宋强　博士生导师

职　　称：副教授

研究方向：泡沫混凝土、碳排放、固废资源化

通信地址：青岛市黄岛区嘉陵江东路 777 号

联系方式：songqiang3709@163.com

songqiang@qut.edu.cn

个人简介

致力于建筑节能墙材**泡沫混凝土**的设计与优化、**碳排放**（核算、数据库、人工智能模型、减排措施）和**大宗固废**（分质分级）**利用**研究。主持国家自然科学基金（面上、专项项目课题、青年），山东省高等学校优秀青年教师创新团队项目（省青创团队）、山东省自然科学基金（面上、青年），山东省博士后创新项目，青岛市博士后应用研究项目及多个省部级开放课题，参与国家重点研发计划，中央引导地方科技发展资金项目和山东省重点研发计划等。发表 Cement and Concrete Composites，Journal of Cleaner Production，Construction and Building Materials，Energy Conversion and Management，Fuel 和硅酸盐学报等高水平学术论文 40 余篇，高被引和热点论文 3 篇，封面论文 1 篇，中国科协科技期刊双语传播工程论文 1 篇。申请中美发明专利、软著 7 项，参编国家标准 2 项、行业和协会标准 4 项，获得中国材料研究学会科技进步一等奖、建筑材料创新二等奖、中国商业联合会科技进步三等奖和青岛市青年科学家协会科技成果创新一等奖等。

招生说明：

每年招收土木、结构、水利、材料、化工等方向硕士研究生 3 名，博士生 1 名；课题组经费充足，按月发放生活补助，并根据学术贡献提供助研奖学金。

工作经历

- 2019.09-2021.12，青岛理工大学土木工工程学院，博士后；
- 2022.01-　至今，青岛理工大学土木工程学院，副教授。

学术兼职

- 2023.01-至今，EI 期刊《煤炭科学技术》青年编委；
- 2022.01-至今，《矿产保护与利用》青年编委；
- 2023.03-至今，《矿冶工程》青年编委。

科研项目

- 2026.01-2029.12，国家自然科学基金面上项目，考虑气泡稳定性演变的泡沫混凝土结构与性能调控，**主持**（52578295）；
- 2024.01-2026.12，国家自然科学基金专项项目，基于低碳建筑目标的混凝土材料-结构一体化设计理论与方法，**合作单位负责人**（52341803）；
- 2026.01-2028.12，山东省自然科学基金面上项目，面向低碳建筑的泡沫混凝土气泡调控与智能制造，**主持**（ZR2025MS905）；
- 2025.12-2027.11，横向课题，超高性能泡沫混凝土结构设计与性能优化，主持；
- 2025.11-2026.05，横向课题，碳监测协同管理平台咨询服务，主持；
- 2025.01-2026.12，横向课题，煤矸石钢渣充填材料制备关键技术研究，主持；
- 2024.01-2026.12，横向课题，城市固废建材化利用关键技术研究，主持；
- 2024.01-2025.12，横向课题，固废胶凝材料制备及道路工程应用研究，主持；
- 2023.01-2025.12，山东省高等学校青创科技计划创新团队，结题；
- 2022.01-2024.12，国家自然科学基金青年科学基金项目，结题；
- 2021.01-2023.12，山东省自然科学基金青年基金，结题；
- 2021.01-2022.12，西部煤炭绿色安全开发国家重点实验室开放课题，结题；
- 2021.01-2023.12，自然资源部煤炭资源勘查与综合利用重点实验室开放课题，结题。

学术成果

近两年代表性成果：

[1] Song Qiang, Hu Yaoyu, Niu Ditao, et al. Research on durability of foam concrete: a systematic review[J]. Journal of Building Engineering, 2026, 117, 114839.

[2] Song Qiang, Zou Yingjie, Zhang Peng, et al. Novel high-efficiency solid particle foam stabilizer: effects

of modified fly ash on foam properties and foam concrete[J]. Cement and Concrete Composites, 2025, 155, 105818.

[3] Song Qiang, Xu Shipeng, Zou Yingjie, et al. Enhancing the performance of multiple solid wastes foam concrete by foam stabilizer synergistic application and quantitative evaluation[J]. Construction and Building Materials, 2025, 489, 142298.

[4] Song Qiang, Yang Yuxin, Niu Ditao, et al. A novel and efficient investigation on coal gangue aggregate processing, evaluation, and concrete performance[J]. Construction and Building Materials, 2025, 492, 142915.

[5] Song Qiang, Yang Yuxin, Xu Shipeng, et al. Mechanical properties, durability, and carbon emissions of concrete with coal gangue coarse aggregate, fine aggregate and mineral admixtures in coal mining environment[J]. Case Studies in Construction Materials, 2025, 23, e05187.

[6] Song Qiang, Xu Shipeng, Shi Baobao et al. Study on the echelon utilization and recycling performance of recycled asphalt pavement based on physical and chemical separation[J]. Case Studies in Construction Materials, 2025, 23, e05273.

[7] Song Qiang, Zou Yingjie, Xu Shipeng, et al. Performance study of foam concrete prepared by the synergistic utilization of agricultural waste and coal gangue based on double orthogonal experiments[J]. Case Studies in Construction Materials, 2024, 21, e03677.

[8] Zou Yingjie, Song Qiang*, Zhang Peng, et al. Research status of building materials utilization and CO_2 curing technology on typical coal-based solid waste: A critical review[J]. Journal of CO_2 Utilization, 2024, 84, 102860.

[9] Song Qiang, Zou Yingjie, Bao Jiuwen, et al. Disposal of solid waste as building materials: A study on the mechanical and durability performance of concrete composed of gold tailings[J]. Journal of Materials Research and Technology, 2024, 30, 2111-2124.

[10] 宋强, 杨玉鑫, 许世鹏, 等. 煤矸石混凝土性能及提升研究进展[J].煤炭科学技术, 2025, 53(2): 402-420.（**封面论文**）

[11] 宋强, 邹颖杰, 张鹏, 等. 泡沫混凝土气泡性能与基体材料研究进展[J]. 硅酸盐学报, 2024, 52(2): 706-724. （**中国科协科技期刊双语传播工程论文**）

[12] 宋强, 路宇辰, 鲍玖文, 牛荻涛, 吕瑶, 薛善彬. Compound foam stabilizer, foam concrete and

preparation methods thereof. US-2025-0052.

[13] 宋强，许世鹏，邹颖杰，杨玉鑫，牛荻涛，鲍玖文，薛善彬，孙建伟. 一种复配稳泡剂、泡沫混凝土及其制备方法. 202510789684.6.

[14] 宋强，杨玉鑫，路宇辰，胡耀禹，鲍玖文，薛善彬. 一种煤矸石粗骨料性能评价及梯次利用方法. 2025103754850.

[15] 宋强，邹颖杰，张鹏，鲍玖文，薛善彬. 一种改性粉煤灰稳泡剂及其制备方法与应用. ZL202410991825.8.

[16] 宋强，许世鹏，张鹏，邹颖杰，杨玉鑫. 一种废旧道路沥青混合料分离系统、方法. ZL202311664829.7.

[17] 宋强，张鹏，鲍玖文，薛善彬，邹颖杰. 多固废泡沫混凝土性能综合鉴定评价系统，V1.0. 2024SR0397292.

[18] 宋强，许世鹏，杨玉鑫，鲍玖文，薛善彬. 混凝土碳排放数据库管理系统，V1.0, 2025SR1608421.

[19] 宋强，路宇辰，许世鹏，牛荻涛. 一种基于多维碳排放因子数据库与混凝土碳排放预测与优化系统及方法.

[20] 宋强,胡耀禹,杨玉鑫，牛荻涛. 一种煤矸石混凝土无损检测的方法.

[21] 宋强，胡耀禹，王庆龙，牛荻涛. 一种矿物包覆玻璃纤维提高泡沫混凝土抗高低温性能的方法.

[22] 参编国家标准《混凝土碳捕集量试验方法》

[23] 参编国家标准《混凝土碳汇核算》

[24] 参编行业标准《天然火山灰质材料再混凝土中应用技术规范》

[25] 参编行业标准《花岗岩石粉在混凝土中应用技术规范》

[26] 参编行业标准《混凝土和砂浆用花岗岩石粉》

[27] 参编团体标准《高抗盐冻水泥混凝土路缘石》

2023 年及以前

[28] Song Qiang, Bao Jiuwen, Xue Shanbin, et al. Study on the recycling of ceramic polishing slag in autoclaved aerated foam concrete by response surface methodology[J]. Journal of Building Engineering, 2022, 56, 104827.

[29] Song Qiang, Zhao Hongyu, Ma Qingxiang, et al. Catalytic upgrading of coal volatiles with Fe_2O_3 and

hematite by TG-FTIR and Py-GC/MS[J]. Fuel, 2022, 313, 122667.

[30] Song Qiang, Bao Jiuwen, Zhang Peng, et al. Collaborative disposal of multisource solid waste: Influence of an admixture on the properties, pore structure and durability of foam concrete [J]. Journal of Materials Research and Technology, 2021, 14, 1778-1790.

[31] Song Qiang, Zhao Hongyu, Zhang Peng*, et al. Study on the catalytic pyrolysis of coal volatiles over hematite for the production of light tar [J]. Journal of Analytical and Applied Pyrolysis, 2020, 151, 104927.

[32] Jia Jinwei, Song Qiang*, Zou Fang, et al. Effect of calcium-based catalyst on pyrolysis characteristics of oil sludge and its products [J]. Energy Sources Part A-Recovery Utilization and Environmental Effects, 2020, 1806411.

[33] Song Qiang, Zhao Hongyu, Zhang Peng *, et al. Pyrolysis of municipal solid waste with iron-based additives: A study on the kinetic, product distribution and catalytic mechanisms [J]. Journal of Cleaner Production, 2020, 258, 120682. (ESI 高倍引/热点)

[34] Song Qiang*, Zhao Hongyu, Shu Xinqian, et al. Effects of demineralization on the surface morphology, microcrystalline and thermal transform characteristics of coal [J]. Journal of Analytical and Applied Pyrolysis, 2020, 145, 104716. (ESI 高倍引)

[35] Song Qiang, Jia Jinwei, Zhao Hongyu*, et al. Characterization of the products obtained by pyrolysis of oil sludge with steel slag in a continuous pyrolysis-magnetic separation reactor [J]. Fuel, 2019, 255, 115711.

[36] Song Qiang, Zhao Hongyu, Shu Xinqian *, et al. Effects of various additives on pyrolysis characteristics of municipal solid waste [J]. Waste Management, 2018, 78: 621-629.

[37] Zhao Hongyu, Song Qiang*, Liu Shucheng, et al. Study on catalytic co-pyrolysis of physical mixture staged pyrolysis characteristics of lignite and straw over an catalytic beds of char and its mechanism [J]. Energy Conversion and Management, 2018, 161 (1): 13-26.

[38] Zhao Honyu, Li Yuhuan, Song Qiang*, et al. Catalytic reforming of volatiles from co-pyrolysis of lignite blended with corn straw over three different structures of iron ores [J]. Journal of Analytical and Applied Pyrolysis, 2019, 144, 104714.

[39] Zhao Honyu, Li Yuhuan, Song Qiang*, et al. Investigation on the thermal behavior characteristics and

products composition of four pulverized coals: Its potential applications in coal cleaning [J]. International Journal of Hydrogen Energy, 2019, 44 (42): 23620-23638.

[40] Zhao Hongyu, Wang Binze, Song Qiang*, et al. Effect of chemical fractionation treatment on structure and characteristics of pyrolysis products of Xinjiang long flame coal [J]. Fuel, 2018, 234(15): 1193-1204.

[41] 宋强, 张鹏, 鲍玖文, 等. 泡沫混凝土的研究进展与应用[J]. 硅酸盐学报, 2021, 49(2):1-13.（**高倍引、高下载**）

荣誉奖励

- 2025.12，中国知网高倍引学者 TOP5%；
- 2025.11，青岛市青科协科技创新一等奖（1 位）；
- 2024.12，中国商业联合会科技进步三等奖（1 位）；
- 2023.06，中国材料研究学会科学技术一等奖（9 位）；
- 2020.12，建筑材料情报研究所建筑材料创新二等奖（3 位）。