

# 新疆大学化学学院

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职称/职务：副教授、博士、硕士生导师

专业：物理化学

研究方向：计算化学、膜分离、限域传质

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## 学习经历:

2014.09-2020.07: 南京理工大学，材料科学与工程专业，博士（硕博连读）

2017.09-2018.09: 美国伊利诺伊大学芝加哥分校，化学学院，CSC 联合培养博士

## 工作经历:

2022.11-至今：新疆大学，化学学院，副教授

2020.08-2022.11：南京邮电大学，材料科学与工程学院，助理研究员

## 研究内容:

1. 限域传质，膜分离
2. 多尺度模拟计算，机器学习

## 主持项目:

1. 国家自然科学基金青年基金项目，22408303，多层氧化石墨烯分离膜中分子传输与分离机制的理论研究，2025.01-2027.12，30万，在研，主持
2. 新疆维吾尔自治区自然科学基金青年基金项目，2023D01C191，低维碳基纳米通道稳定性问题及相关液相输运与分离机制的研究，2023-09 至 2026-08，7万元，在研，主持
3. 新疆维吾尔自治区“天池英才”人才引进计划-青年博士人才，先进碳基膜材料用于CO<sub>2</sub>分离及相关气体分子输运与分离机制的研究，2023-02 至 2026-01，45万元，在研，主持
4. 新疆维吾尔自治区高校基本科研业务费科研项目-培育类项目，XJEDU2023P002，无序堆叠GO膜通道中气体分子传输与分离机制的研究，2023-06 至 2025-05，6万元，在研，主持
5. 江苏省博士后科研资助计划，2021K268B，纳米通道中水分子输运的动力学研究，2021-06 至 2022-12，5万元，结题，主持

## 参与项目:

1. 国家自然科学基金联合基金项目，U23A20688，面向药物脱盐的新型COF基耐溶剂纳滤膜的绿色构筑与性能研究，2024-01-01 至 2027-12-31，253万元，在研，参与
2. 国家自然科学基金面上项目，11974185，从晶体对称性出发探索超快强激光作用下的固体谐波产生

# 新疆大学化学学院

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与应用, 2020-01-01 至 2023-12-31, 63万元, 结题, 参与

3. 国家自然科学基金面上项目, 51872142, 类石墨烯膜材料用于气体分离、海水脱盐的理论研究, 2019-01-01 至 2022-12-31, 60万元, 结题, 参与

## 代表性论文:

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1. Deren Liu, Jing Wang, **Haiqi Gao\***, Yuzhen Liu\*, Ruifeng Lu\*, Beyond the single-layer limit for desalination based on conical channels of multilayer nanoporous graphene membranes, *Journal of Membrane Science*, 695, 2024, 122474. **(Corresponding author)**
2. Lei Zhang<sup>#</sup>, Jiawei Wu<sup>#</sup>, Tiantian Lu<sup>#</sup>, Xueyong Li<sup>#</sup>, Hao Wu, Tao Chen, Yulin Zhang, Jintao Wei, Mingao Hu, Xiaomei Zheng, **Haiqi Gao\***, Zhen-Dong Huang, Qian Wang\*, Shi Wang\*, Zhong Jin, Improving Zn<sup>2+</sup> migration via designing multiple zincophilic polymer electrolyte for advanced aqueous zinc ion batteries, *Chemical Engineering Journal*, 496, 2024, 153815. **(Corresponding author)**
3. Shi Wang, Lei Zhang, Qinghui Zeng, Jiazhu Guan, **Haiqi Gao\***, Liaoyun Zhang\*, Zhong Jin, Wen-Yong Lai\*, Qian Wang\*, Designing Polymer Electrolytes via Ring-opening polymerization for advanced lithium batteries, *Advanced Energy Materials*, 14(13), 2024, 2302876. **(Corresponding author)**
4. **Haiqi Gao**, Xin Hu, Xueyong Li, Deren Liu, Mingao Hu, Wenhai Zhang\*, Yuzhen Liu\*, Hong Meng, Exploring water/ion transport through the polarized lamellar channels, *Industrial & Engineering Chemistry Research*, 62, 2023, 19987-19994.
5. **Haiqi Gao**, Mingao Hu, Junfei Ding, Bailu Xia, Guanglu Yuan, Huasheng Sun, Qinghao Xu, Shiyu Zhao, Yawei Jiang, Hong Wu, Ming Yuan, Jiahui Li, Bingxiang Li, Jin Zhao\*, Dewei Rao\*, Yannan Xie\*, Investigation of contact electrification between 2D MXenes and MoS<sub>2</sub> through density functional theory and triboelectric probes, *Advanced Functional Materials*, 33, 2023, 2213410.
6. **Haiqi Gao**, Jing Wang, Xirui Zhang, Mingao Hu, Qinghao Xu, Yannan Xie\*, Yuzhen Liu\*, and Ruifeng Lu\*. Confined lamellar channels structured by multilayer graphene for high-efficiency desalination. *Desalination* 530, 2022, 115681.
7. **Haiqi Gao**, Qinghao Xu, Jing Wang, Cai Ning, Yuzhen Liu, Yannan Xie\*, and Ruifeng Lu\*. Beyond the pore size limitation of a nanoporous graphene monolayer membrane for water desalination assisted by an external electric field. *The Journal of Physical Chemistry Letters* 13, 2021, 258-266.
8. **Haiqi Gao**, Jing Wang, Yuzhen Liu\*, Yannan Xie, Petr Král, and Ruifeng Lu\*. Selectivity of ion transport in narrow carbon nanotubes depends on the driving force due to drag or drive nature of their active hydration shells. *The Journal of Chemical Physics* 154, 2021, 104707.
9. **Haiqi Gao** Qi Shi, Petr Kral\*, Rufeng Lu\*, Water transport through ultrathin nanopores with highly polar rims. *The Journal of Physical Chemistry C* 123, 2019, 27690-27696.
10. **Haiqi Gao**<sup>#</sup>, Qi Shi<sup>#</sup>, Dewei Rao, Yadong Zhang, Jiaye Su, Yuzhen Liu, Yunhui Wang\*,

# 新疆大学化学学院

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- Kaiming Deng\*, Ruifeng Lu\*, Rational design and strain engineering of nanoporous boron nitride nanosheet membranes for water desalination, *The Journal of Physical Chemistry C*, 121, 2017, 22105-22113.
11. Lei Zhang, **Haiqi Gao\***, Lixiang Guan, Yuchao Li\*, Qian Wang\*, Polyzwitterion-SiO<sub>2</sub> double-network polymer electrolyte with High Strength and High Ionic Conductivity, *Polymers*, 15, 2023, 466. (Corresponding author)
  12. Wei Zong, **Haiqi Gao#**, Yue Ouyang, Kaibin Chu, Hele Guo, Leiqian Zhang, Wei Zhang, Ruwei Chen, Yuhang Dai, Fei Guo, Jiexin Zhu, Zhenfang Zhang, Chumei Ye, Yue- E. Miao, Johan Hofkens, Feili Lai\*, Tianxi Liu\*, Bio-inspired aerobic-hydrophobic janus interface on partially carbonized iron heterostructure promotes bifunctional nitrogen fixation, *Angew. Chem. Int. Ed. Engl.*, 135(7), 2023, e202218122. (Co-first author)
  13. Shi Wang#, Qiange Li#, **Haiqi Gao#**, Henan Cai, Chao Liu, Tao Cheng, Chongyang Liu, Yonghua Li, Wen-Yong Lai\*, A Polyzwitterion-mediated polymer electrolyte with high oxidative stability for lithium-metal batteries, *Small*, 19(50), 2023, 2304677. (Co-first author)
  14. Rehak, Pavel#, **Haiqi Gao#**, Ruifeng Lu, and Petr Král \*. Nanoscale Venturi-Bernoulli pumping of liquids. *ACS Nano* 15, 2021, 10342-10346. (Co-first author)
  15. Lei, Zhang#, **Haiqi Gao#**, Shijun Xiao #, Jinyu Li, Tianli Ma, Qian Wang\*, Wen Liu\*, and Shi Wang\*. In-situ construction of ceramic-polymer all-solid-state electrolytes for high-performance room-temperature lithium metal batteries. *ACS Materials Letters* 4, 2022, 1297-1305. (Co-first author)
  16. Guangjin Zhao, **Haiqi Gao**, Zhou Qu, Hongwei Fan\*, Hong Meng\*, Anhydrous interfacial polymerization of sub-1 Å sieving polyamide membrane, *Nature Communications*, 14, 2023, 7624.
  17. Yan Pan, HaoHao Liu, ZiQi Huang, WenHai Zhang, **Haiqi Gao**, LiJun Liang\*, LiangLiang Dong\*, Hong Meng\*, Membranes based on covalent organic frameworks through green and scalable interfacial polymerization using ionic liquids for antibiotic desalination, *Angewandte Chemie International Edition*, 63(4), 2023, e202316315.
  18. Wenjing Han, Dewei Rao, **Haiqi Gao**, Xingda Yang, Hongwei Fan, Chunxi Li, Liangliang Dong\*, and Hong Meng\*. Green-solvent-processable biodegradable poly (lactic acid) nanofibrous membranes with bead-on-string structure for effective air filtration:“Kill two birds with one stone”. *Nano Energy* 97, 2022, 107237.
  19. Qinghao Xu, Yuting Lu, Shiyu Zhao, Ning Hu, Yawei Jiang, Hang Li, Yue Wang, **Haiqi Gao** et al. A wind vector detecting system based on triboelectric and photoelectric sensors for simultaneously monitoring wind speed and direction. *Nano Energy* 89, 2021, 106382.
  20. Qi Shi, **Haiqi Gao**, Yadong Zhang, Zhaosun Meng, Dewei Rao, Jiaye Su, Yuzhen Liu, Yunhui, Wang\*, Ruifeng Lu\*, Bilayer graphene with ripples for reverse osmosis desalination, *Carbon* 136, 2018, 21-27.