

## 第 39 卷 第 1 期 2020 年 1 月

### 目 次

#### · 特邀综述 ·

混凝土技术的发展与展望 ..... 缪昌文 穆松(1)

#### · 水泥混凝土 ·

超低温条件下引气剂对混凝土抗冻性能影响的试验研究 ..... 谢剑 唐静 孙雅丹(12)

碳化环境混凝土结构的耐久性定量分析模型 ..... 余波 李启明 刘姝姮(20)

水玻璃对大流动度的磷酸铵镁水泥浆体性能的影响 ..... 纪荣健 杨建明 吴庆 单春明(28)

多层石墨烯/钢纤维复合砂浆导电性能研究 ..... 韩瑞杰 程忠庆 高屹 张元豪(34)

纳米二氧化硅改性 SAP 内养护水泥基材料的力学性能研究  
..... 王豪杰 刘荣桂 崔钊玮 蔡俊华 王振兴 薛江(41)

硫酸盐侵蚀下混凝土内腐蚀反应-扩散过程的实验研究 ..... 李涛 朱鹏涛 张彬 丁凯伦 孙忠民(50)

实体结构混凝土早期温度发展特征与凝结时间关系 ..... 费晓春 李明 王方刚 徐文(56)

机制砂中绿泥岩粉含量对混凝土力学性能及耐久性的影响  
..... 张鹏举 张兴军 宋尚霖 栾纪昊 南雪丽 韩博(61)

ECC 的材料组成与性能关系分析 ..... 孔燕 邵永健 杜亮 梁肖 李国建(68)

基于图像处理技术的粗骨料形状特征对自密实混凝土工作性的影响研究  
..... 于峰 刘平 高亚磊 方小婉 娄宗科(75)

养护制度对高掺花岗岩石粉 UHPC 性能的影响 ..... 耿春东 商得辰 余松柏 丁庆军(83)

泡沫混凝土用生物基发泡剂的研制及其性能研究 ..... 荣辉 张静 张磊 张颖 徐蕊 刘志华(90)

ECC 三轴压缩特性试验研究 ..... 管延华 吴佳杰 朱登元 张宏庆 孙仁娟 王怡凯(96)

不同温度下粒径对玻璃粉抑制碱硅酸反应的影响 ..... 高鹏飞(101)

不同取代率橡胶混凝土受压尺寸效应试验研究 ..... 张军 胡艳丽(106)

多排陶粒混凝土复合砌块结构优化设计分析 ..... 杨召通 刘勇 尹冠生 史明辉 韦鹏飞(113)

水泥熟料全窑系统热效率模型构建 ..... 姚艳飞 丁松雄 陈延信(124)

基于常规三轴试验 PBFC 防渗浆材破坏形态机理分析 ..... 盛炎民 代国忠 李书进(132)

垃圾填埋场改性膨润土浆材力学性能研究 ..... 章泽南 代国忠 史贵才 李雄威 李书进(137)

#### · 资源综合利用 ·

赤泥资源化综合利用研究进展 ..... 张利祥 高一强 黄建洪 陈珊 张琴 陈允建 伏江丽(144)

透水再生骨料混凝土研究进展 ..... 陈尚权 高越青 梁超锋 Raphael Desire 邵晓蓉(150)

基于密度泛函理论的高岭石吸附机理研究进展  
..... 吕文婷 程运 谢浩 张居兵 卜昌盛 郭若军 王昕晔(157)

铜矿尾砂基生态型混凝土力学性能的研究

..... 刘轩睿 刘开志 余百炼 国 诚 肖勋光 覃宇坤 水中和(169)

钢渣-粉煤灰-硅灰复合改性剂对硫铝酸盐水泥性能的影响

..... 李正学 戴绍斌 马保国 刘凤利 周铨棠 张 婷(175)

高强度粉煤灰基地聚物的设计与性能研究

..... 李 琳 吴 红 连明磊 孔德顺 方 清(182)

加速碳化条件下钢渣块体体积安定性的研究

..... 姚恒山 陈思佳 陈德伟 Hamdy M. Naguib 侯贵华(187)

高沙充填材料的输送性能研究

..... 陈 杰 梁杨芝 王 俊 褚运凯(194)

黏性土和纤维对风积沙改性土热膨胀特性的影响

..... 周富彪 苏占东 田梦楠 李 高 陈 祥 孙进忠(199)

EPS-磷石膏复合体系浆体流变性调控研究

..... 张雨薇 戴绍斌 马保国 孙仲达 李玉博(206)

CaO 改性赤泥固化剂固化黄土的力学性能研究

..... 陈立东 宋志伟(213)

基于硅酸盐对建筑垃圾过滤分离的脱水机理研究

..... 朱国瑞 郭希艳 谭 蔚 全晓宇 刘帅男(219)

河南夜长坪钨钼尾矿制备橡胶填料的研究

..... 李二伟 刘 昊 吕国诚 梅乐夫 王丽娟 王红缨 廖立兵(225)

黏土质煤矸石强化技术研究

..... 温久然 刘小婷 刘开平 高 妮 钟佳墙 孙志华 王思雨(233)

不同颜色青海软玉的谱学特征分析

..... 宋华玲 谭红琳 祖恩东(242)

水分子在高岭石(001)面吸附的密度泛函计算

..... 陈浙锐 邱鸿鑫 王光辉(247)

· 陶 瓷 ·

Mn 掺杂三元固溶体系 BNT-KBT-BT 陶瓷的结构与性能研究

..... 赵北龙 刘立英 华梦婷(254)

分散剂及粉体粒径对光固化氧化铝陶瓷浆料粘度及制件性能的影响

..... 焦守政 齐 文 陈 松 侯宇婷 陆 春(260)

氮化硼纤维合成工艺与结构表征

..... 黄青武 王 玲 吴金金 李明辉 宋武林 丁雨葵(266)

氧化锆陶瓷磨削工艺优化和粗糙度控制研究

..... 李颂华 王科冲 孙 健 隋阳宏 韩光田 沙 勇(271)

$\beta$ -SiC 微粉纯化试验研究

..... 白 泉 王晓刚 段晓波(278)

· 玻 璃 ·

ZnO 对  $\text{Bi}_2\text{O}_3$ - $\text{B}_2\text{O}_3$ -ZnO 低熔点玻璃结构与性能的影响

..... 张 兵 何 峰 曹秀华 徐佳佳 任海东 谢峻林 钟克菊 刘小青(283)

· 新型功能材料 ·

TiO<sub>2</sub> 气凝胶的制备及光催化性能研究进展

..... 董龙浩 韩 磊 田 亮 张 俊 张海军(290)

相变储热材料三水醋酸钠循环热稳定性实验与数值模拟研究

..... 宋雪阳 秦 善 顾晓滨(303)

SiO<sub>2</sub>/C 复合微球的制备及其脱除水体中 Cu( II) 和 Cr( VI) 的动力学和热力学

..... 徐泽忠 曹显志 龚哲清 甘杰军 谢劲松 韩成良(309)

动态晶化法合成 NaP 分子筛的研究

..... 陈彦广 王 皓 张亚男 吴 凯 杨秀琪 韩洪晶 韩 彤 王海英 刘艳丽 张 梅(315)

改性多孔硅藻土涂料的制备及其性能研究

..... 徐鑫强 张雪梅 陈凯琴 冯 玲 韩 宇 汪 婷 汪徐春(321)

Mn-Ce 催化剂低温脱硝性能的研究

..... 王献忠 吴彦霞 陈 鑫 陈 琛 梁海龙 朱 江 戴长友 唐 婕(326)

· 路面材料 ·

彩色沥青胶结料的化学组成与热行为关系分析

..... 王永清 徐 鹏 弥海晨(332)

# BULLETIN OF THE CHINESE CERAMIC SOCIETY

Vol. 39 No. 1 January 2020 (Series No. 280)

## CONTENTS

- Development and Prospect of Concrete Technology ..... MIAO Changwen, MU Song(1)
- Experimental Study on the Influence of Air-entraining Agent on the Frost Resistance of Concrete at Ultra-low Temperatures ..... XIE Jian, TANG Jing, SUN Yadan(12)
- Quantitative Durability Analysis Models of Concrete Structures under Carbonation Environment  
..... YU Bo, LI Qiming, LIU Shudan(20)
- Effect of Water Glass on Properties of High Flowing Magnesium Ammonium Phosphate Cement Paste  
..... JI Rongjian, YANG Jianming, WU Qing, SHAN Chunming(28)
- Electrical Conductivity of Multilayer Graphene/Steel Fiber Composite Mortar  
..... HAN Ruijie, CHENG Zhongqing, GAO Yi, ZHANG Yuanhao(34)
- Mechanical Properties of Cement-Based Materials Using SAP as Internal Curing Agent Modified by Nano-silica  
..... WANG Haojie, LIU Ronggui, CUI Zhaowei, CAI Junhua, WANG Zhenxing, XUE Jiang(41)
- Experimental Study on Corrosion Reaction-Diffusion Process of Concrete under Sulfate Attack  
..... LI Tao, ZHU Pengtao, ZHANG Bin, DING Kailun, SUN Zhongmin(50)
- Relationship between Early Age Temperature Development Characteristics of Entity Structure Concrete and Setting Time  
..... FEI Xiaochun, LI Ming, WANG Fanggang, XU Wen(56)
- Effect of Green Mudstone Powder Content in Manufactured Sand on Mechanical Properties and Durability of Concrete  
..... ZHANG Pengju, ZHANG Xingjun, SONG Shanglin, LUAN Jihao, NAN Xueli, HAN Bo(61)
- Analysis of Relationship between Material Composition and Properties of ECC  
..... KONG Yan, SHAO Yongjian, DU Liang, LIANG Xiao, LI Guojian(68)
- Research on the Influence of Coarse Aggregate Shape Characteristics on Workability of Self-compacting Concrete Based on Image Processing Technology ..... YU Feng, LIU Ping, GAO Yalei, FANG Xiaowan, LOU Zongke(75)
- Effect of Curing Regime on Performance of Ultra High Performance Concrete with High-doped Granite Powder  
..... GENG Chundong, SHANG Dechen, YU Songbai, DING Qingjun(83)
- Preparation and Performance of Bio-Based Foaming Agents for Foam Concrete  
..... RONG Hui, ZHANG Jing, ZHANG Lei, ZHANG Ying, XU Rui, LIU Zhihua(90)
- Behavior of ECC under Triaxial Compression  
..... GUAN Yanhua, WU Jiajie, ZHU Dengyuan, ZHANG Hongqing, SUN Renjuan, WANG Yikai(96)
- Effect of Particle Size on the Inhibition of Alkali-silica Reaction by Glass Powder at Different Temperatures  
..... GAO Pengfei(101)
- Experimental Study on Size Effect of Rubber Concrete with Different Substitution Rates under Compression  
..... ZHANG Jun, HU Yanli(106)
- Optimum Design and Analysis of Multi-row Ceramsite Concrete Composite Block Structure  
..... YANG Zhaotong, LIU Yong, YIN Guansheng, SHI Minghui, WEI Pengfei(113)
- Modeling of Thermal Efficiency of Whole Cement Clinker System  
..... YAO Yanfei, DING Songxiong, CHEN Yanxin(124)
- Destruction Foams Mechanism Analysis of PBFC Anti-seepage Slurry Based on Conventional Triaxial Experiment  
..... SHENG Yanmin, DAI Guozhong, LI Shujin(132)
- Mechanical Properties of Modified Bentonite Slurry in Landfill  
..... ZHANG Zenan, DAI Guozhong, SHI Guicai, LI Xiongwei, LI Shujin(137)
- Research Progress on Resource Comprehensive Utilization of Red Mud  
..... ZHANG Lixiang, GAO Yiqiang, HUANG Jianhong, CHEN Shan, ZHANG Qin, CHEN Yunjian, FU Jiangli(144)
- Research Progress on Pervious Recycled Aggregate Concrete  
..... CHEN Shangquan, GAO Yueqing, LIANG Chaofeng, RAPHAEL Desire, SHAO Xiaorong(150)
- Research Progress on Adsorption Mechanism of Kaolinite Based on Density Functional Theory  
..... LYU Wenting, CHENG Yun, XIE Hao, ZHANG Jubing, BU Changsheng, GUO Ruojun, WANG Xinye(157)

- Study on Mechanical Properties of Copper Tailing-Based Eco-Concrete  
..... *LIU Xuanrui, LIU Kaizhi, YU Bailian, GUO Cheng, XIAO Xunguang, QIN Yukun, SHUI Zhonghe*(169)
- Effect of Steel Slag-Fly Ash-Silica Fume Composite Modifier on Properties of Sulphoaluminate Cement  
..... *LI Zhengxue, DAI Shaobin, MA Baoguo, LIU Fengli, ZHOU Xuantang, ZHANG Ting*(175)
- Design and Performance of High Strength Fly Ash Base Geopolymer  
..... *LI Lin, WU Hong, LIAN Minglei, KONG Deshun, FANG Qing*(182)
- Study on Soundness of Steel Slag Block under Accelerated Carbonation  
..... *YAO Hengshan, CHEN Sijia, CHEN Dewei, Hamdy M. NAGUIB, HOU Guihua*(187)
- Research on Transport Characteristic of High Sand Content Filling Material  
..... *CHEN Jie, LIANG Yangzhi, WANG Jun, CHU Yunkai*(194)
- Effect of Clayey Soil and Fiber on Thermal Expansion of Aeolian Sand Modified Soil  
..... *ZHOU Fubiao, SU Zhandong, TIAN Mengnan, LI Gao, CHEN Xiang, SUN Jinzhong*(199)
- Study on Rheology Control of EPS-Phosphorus Gypsum Composite System Paste  
..... *ZHANG Yuwei, DAI Shaobin, MA Baoguo, SUN Zhongda, LI Yubo*(206)
- Mechanical Properties of Solidified Loess Mixed with CaO-Modified Red Mud Curing Agent  
..... *CHEN Lidong, SONG Zhiwei*(213)
- Mechanical Research on Dehydration in the Filtration and Separation of Construction Waste Based on Silicate  
..... *ZHU Guorui, GUO Xiyan, TAN Wei, QUAN Xiaoyu, LIU Shuainan*(219)
- Preparation of Rubber Filler by Tungsten-Molybdenum Tailings from Yechangping in Henan Province  
..... *LI Erwei, LIU Hao, LYU Guocheng, MEI Lefu, WANG Lijuan, WANG Hongying, LIAO Libing*(225)
- Study on Clay Coal Gangue Strengthening Technology  
..... *WEN Jiuran, LIU Xiaoting, LIU Kaiping, GAO Ni, ZHONG Jiaqiang, SUN Zhihua, WANG Siyu*(233)
- Spectral Characteristics of Qinghai Nephrite with Different Colors  
..... *SONG Hualing, TAN Honglin, ZU Endong*(242)
- Density Functional Calculations of Adsorption of Water Molecules on Kaolinite (001) Surface  
..... *CHEN Zherui, QIU Hongxin, WANG Guanghui*(247)
- Structure and Properties of Mn Doped BNT-KBT-BT Ternary Solution System  
..... *ZHAO Beilong, LIU Liying, HUA Mengting*(254)
- Effect of Dispersant and Powder Particle Size on Viscosity and Samples Properties of Photocured Alumina Ceramic Slurries  
..... *JIAO Shouzheng, QI Wen, CHEN Song, HOU Yuting, LU Chun*(260)
- Synthesis Process and Structure Characterization of Boron Nitride Fiber  
..... *HUANG Qingwu, WANG Ling, WU Jinjin, LI Minghui, SONG Wulin, DING Yukui*(266)
- Research on Grinding Process Optimization and Roughness Control of Zirconia Ceramics  
..... *LI Songhua, WANG Kechong, SUN Jian, SUI Yanghong, HAN Guangtian, SHA Yong*(271)
- Research on Purification of  $\beta$ -SiC Micropowder ..... *BAI Xiao, WANG Xiaogang, DUAN Xiaobo*(278)
- Effect of ZnO on Structure and Properties of  $\text{Bi}_2\text{O}_3$ - $\text{B}_2\text{O}_3$ -ZnO Low-melting Glass  
..... *ZHANG Bing, HE Feng, CAO Xiuhua, XU Jiajia, REN Haidong, XIE Junlin, ZHONG Keju, LIU Xiaoping*(283)
- Research Progress of Preparation and Photocatalytic Performance of  $\text{TiO}_2$  Aerogel  
..... *DONG Longhao, HAN Lei, TIAN Liang, ZHANG Jun, ZHANG Haijun*(290)
- Experimental Study and Numerical Simulation on Thermal Circulation Stability of  $\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$  as Phase Change Material  
..... *SONG Xueyang, QIN Shan, GU Xiaobin*(303)
- Synthesis of  $\text{SiO}_2/\text{C}$  Composite Microspheres and Removing Kinetics and Thermodynamics of  $\text{Cu}(\text{II})$  and  $\text{Cr}(\text{VI})$  from Water  
..... *XU Zezhong, CAO Xianzhi, GONG Zheqing, GAN Jiejun, XIE Jingsong, HAN Chengliang*(309)
- Research on Synthesis of NaP Zeolite by Dynamic Crystallization  
..... *CHEN Yanguang, WANG Hao, ZHANG Yanan, WU Kai, YANG Xiuqi, HAN Hongjing, HAN Tong, WANG Haiying, LIU Yanli, ZHANG Mei*(315)
- Preparation and Properties of Modified Porous Diatom Mud Coatings  
..... *XU Xinqiang, ZHANG Xuemei, CHEN Kaiqin, FENG Ling, HAN Yu, WANG Ting, WANG Xuchun*(321)
- Study on Low Temperature Denitration Performance of Mn-Ce Catalyst  
..... *WANG Xianzhong, WU Yanxia, CHEN Xin, CHEN Chen, LIANG Hailong, ZHU Jiang, DAI Changyou, TANG Jie*(326)
- Relationship between Chemical Constitution and Thermo-stability of Color Asphalt  
..... *WANG Yongqing, XU Peng, MI Haichen*(332)