



江南大学
JIANGNAN UNIVERSITY



化学与材料工程学院
School of Chemical & Material Engineering

低维固体材料课题组

团队负责人：焦星辰

团队成员：

副教授：陈庆霞

一、研究领域 / Research Fields

1. 低维固体材料可控制备
2. 低维固体材料有序组装体
3. 低维固体材料能源与环境催化

二、研究内容 / Research Contents

1. 低维高效催化剂的设计、制备和精细结构表征
2. 可控组装及有序组装体的精准构筑
3. 能源小分子和废弃塑料催化转化制高附加值燃料

三、代表性成果 / Representative Achievements

1. 项目
 - 1) 科技部国家重点研发计划子课题，2022YFA1502904，2023.01–2027.12
 - 2) 科技部国家重点研发计划子课题，2022YFA1203600，2023.01–2027.12
 - 3) 国家自然科学基金面上项目，22275178，2023.01–2026.12
 - 4) 国家自然科学基金青年项目，22005285，2021.01–2023.12
 - 5) 安徽省自然科学基金青年项目，21080850B69，2021.01–2022.12
 - 6) 中国博士后创新人才支持计划，BX20200316，2020.06–2022.05
 - 7) 中国博士后科学基金特别资助（站前），2019TQ0304，2019.07–2021.06
2. 获奖
 - 1) 中国科学院优秀博士学位论文
 - 2) 中国科学院院长优秀奖
3. 专利
 - 1) 焦星辰，丁金钰，陈庆霞；钨掺杂的 Co₃₀₄ 纳米片及其在光催化还原 CO₂ 产乙酸中的应用；申请号：2023111546954
 - 2) 焦星辰，胡秦源，陈庆霞；一种氮掺杂的钛酸铜纳米片及其制备方法和应用；申请号：2023110180724

4. 论文

- 1) Kai Zheng, + Yang Wu, + Zexun Hu, Shumin Wang, Xingchen Jiao, * Juncheng Zhu, Yongfu Sun, * and Yi Xie*; Progress and Perspective for Conversion of Plastic Wastes into Valuable Chemicals. Chem. Soc. Rev. 2023, 52, 8-29
- 2) Xingchen Jiao, + Kai Zheng, + Liang Liang, Xiaodong Li, Yongfu Sun, * and Yi Xie*; Fundamentals and challenges of ultrathin 2D photocatalysts in boosting CO₂ photoreduction. Chem. Soc. Rev. 2020, 49, 6592-6604
- 3) Yang Wu, + Qinyuan Hu, + Qingxia Chen, * Xingchen Jiao, * and Yi Xie*; Fundamentals and Challenges of Engineering Charge Polarized Active Sites for CO₂ Photoreduction toward C₂ Products. Acc. Chem. Res. 2023, 56, 2500–2513
- 4) Xingchen Jiao, + Zongwei Chen, + Xiaodong Li, + Yongfu Sun, * Shan Gao, Wensheng Yan, Chengming Wang, Qun Zhang, * Yue Lin, Yi Luo, and Yi Xie*; Defect-Mediated Electron–Hole Separation in One-Unit-Cell ZnIn₂S₄ Layers for Boosted Solar-Driven CO₂ Reduction. J. Am. Chem. Soc. 2017, 139, 7586–7594
- 5) Xingchen Jiao, + Xiaodong Li, + Xiuyu Jin, Yongfu Sun, * Jiaqi Xu, Liang Liang, Huanxin Ju, Junfa Zhu, Yang Pan, Wensheng Yan, Yue Lin, and Yi Xie*; Partially Oxidized SnS₂ Atomic Layers Achieving Efficient Visible-Light-Driven CO₂ Reduction. J. Am. Chem. Soc. 2017, 139, 18044–18051
- 6) Qingxia Chen, + Yinghuan Liu, + Xiaozhuo Qi, Jianwei Liu, * Huijun Jiang, * Jinlong Wang, Zhen He, Xifeng Ren, Zhonghuai Hou, and Shuhong Yu*; Ordered Nanostructure Enhances Electrocatalytic Performance by Directional Micro-Electric Field. J. Am. Chem. Soc. 2019, 141, 10729–10735
- 7) Qingxia Chen, + Yinghuan Liu, + Zhen He, Jinlong Wang, Jianwei Liu, * Huijun Jiang, * Wenran Huang, Guanyin Gao, Zhonghuai Hou, and Shuhong Yu*; Microchemical Engineering in a 3D Ordered Channel Enhances Electrocatalysis. J. Am. Chem. Soc. 2021, 143, 12600–12608
- 8) Xingchen Jiao, + Kai Zheng, + Qingxia Chen, Xiaodong Li, Yamin Li, Weiwei Shao, Jiaqi Xu, Junfa Zhu, Yang Pan, Yongfu Sun, * and Yi Xie*; Photocatalytic Conversion of Waste Plastics into C₂ Fuels under Simulated Natural Environment Conditions. Angew. Chem. Int. Ed. 2020, 59, 15497–15501
- 9) Yang Wu, + Qingxia Chen, + Juncheng Zhu, + Kai Zheng, Mingyu Wu, Minghui Fan, Wensheng Yan, Jun Hu, Junfa Zhu, Yang Pan, Xingchen Jiao, * Yongfu Sun, * and Yi Xie; Selective CO₂-to-C₂H₄ Photoconversion Enabled by Oxygen-Mediated Triatomic Sites in Partially Oxidized Bimetallic Sulfide. Angew. Chem. Int. Ed. 2023, 62, e202301075
- 10) Xingchen Jiao, + Kai Zheng, + Zexun Hu, Shan Zhu, Yongfu Sun, * and Yi Xie*; Conversion of Waste Plastics into Value-Added Carbonaceous Fuels under Mild Conditions. Adv. Mater. 2021, 33, 2005192