



# 逄博 博士生导师

职 称：副教授

研究方向：高性能建筑延寿材料与海洋环境清洁材料

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## 个人简介

海工混凝土劣化预控与延寿服役技术（2023KJ322）省级青年创新团队带头人，从事高性能多功能建筑材料设计与开发十余年，先后在东南大学材料与化工学院、新加坡国立大学土木工程与环境学院学习深造。着力破解材料、结构、信息等技术融合的科学性与产学研难题，突破交通基础设施绿色化、智能化建设与运维等重大技术短板，为重大基础设施的延寿服役和劣化预控拓展新材料。获山东省自然科学二等奖、青岛市科技进步一等奖、中国腐蚀与防护协会科学技术二等奖、中国商业联合会科学技术二等奖，主持 3 项国家、省级自然科学基金，5 项重点产业研发项目，承担 3 项军工、科技部重点研发子课题。发表高水平 SCI 论文 60 余篇（谷歌学术他引 2300 余次），其中以第一、通讯作者发表《Advanced Functional Materials》、《Cement and Concrete Research》、《Composite Part B》、《Cement and Concrete Composites》等国际顶级期刊论文 30 余篇，热点、封面论文 5 篇，第一发明人授权国家发明专利、PCT 等专利 10 余项，多次受邀在国内外会议作学术报告。

## 学习经历

- 2009.09-2013.07，济南大学，材料科学与工程，工学学士
- 2013.09-2016.07，济南大学，材料科学与工程，工学硕士
- 2017.03-2021.05，东南大学( 新加坡国立大学, CSC 联培) ，材料科学与工程，工学博士

## 工作经历

- 2021.9-至今，青岛理工大学土木工程学院，副教授

## 学术兼职

- 2021.09-至今，中国硅酸盐学会 固废与生态材料学术委员会 委员
- 2024.09-至今，全国专业标准化技术委员会 全国塑料标准化技术委员会数字化工作组 委员
- 2024.10-至今，新质力材料发展联盟专家智库 常务理事
- 2022.03-至今，青岛市腐蚀与防护学会 理事
- 2022.12-至今，SCI 期刊《Buildings》 编委
- 2022.12-至今，SCI 期刊《Frontiers in Materials》 编委
- 2024.09-至今，SCI 期刊《Scientific Report》 编委

## 教科研项目

- 国家自然科学基金委员会，面上项目，基于“吸湿诱导”功能设计的环氧改性水泥基快修材料性能调控与长效粘结机理,2025 年 01 月 01 日 -- 2025 年 12 月 31 日,48 万元, 在研, 主持 52478260
- 山东省自然科学基金委员会，青年科学基金项目，水性环氧-水泥基复合修补材料的微结构调控与协同机理研究,2023 年 01 月 01 日 -- 2025 年 12 月 31 日,15 万元, 在研, 主持;ZR2022QE136
- 东南大学江苏省土木工程材料重点实验室开放基金，海洋环境混凝土渗透强化-疏水防护自修复涂层设计、制备与机理研究,2022 年 11 月 15 日 -- 2023 年 11 月 15 日,5 万元, 在研, 主持
- 水资源与水电工程科学国家重点实验室（武汉大学）开放研究基金项目, WPU-混凝土复合修补材料设计、制备与机理研究,2023 年 01 月 01 日 -- 2024 年 12 月 31 日,10 万元, 在研, 主持
- 青岛市政道桥维养快修材料研发与应用技术，横向课题, 2023 年 01 月 01 日 -- 2024 年 12 月 31 日,120 万元, 主持
- 极端环境混凝土结构劣化预控关键材料与智能修复装备开发，横向课题, 2023 年 09 月 01 日 -- 2025 年 12 月 31 日,520 万元, 主持
- 面向滨海盐碱环境的钢混结构修复与耐久性提升关键技术研发，横向课题, 2023 年 09 月 01 日 -- 2025 年 12 月 31 日,600 万元, 主持
- 教育部高等教育司，“海洋强国”与双碳战略背景下海洋特色土木类专业建设模式研究, 231002458181354, 2024 第一批，教育部产学合作协同育人项目, 5 万元, 主持

- 中华人民共和国科学技术部, 国家重点研发计划, 2020YFC1522404, 明清官式建筑本体材料劣化机理与保护材料研究, 2020-10 至 2023-09, 350 万元, 参与

## 学术成果

### 参编标准:

- [1] GB/T 45091-2024 国家标准《塑料 再生塑料限用物质限量要求》

### 代表性著作、论文:

- [1] Pang, B., Jin, Z., Zhang, Y., Liu, Z., She, W., Wang, P., Yu, Y., Zhang, X., Xiong, C., Li, N., Sun, G., Zhao, P., Liu, G., Song, X., Gao, S., Ultraductile Cementitious Structural Health Monitoring Coating: Waterborne Polymer Biomimetic Muscle and Polyhedral Oligomeric Silsesquioxane-Assisted C-S-H Dispersion. *Adv. Funct. Mater.* 2022, 2208676. <https://doi.org/10.1002/adfm.202208676>
- [2] Pang B, Zheng H, Jin Z, Hou D, Zhang Y, Song X, Sun Y, Liu Z, She W, Yang L, Li M. Inner superhydrophobic materials based on waste fly ash: Microstructural morphology of microetching effects. *Composites Part B: Engineering*. 2024 Jan; 1;268:111089. <https://doi.org/10.1016/j.compositesb.2023.111089> (前 1% 热点论文/前 1% 高被引论文)
- [3] Wang D, Zhang Y, Pang B\*, Liu C, Liu Z. Study on the optimal conductivity titration parameters for SO42-in cement-based materials. *Measurement*. 2024 Jul; 11:115277. <https://doi.org/10.1016/j.measurement.2024.115277>
- [4] Zheng, H., Duan, Y., Lirong, L., Wang, P., Pang B\*. Duan, H., & Hou, D. (2024). Molecular structure and dynamics of water on the surfaces of cement hydration products and associated Minerals: Nanoscale wettability behavior. *Applied Surface Science*, 162274. <https://doi.org/10.1016/j.apsusc.2024.162274>
- [5] Zheng H, Pang B\*, Jin Z, Zhang Y, Hou D, Bi J, Zhang W, Yuan L. Durability enhancement of cement-based repair mortars through waterborne polyurethane modification: Experimental characterization and molecular dynamics simulations. *Construction and Building Materials*. 2024 Aug 9;438:137204. <https://doi.org/10.1016/j.conbuildmat.2024.137204>
- [6] Wang D, Zhang Y, Pang B\*, Liu C, Chen Y. Study on test of free and total SO42-in cement-based materials subjected to sulfate attack by conductivity titration. *Construction and Building Materials*. 2024 Apr 19;424:135905. <https://doi.org/10.1016/j.conbuildmat.2024.135905>
- [7] Pang B, Liu Y, Wang P, Tian L, Song X, Zhang W. Composite Hydrophobic Coatings with Progressive High Penetration through Chromatography: Protective Properties and Mechanisms. *ACS Applied Polymer*

Materials. 2024 Mar 4. (封面论文) <https://doi.org/10.1021/acsapm.3c03094>

- [8] Zheng H, Pang B\*, Jin Z, Liu S, Zhang Y, Bi J, Chang H, Liu Y, Wang F. Mechanical properties and microstructure of waterborne polyurethane-modified cement composites as concrete repair mortar. Journal of Building Engineering. 2024 Jan 6:108394. (前 1% 高被引论文) <https://doi.org/10.1016/j.jobe.2023.108394>
- [9] Jin Z, Li M, Pang B\*, Yang L, Chen Y, Wang D. Internal superhydrophobic marine concrete: Interface modification based on slag microstructure regulation. Journal of Building Engineering. 2024 Feb 14:108769. (前 1% 高被引论文) <https://doi.org/10.1016/j.jobe.2024.108769>
- [10] Fu H, Pang B\*, Wang P, Yang C, Liu Y, Du Z, Ji H. Microstructure and durability of rapid repair mortar with self-emulsifying waterborne epoxy polymer. Materials Today Communications. 2024 Jun 2:109375.
- [11] Pang B\*, Jin Z, Zhang Y, Xu L, Li M, Wang C, Zhang Y, Yang Y, Zhao P, Bi J, Zhu W. Ultraductile waterborne epoxy-concrete composite repair material: Epoxy-fiber synergistic effect on flexural and tensile performance. Cement and Concrete Composites. 2022 Mar 7:104463. (前 1% 高被引论文) <https://doi.org/10.1016/j.cemconcomp.2022.104463>
- [12] Pang, B, Chen Yang, Penggang Wang, Li Tian, Bo Mei, and Xiaoyun Song. "Cement-based ductile rapid repair material modified with self-emulsifying waterborne epoxy." Journal of Building Engineering (2023): 107864. <https://doi.org/10.1016/j.jobe.2023.107864>
- [13] Pang B, Jia Y, Dai Pang S, Zhang Y, Du H, Geng G, Ni H, Qian J, Qiao H, Liu G. The interpenetration polymer network in a cement paste–waterborne epoxy system. Cement and Concrete Research. 2021 Jan 1;139:106236. <https://doi.org/10.1016/j.cemconres.2020.106236>
- [14] Pang B, Jia Y, Dai Pang S, Zhang Y, Du H, Geng G, Ni H, Qian J, Qiao H, Yang L, Liu G. Research on the toughening mechanism of modified nano-silica and silane molecular cages in the multi-scale microfracture of cement-epoxy composite. Cement and Concrete Composites. 2021 May 1;119:104027. <https://doi.org/10.1016/j.cemconcomp.2021.104027>
- [15] Pang B, Qian J, Zhang Y, Jia Y, Ni H, Pang SD, Liu G, Qian R, She W, Yang L, Liu Z. 5S multifunctional intelligent coating with superdurable, superhydrophobic, self-monitoring, self-heating, and self-healing properties for existing construction application. ACS applied materials & interfaces. 2019 Jul 18;11(32):29242-54. <https://doi.org/10.1021/acsami.9b08303>
- [16] Pang B, Zhang Y, Liu G, She W. Interface properties of nanosilica-modified waterborne epoxy cement repairing system. ACS applied materials & interfaces. 2018 May 4;10(25):21696-711. <https://doi.org/10.1021/acsami.8b04092>
- [17] Pang B, Jia Y, Zhang Y, Ni H, Liu G, She W, Yang L, Qian R. Effect of the combined treatment with

inorganic and organic agents on the surface hardening and adhesion properties of cement-based materials. Materials & Design. 2019 May 5;169:107673. <https://doi.org/10.1016/j.matdes.2019.107673>

[18] **Pang B**, Zhang Y, Liu G. Study on the effect of waterborne epoxy resins on the performance and microstructure of cement paste. Construction and Building Materials. 2018 Apr 10;167:831-45. <https://doi.org/10.1016/j.conbuildmat.2018.02.096>

[19] **Pang B**, Zhou Z, Xu H. Utilization of carbonated and granulated steel slag aggregate in concrete. Construction and building materials. 2015 Jun 1;84:454-67. <https://doi.org/10.1016/j.conbuildmat.2015.03.008>

[20] **Pang B**, Zhou Z, Hou P, Du P, Zhang L, Xu H. Autogenous and engineered healing mechanisms of carbonated steel slag aggregate in concrete. Construction and Building Materials. 2016 Mar 15;107:191-202. <https://doi.org/10.1016/j.conbuildmat.2015.12.191>

[21] **Pang B**, Zhou Z, Cheng X, Du P, Xu H. ITZ properties of concrete with carbonated steel slag aggregate in salty freeze-thaw environment. Construction and Building Materials. 2016 Jul 1;114:162-71. <https://doi.org/10.1016/j.conbuildmat.2016.03.168>

[22] **Pang B**, Chen R, Wang P, Song L, Tian L, Song X, Yang Y. Design and Preparation of durable intelligent haze removal and self-cleaning protective coatings. Journal of Building Engineering. 2024 May 29:109787. <https://doi.org/10.1016/j.jobe.2024.109787>

[23] Qi Luo, Tian Qin, Zheng Chen, **Bo Pang\***, Jian Qu, Zhuangzhaung Gao, The influence of moisture and epoxy bonding agents on interfacial behavior between normal concrete substrate and ultrahigh performance concrete as a repair material: Experimental and molecular dynamics study, Construction and Building Materials, 372,2023,130779, <https://doi.org/10.1016/j.conbuildmat.2023.130779>.

[24] Chencui Wang, Zuquan Jin\*, Guanlin Liu, Wenkui Dong, **Bo Pang\***, Xiaofeng Ding, Mechanisms of chloride transport in low carbon marine concrete: An alkali-activated slag system with high limestone powder, Journal of Building Engineering, 72, 2023, 106539, <https://doi.org/10.1016/j.jobe.2023.106539>.

[25] Yidong Chen, Wenhua Zhang, Yunsheng Zhang\*, Yu Zhang, Cheng Liu, Dafu Wang, Zhiyong Liu, Guojian Liu, **Bo Pang\***, Lin Yang, 3D Printed concrete with coarse aggregates: Built-in-Stirrup permanent concrete formwork for reinforced columns, Journal of Building Engineering, Volume 70,2023,106362,ISSN 2352-7102, <https://doi.org/10.1016/j.jobe.2023.106362>.

[26] Zhuoyang Zhang, Yunsheng Zhang\*, Bin Li, Cheng Liu, Li Xu, Xiaoyun Song, Meng Wu, **Bo Pang\***, Shengtian Zhai, Guojian Liu, Migration and solidification behavior of the semivolatile heavy metal elements Zn and Cd during high ferrite cement clinker (HFCC) calcination, Cement and Concrete Composites, Volume 139,2023,105032, <https://doi.org/10.1016/j.cemconcomp.2023.105032>.

- [27] Dafu Wang, Yunsheng Zhang\*, Zhiheng Li, Jiashun Shi, Zhiyong Liu, Meng Wu, Cheng Liu, Yidong Chen, Guojian Liu, Yonggan Yang, **Bo Pang\***, Degradation of mortar fully buried in saline soil containing sodium sulfate or magnesium sulfate, Construction and Building Materials, Volume 369, 2023, 130620, ISSN 0950-0618, <https://doi.org/10.1016/j.conbuildmat.2023.130620>.
- [28] Chencui Wang, Zuquan Jin\*, **Bo Pang\***, Jinxin Li, Wenkui Dong, Ruixin Chen, Experimental study of delayed ettringite formation under geothermal high-temperature environment, Journal of Building Engineering, 2023, 107519, ISSN 2352-7102, <https://doi.org/10.1016/j.jobe.2023.107519>.
- [29] Yang YE, **Pang B\***, Zhang Y, Wang M, Miao G, Zhou A. A Review of Waterborne Polymer–Cementitious Composite Repair Materials for Application in Saline Soil Environments: Properties and Progress. Buildings. 2024 Mar 21;14(3):848.
- [30] Hu Y, Jin Z\*, **Pang B\***, Du Z, Li X, Huang Y. Improving Sag Resistance in Geopolymer Coatings Using Diatomite Filler: Effects on Rheological Properties and Early Hydration. Materials. 2024 Jan;17(11):2516.
- [31] 王鹏刚,陈睿馨,逄博,张敏,孙晓光,凌梓峻 & 张海洋..TiO<sub>2</sub> 基环境稳定性光催化自清洁涂层的设计及制备. 复合材料学报. doi:10.13801/j.cnki.fhclxb.20240616.001.
- [32] Fu H, Wang P, Zheng H, **Pang B\***, Li W, Liu P. Bionic repair protective coatings with high toughness and bond strength based on anionic waterborne polyurethane-modified cement. Construction and Building Materials. 2024 Sep 20;444:137861.
- [33] Fu H, Wang P, **Pang B\***, Dong W, Li L, Jin Z, Liu P, Wei D. Percolation network and piezoresistive properties of ultraductile cementitious monitoring coating with A-POSS modified carbon-based nanoconductors. Cement and Concrete Composites. 2024 Oct 1;153:105692.

### 代表性专利:

- [1] Bo PANG Zuquan JinYunsheng ZHANG Yong Yu Xiaoying Zhang Chuansheng XIONG Ning Li Xiaoyun SONG Mengyuan LI. "Concrete curing agent, curing coating layer and preparation method thereof." U.S. Patent No. 11,802,092. 31 Oct. 2023. <https://patents.justia.com/patent/11802092>
- [2] Bo Pang, Qingdao (CN); Zuquan Jin, Qingdao (CN); Guoqing Geng, Singapore (SG); Yunsheng Zhang, Qingdao (CN); Cheng Liu, Qingdao (CN); Yidong Chen, Qingdao (CN); Dafu Wang, Qingdao (CN); Rusheng Qian, Qingdao (CN). "Concrete interface agent" Patent No.: US 12,030,821 B1. Date of Patent: Jul. 9, 2024.
- [3] Zuquan Jin, Qingdao (CN); Bo Pang, Qingdao (CN); Yunsheng Zhang, Qingdao (CN); Dongshuai Hou, Qingdao (CN); Heping Zheng, Qingdao (CN) UNDERWATER RAPID REPAIR MATERIAL FOR MARINE STEEL STRUCTURE, Patent No.: US 12,030,812 B1 Date of Patent: Jul. 9, 2024
- [4] 逄博, 金祖权, 张云升, 王鹏刚, 于泳, 张小影, 熊传胜, 李宁, 李梦圆, 監視システムおよび

監 視 シ ス テ ム の 製 造 方 法 , JP 7370111 B2 , 2023.10.27

[https://jglobal.jst.go.jp/detail?JGLOBAL\\_ID=202303011279971652](https://jglobal.jst.go.jp/detail?JGLOBAL_ID=202303011279971652)

- [5] 逢博,金祖权,宋晓云,杨晨,杨林,钱如胜,翟胜田, 一种锂盐改性硫铝酸盐水泥的制备方法及其制品, 中国发明专利, 专利号: ZL 202311193743.0
- [6] 逢博、王鹏刚、杨晨、宋晓云、王大富、陈逸东, 一种有机-无机复合超早强高韧性路面快修材料及其制备方法和应用, 中国发明专利, 专利号: ZL2023108164884
- [7] 逢博 金祖权 张云升 熊远亮 宋晓云 丁晓峰 何松, 一种捕集和固定 CO<sub>2</sub> 的复合材料及制备方法、CO<sub>2</sub> 吸收装置, 中国发明专利, 专利号: ZL202311049691X
- [8] 逢博,金祖权,宋晓云,张云升,丁晓峰,张卓杨,陈逸东,王大富, 一种应用于水下混凝土修复的快速修补材料及其制备方法和应用, 中国发明专利, 专利号: ZL 202310965010.8
- [9] 逢博、金祖权、张云升、于泳、张小影、熊传胜、李宁、李梦圆, 一种混凝土养护剂、养护涂层及其制备方法, 中国发明专利, 专利号: ZL 2021116297662 (转让 3 万)
- [10] 逢博、金祖权、张云升、李梦圆, 用于既有建筑应变监测的水泥基导电材料及水泥基传感器, 中国发明专利, 专利号: ZL 202111484425.0 (转让 3 万)
- [11] 逢博、金祖权、张云升、李梦圆, 用于既有建筑应变监测的储能保护型水泥基微变监测涂层及水泥基传感器, 中国发明专利, 专利号: ZL 20211130448.0
- [12] 逢博, 金祖权, 侯东帅, 张云升, 王鹏刚, 于泳, 张小影, 熊传胜, 李宁, 利用废水、污泥的超早强韧性快修材料及其制备方法, 中国发明专利, 专利号: ZL 202210783832.X (转让 3 万)
- [13] 逢博,金祖权,王鹏刚,刘洋,宋晓云,丁晓峰, 一种混凝土界面剂及其制备方法, 中国发明专利, 专利号: ZL 202310711835.7
- [14] 逢博,金祖权,王鹏刚,陈睿馨,宋晓云,丁晓峰, 一种可主动吸尘除霾的自清洁涂层、制备方法及应用, 中国发明专利, 专利号: ZL 202310714439.X
- [15] 逢博,金祖权,张云升,宋晓云,丁晓峰,张宇,陈逸东,王大富, 一种海工钢结构水下快速修补材料及其制备方法, 中国发明专利, 专利号: ZL 202311005889.8
- [16] 逢博;郑和平;金祖权;侯东帅;宋晓云;张文华;余伟, 一种具有网络互穿结构的环氧树脂-水泥基快修材料及其制备方法和应用, 中国发明专利, 专利号: ZL 2023 1 1470599.0
- [17] 金祖权;逢博;袁连旺;李梦圆;闫婕;赵玲玲;王国一, 一种超疏水颗粒、内外超疏水灌浆料及其制备方法, 中国发明专利, 专利号: ZL 2024 1 0445240.6
- [18] 王鹏刚,逢博,陈睿馨,魏功槐,吴庆东,周建国,宋晓云, 一种利用洞渣微粉制备的超疏水粉体及其制备方法、应用, 中国发明专利, 专利号: ZL 202310714559X
- [19] 张云升, 逢博 “一种水性环氧混凝土修补界面剂及其制备方法”, 中国发明专利, 专利号: ZL

201810412394.X

- [20] 张云升, 钱佳佳, 逢博, 陈逸东, 石加顺“用于环氧树脂改性砂浆抹平与收光的施工装置”, 中国发明专利, 专利号: ZL 202010305521.3
- [21] 张云升, 毕金旭, 逢博, 李之恒, 赵鸣宇, “一种水性聚氨酯-水泥基修复材料及其制备方法”, 中国发明专利, 专利号: ZL 202110654313.9
- [22] 王鹏刚;付华;逢博;金祖权;孙晓光;田砾;高嵩;杜振兴;张红波;李亚慧, 一种高韧性、高耐久海工混凝土防护涂层及其制备方法, 中国发明专利, 专利号: ZL 2024 1 0327740.X
- [23] 蒋金洋;孙国文;逢博;刘志勇;王凤娟;卢立群;韩方玉 李一凡;郑皓睿, 水泥基水下不分散修补材料及其制备方法, 中国发明专利, 专利号: ZL 2024 1 1659048.3
- [24] 张小影, 金祖权, 王晓晴, 唐恒, 逢博, 闫杰, 蒋浩森, 陈越华, 程海洋, 刘佳豪, 于偲怡, 贾小玥“Z型硫化铈基阴极保护光阳极膜及其制备方法和应用”, 中国发明专利, 专利号: ZL 202210189711.2
- [25] 宋晓云、徐磊、李秋馀、徐婷婷、逢博, 一种监测化学反应速率和反应时间的装置, 实用新型专利, 专利号: ZL 202220923030.X
- [26] 宋晓云、徐磊、李秋馀、徐婷婷、逢博, 一种实验室器皿清洗装置, 实用新型专利, 专利号: ZL 202320990184.5
- [27] 刘岳, 逢博, 张长舒, 张恩慧, 张君卓, 宋彤“橡胶耐臭氧试验机”, 实用新型专利, 专利号: ZL 201720155348.7
- [28] 逢博, 刘岳, 张恩慧, 王晓娇, 徐俊, 张凯强, “一种绝缘油介损及电阻率全自动测定仪”, 实用新型专利, 专利号: ZL 201720168939.8
- [29] 刘志威, 季倩倩, 逢博, 苏惠, 王晓娇, 徐俊“橡胶用紫外老化试验箱”, 实用新型专利, 专利号: ZL 201720155335.X

## 🏆 荣誉奖励

- “海洋钢筋混凝土腐蚀机制与协同延寿”, 2024 年山东省自然科学二等奖, 排名 3.
- 低碳海工混凝土多层级“耐-防协同”抗腐蚀关键技术与应用, 2021 年青岛市科学技术进步一等奖
- 绿色海工混凝土“构-效多维协同”重防腐关键技术与应用, 2021 中国腐蚀与防护协会科学技术二等奖
- 绿色海工混凝土“构-效多维协同”重防腐关键技术与应用”, 2022 年中国商业联合会科学技术

## 二等奖

- 2024 中国 · 启东第九届“启创杯”创业大赛总决赛三等奖
- “新锐青岛 · 创享市北” 2024 国际高层次人才创新创业大赛优胜奖