

Jinsong Xia

Research Scientist at Caltech

Contact

1200 E California Blvd, MC 132-80
California Institute of Technology
Pasadena, CA, 91125

Email: jinsong.xia@outlook.com
Mobile: +1 (626) 692-2633
Website: <https://jinsongxia.com>

Professional Experience

Research Scientist

10/2023 – Present

Caltech

Pasadena, California, USA

- Lead and conduct independent research projects in carbon capture and renewable energy, focusing on advancing decarbonization efforts.
- Design and fabricate catalyst materials (e.g., water dissociation catalysts, electrocatalysts) and electrochemical systems for applications in carbon capture and conversion.
- Develop research ideas and prepare grant proposals.

Casual Research Associate

07/2023 – 09/2023

Queen's University

Kingston, Ontario, Canada

- Designed and executed independent research projects on metal extraction and recovery.
- Authored and published research papers.

Teaching Fellow

09/2022 – 12/2022

Queen's University

Kingston, Ontario, Canada

- Held full responsibility for teaching MNTC POS Foundational Physics, including developing the syllabus, delivering lectures, and assessing student performance.

Teaching Assistant

05/2020 – 04/2022

Queen's University

Kingston, Ontario, Canada

- Assisted in teaching multiple undergraduate courses, including MINE 268, CHEM 112, APSC 100, MNTC 306, MINE 422, and CHEM 113.
- Led laboratory experiments, graded assignments and reports, and provided academic support to students.

Formulation Design Engineer

11/2018 – 05/2019

Giti Tire R&D Center

Hefei, Anhui, China

- Designed innovative tire compounds for commercial passenger vehicles, contributing to product development cycles.
- Engineered and executed lab-scale experiments and supervised plant-scale operations, ensuring quality and efficiency.
- Collaborated with cross-functional teams and external partners on R&D projects.

Education

PhD	Mining Engineering Queen's University	09/2019 – 05/2023 Kingston, Ontario, Canada
MS	Materials Science and Engineering Hainan University	09/2015 – 06/2018 Haikou, Hainan, China
BS	Materials Science and Engineering Hainan University	09/2011 – 06/2015 Haikou, Hainan, China

Research Highlights

- **Bipolar Membrane Development (Caltech):** Synthesize transition metal oxide-based water dissociation catalyst achieving state-of-the-art performance in electro dialysis for acid-base production.
- **Reactive Carbon Capture (Caltech):** Design electrochemical system and develop electrocatalysts for a reactive carbon capture system that enables simultaneous carbon capture and conversion, promising significant cost reductions over traditional methods.
- **Magnetic Adsorbents for Gold Recovery (PhD):** Developed novel magnetic adsorbents (e.g., magnetic iron sulfide, magnetic activated carbon, Fe₃O₄@CuS) demonstrating improved capacity, selectivity, kinetics, and effective magnetic separation for gold recovery, revolutionizing conventional gold recovery processes.
- **Precious Metal Recycling (PhD):** Investigated metal extraction and recovery technologies for recycling precious metals from e-waste and spent automotive catalysts; performed hydrometallurgical experiments for copper and gold extraction from PCBs.
- **Graphene Synthesis from Biocarbon (MS):** Successfully converted biocarbon from coconut shells to graphene at a significantly reduced temperature (900°C) using a novel catalytic graphitization approach. The resulting high-purity, high-conductivity graphene proved ideal for supercapacitor electrodes.

Management and Leadership Experience

Supervisor of an Undergraduate Research Assistant at Queen's U. 05/2021 – 12/2021

Train the Research Assistant in experimental and research techniques applicable to metal extraction and recovery, as well as in the methods for writing and publishing research papers.

Supervisor of an Undergraduate Research Assistant at Caltech. 02/2025 – present

Train the Research Assistant in experimental and research techniques applicable to carbon capture, bipolar membrane electro dialysis systems, and catalyst synthesis.

Honors and Awards

Margaret Anderson Graduate Scholarship 08/2022

School of Graduate Studies, Queen's University

Pickles Family Scholarship	03/2022
Department of Mining, Queen's University	
Dean's Teaching Assistant Award	06/2021
Faculty of Engineering and Applied Science, Queen's University	
Outstanding Graduate	09/2018
Hainan University	

Peer-Reviewed Journal Articles (*Corresponding author)

1. **Jinsong Xia***, Ahmad Ghahreman, Sustainable Technologies for the Recycling and Upcycling of Precious Metals from E-waste, *Science of the Total Environment*, 2024, 916, 170154
(<https://doi.org/10.1016/j.scitotenv.2024.170154>)
 2. **Jinsong Xia***, Ahmad Ghahreman, Core-Shell Structured Fe₃O₄@CuS for Effective Gold Capture and Recovery. *ACS Applied Nano Materials*, 2023, 6, 12, 10837–10844
(<https://doi.org/10.1021/acsanm.3c01772>)
 3. **Jinsong Xia***, Ahmad Ghahreman, Platinum Group Metals Recycling from Spent Automotive Catalysts: Metallurgical Extraction and Recovery Technologies. *Separation and Purification Technology*, 2023, 311, 123357
(<https://doi.org/10.1016/j.seppur.2023.123357>)
 4. **Jinsong Xia***, Julia Twinney, Rajashekhar Marthi, Ahmad Ghahreman, Ultra-efficient and Selective Recovery of Au(III) Using Magnetic Fe₃S₄/Fe₇S₈. *Separation and Purification Technology*, 2023, 306, Part A, 122611
(<https://doi.org/10.1016/j.seppur.2022.122611>)
 5. **Jinsong Xia***, Rajashekhar Marthi, Julia Twinney, Ahmad Ghahreman, A Review on Adsorption Mechanism of Gold Cyanide Complex onto Activation Carbon. *Journal of Industrial and Engineering Chemistry*, 2022, 111, 35-42
(<https://doi.org/10.1016/j.jiec.2022.04.014>)
 6. **Jinsong Xia**, Harshit Mahandra, Ahmad Ghahreman, Efficient Gold Recovery from Cyanide Solution Using Magnetic Activated Carbon. *ACS Applied Materials & Interfaces*, 2021, 13, 40, 47642–47649
(<https://doi.org/10.1021/acsami.1c13920>)
 7. **Jinsong Xia**, Na Zhang, Shaokun Chong, De Li, Yong Chen, Chenghua Sun, Three-dimensional porous graphene-like sheets synthesized from biocarbon via low-temperature graphitization for a supercapacitor. *Green Chemistry*, 2018, 20, 694-700
(<https://doi.org/10.1039/C7GC03426A>)
- 2018 Green Chemistry Hot Articles**
8. Na Liu, Yanli Su, Zhiqiang Wang, Zhen Wang, **Jinsong Xia**, Yong Chen, Zhigang Zhao, Qingwen Li, Fengxia Geng, Electrostatic-Interaction-Assisted Construction of 3D Networks of Manganese Dioxide Nanosheets for Flexible High-Performance Solid-State Asymmetric Supercapacitors. *ACS Nano*, 2017, 11, 7879–7888

- (<https://doi.org/10.1021/acsnano.7b02344>)
9. Chao Yao, Yan Mo, Xiaobo Jia, Xianglei Chen, **Jinsong Xia**, Yong Chen, LiMnPO₄ surface coating on LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ by a simple sol-gel method and improving electrochemical properties. *Solid State Ionics*, 2018, 317, 156-163
(<https://doi.org/10.1016/j.ssi.2018.01.018>)
 10. Bo Hou, Lihong Yin, **Jinsong Xia**, Rongwei Yan, Yong Chen, Research progress of electrode materials for Super-capacitor. *Journal of Henan University (Natural Science)*, 2016, 46, 286-299
(<https://doi.org/10.15991/j.cnki.411100.2016.03.004>)
 11. Rongwei Yan, Bo Hou, **Jinsong Xia**, Shuo Yang, Feng Yu, Yong Chen, Adjustment of Pore Structure of Coconut Shell Activated Carbon and Its Influence on the Performance of Supercapacitors. *Journal of synthetic crystals*, 2018, 47, 550-555
(<http://doi.org/10.16553/j.cnki.issn1000-985x.2018.03.016>)

Patent

1. Yong Chen, **Jinsong Xia**, Chenhua Sun, *A method of preparing three-dimensional porous graphene sheets and its application*. Publication Number: CN108002370A, 2018-05-08
(<https://patents.google.com/patent/CN108002370A/zh>)

Selected Professional Services

- **Guest editor**
From Fossil Fuels to Clean Energy: Mapping the Transition, Innovations and Hurdles
(https://www.mdpi.com/journal/sustainability/special_issues/2TOTYOL5O7)
Modelling and Optimisation of CO₂ Capture and Storage Systems
(https://www.mdpi.com/journal/processes/special_issues/Z728648SC6)
- **Reviewer** for journals including Nature Communications, Journal of Materials Chemistry A, Chemical Engineering Journal, Desalination, ChemComm, Inorganic Chemistry Frontiers, Journal of Colloid and Interface Science, Separation and Purification Technology, Materials Today Chemistry, Hydrometallurgy, Journal of Water Process Engineering, etc.