device based on photoplethysmography (PPG) is designed, and the equipment was applied to acquire PPG signals and acceleration sensor signals under different motion states. The analysis of the experimental data showed that, the fusion method of the acceleration sensing information in the motion artifact removal method is perfected. The effectiveness of the baseline drift removal algorithm, motion artifact removal algorithm and dynamic heart rate monitoring algorithm was verified by reconstructing the signal quality evaluation index. To sum up, taking MINDRAY VS-800 as a reference device, it is compared with the adaptive filtering technology in terms of signal quality, BPM detection results and algorithm complexity, and better results are finally obtained.

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第 2 篇

标　　题：Mechanism Of The Effect Of Traditional Chinese Medicine Fumigation On Blood Lactic Acid In Exercise Body

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期　　刊：JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING

摘　　要：The production of blood lactic acid in exercise can make the body feel tired and affect the normal movement of the body. Therefore, from the aspects of energy metabolism, mechanical injury, inflammation, free radicals and lipid peroxidation, and growth factors regulating the repair of skeletal muscle injury, the mechanism of Chinese herbal compound on skeletal muscle exercise induced injury is systematically analyzed and discussed. In order to provide theoretical basis for sports training, public health and labor hygiene, one or two of the seven Chinese herbal prescriptions which have good effects on exercise-induced muscle injury are selected. The paper delivers guidelines for avoiding and decreasing exercise caused lactate accumulation and lactic acid. The results show that Chinese herbal fumigation lotion can effectively remove blood lactic acid, accelerate the recovery of muscle strength, and obviously eliminate exercise-induced muscle fatigue.

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第 3 篇
标　　题： Research On Simulation Technology Of Wireless Sensor In Swimming Mechanics
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期　　刊： EURASIP JOURNAL ON WIRELESS COMMUNICATIONS AND NETWORKING
摘　　要： In order to improve the quantitative teaching level of swimming sports, it is necessary to carry out quantitative analysis of swimming sports mechanics. A method of swimming mechanics analysis based on computer simulation technology is proposed. The ARMA model is used to analyze the mechanics of the limb movement of swimming, the Lagrange dynamics model is used to model the characteristics of the mechanics of swimming movement, and the distributed characteristic parameter model of the dynamics of swimming is analyzed in the space of six degrees of freedom. The dynamic distribution space of swimming motion is obtained by using the forward kinematics analysis model, and the inverse kinematics of multiple degrees of freedom is solved by analytic method, and the global and local joint force and force parameters in swimming are estimated. The model of swimming mechanics is realized. The simulation results show that the proposed method is accurate and accurate in estimating the mechanical parameters of swimming movement, and it can effectively guide swimming training.
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人文学院

第 1 篇
标　　题： Analysis On The Coupling Development Path Of Economy And Ecological Environment Under The Rural Revitalization Strategy
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期　　刊： FRESENIUS ENVIRONMENTAL BULLETIN
摘　　要： In order to achieve comprehensive, coordinated and sustainable development, the coupling development path of economy and ecological environment under the rural revitalization strategy is analyzed. Through the dialectical relationship between economy and ecological environment, a coupling system is established. We analyze the characteristics of the relativity, controllability and relative stability of the two developments, and draw the relationship between poverty and the ecological environment, and the relationship between economic development and the ecological

environment. We divide the coupled development evaluation system into index layers, system layer, indicator layer and variable layer to determine the two evaluation indicators. Then, we use factor analysis to reduce the dimensionality of indicator data, build a coupled development degree evaluation model. After that, we combine the development degree, respectively from improving infrastructure, villagers' quality, developing circular economy to transform government functions and other paths to further promote rural revitalization and achieve coordinated economic and environmental development.

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第 2 篇

标　　题： 'Get A Fish' Vs. 'Get A Fishing Skill': Farmers' Preferred Compensation Methods To Control Agricultural Nonpoint Source Pollution

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期　　刊： INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH

摘　　要： Ecological compensation is an important means for controlling agricultural nonpoint source pollution, and compensation methods comprise an essential part of the compensation policy for mitigating this form of pollution. Farmers' choice of compensation methods affects their response to compensation policies as well as the effects of pollution control and ecological compensation efficiency. This study divides ecological compensation methods into two distinct philosophies-the get a fish method (GFM) and get a fishing skill method (GFSM)-based on policy objectives, to determine farmers' choice between the two methods and the factors influencing this choice. Furthermore, by analyzing survey data of 632 farmers in the Ankang and Hanzhong cities in China and using the multivariate probit model, the study determines farmers' preferred option among four specific compensation modes of GFM and GFSM. The three main results are as follows. (1) The probability of farmers choosing GFM is 82%, while that of choosing GFSM is 51%. Therefore, GFM should receive more attention in compensation policies relating to agricultural nonpoint source pollution control. (2) Of the four compensation modes, the study finds a substitution effect between farmers' choice of capital and technology compensations, capital and project compensations, material and project compensations, while there is a complementary relationship between the choice of material and technology compensations. Therefore, when constructing the compensation policy basket, attention should be given to achieving an organic combination of different compensation methods. (3) Highly educated, young, and male farmers with lower part-time employment, large cultivated land, and a high level of eco-friendly technology adoption and policy understanding are more likely to choose GFSM. Hence, the government should prioritize promoting GFSM for farmers

with these characteristics, thereby creating a demonstration effect to encourage transition from GFM to GFSM.

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外国语学院

第 1 篇

标　　题： The Research Trends Of Multilingualism In Applied Linguistics And Education (2000-2019): A Bibliometric Analysis

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期　　刊： SUSTAINABILITY

摘　　要： This study explored the state of the arts of bilingualism or multilingualism research in the past two decades. In particular, it employed a bibliometric method to examine the publication trend, the main publication venues, the most influential articles, and the important themes in the area of bilingualism or multilingualism. The main findings are summarised as follows. First, a significant increase of publications in the area was found in the past two decades. Second, the main publication venues and the most influential articles were reported. The results seemingly indicated that the research in the area focused largely on two broad categories, that is, (1) bilingualism or multilingualism from the perspective of psycholinguistics and cognition research and (2) how second/additional languages are learned and taught. Last, the important themes, including the hot and cold themes, were identified. Results showed that researchers prefer to study bilingualism or multilingualism more from deeper cognition levels such asmetalinguistic awareness,phonological awareness, andexecutive control. Also, they may become more interested in the issue frommultilingualperspectives rather than from the traditionalbilingualview. In addition, the themeemergent bilinguals, a term closely related totranslanguaging, has recently gained its popularity, which seemingly indicates a recent advocate forheteroglossic language ideologies.

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