



Xueli(Sherry) Zheng

Staff Scientist, SLAC National Accelerator Laboratory

Bio

BIO

Xueli (Sherry) Zheng is a Physical Science Research Scientist in the Department of Materials Science and Engineering at Stanford University. Dr. Zheng has over 10 years of experience in battery technology, electrochemistry, materials science, X-ray science, and catalysis. Throughout her career, she has published more than 50 peer-reviewed papers, with over 11,000 citations and an H-index 36 (according to Google Scholar). Her research focuses on 1) advancing the design, synthesis, and characterization of 2D nanomaterials, leveraging her extensive background and specialized expertise in materials synthesis and synchrotron X-ray spectroscopy/imaging characterization. 2) advanced synchrotron-based characterization techniques, particularly for studying interfaces, surfaces, and nanomaterial properties. These include in situ measurements to explore catalytic reactions, lithium metal batteries, and aqueous battery systems. 3) decarbonizing steelmaking using sustainable hydrogen; 4) critical materials including Li/Co and rare earth element characterization and extraction. 5) leveraging fundamental science to enable translational research across many sustainable energy technologies, including batteries and decarbonizing steelmaking.

EDUCATION AND CERTIFICATIONS

- Principal Investigator, SLAC-Stanford Battery Center , Batteries, Synchrotron X-ray Characterization, Materials Science, Critical Minerals (2021)
- Postdoc, Stanford University , Materials Science and Engineering (2017)

PATENTS

- Guangxia Feng, Xueli Zheng, Yi Cui. "United States Patent U.S. Provisional Application No. 63/875,190 Hydrotrope-enabled high concentration aqueous electrolytes for reversible and sustainable iron metal anodes"
- Bo Zhang, Xueli Zheng, Oleksandr VOZNYI, Sjoerd HOOGLAND, Jixian XU, Min Liu, Cao-Thang DINH, Edward Sargent. "United States Patent US20170218528A1 Homogeneously dispersed multimetal oxy-hydroxide catalysts"

LINKS

- <https://scholar.google.com/citations?user=EWdW56wAAAAJ&hl=en&oi=ao>: <https://scholar.google.com/citations?user=EWdW56wAAAAJ&hl=en&oi=ao>

Publications

PUBLICATIONS

- **Solvation-property relationship of lithium-sulphur battery electrolytes.** *Nature communications*
Kim, S. C., Gao, X., Liao, S., Su, H., Chen, Y., Zhang, W., Greenburg, L. C., Pan, J., Zheng, X., Ye, Y., Kim, M. S., Sayavong, P., Brest, et al
2024; 15 (1): 1268
- **Correlating chemistry and mass transport in sustainable iron production.** *Proceedings of the National Academy of Sciences of the United States of America*
Zheng, X., Paul, S., Moghimi, L., Wang, Y., Vilá, R. A., Zhang, F., Gao, X., Deng, J., Jiang, Y., Xiao, X., Wu, C., Greenburg, L. C., Yang, et al

2023; 120 (43): e2305097120

- **Electrolytes with moderate lithium polysulfide solubility for high-performance long-calendar-life lithium-sulfur batteries.** *Proceedings of the National Academy of Sciences of the United States of America*
Gao, X., Yu, Z., Wang, J., Zheng, X., Ye, Y., Gong, H., Xiao, X., Yang, Y., Chen, Y., Bone, S. E., Greenburg, L. C., Zhang, P., Su, et al
2023; 120 (31): e2301260120
- **All-Solid-State Lithium-Sulfur Batteries Enhanced by Redox Mediators.** *Journal of the American Chemical Society*
Gao, X., Zheng, X., Tsao, Y., Zhang, P., Xiao, X., Ye, Y., Li, J., Yang, Y., Xu, R., Bao, Z., Cui, Y.
2021
- **Defect-mediated ferromagnetism in correlated two-dimensional transition metal phosphorus trisulfides.** *Science advances*
Wang, F., Mathur, N., Janes, A. N., Sheng, H., He, P., Zheng, X., Yu, P., DeRuiter, A. J., Schmidt, J. R., He, J., Jin, S.
2021; 7 (43): eabj4086
- **Origin of enhanced water oxidation activity in an iridium single atom anchored on NiFe oxyhydroxide catalyst** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Zheng, X., Tang, J., Gallo, A., Torres, J., Yu, X., Athanitis, C. J., Been, E., Ercius, P., Mao, H., Fakra, S. C., Song, C., Davis, R. C., Reimer, et al
2021; 118 (36)
- **Concentrated dual-cation electrolyte strategy for aqueous zinc-ion batteries** *ENERGY & ENVIRONMENTAL SCIENCE*
Zhu, Y., Yin, J., Zheng, X., Emwas, A., Lei, Y., Mohammed, O. F., Cui, Y., Alshareef, H. N.
2021
- **Large Scale Synthesis of Manganese Oxide/Reduced Graphene Oxide Composites as Anode Materials for Long Cycle Lithium Ion Batteries** *ACS APPLIED ENERGY MATERIALS*
Meng, Y., Liu, Y., He, J., Sun, X., Palmieri, A., Gu, Y., Zheng, X., Dang, Y., Huang, X., Mustain, W., Suib, S. L.
2021; 4 (6): 5424-5433
- **Organic wastewater treatment by a single-atom catalyst and electrolytically produced H₂O₂.** *Nature sustainability*
Xu, J., Zheng, X., Feng, Z., Lu, Z., Zhang, Z., Huang, W., Li, Y., Vuckovic, D., Li, Y., Dai, S., Chen, G., Wang, K., Wang, et al
2021; 4: 233-241
- **Organic wastewater treatment by a single-atom catalyst and electrolytically produced H₂O₂** *NATURE SUSTAINABILITY*
Xu, J., Zheng, X., Feng, Z., Lu, Z., Zhang, Z., Huang, W., Li, Y., Vuckovic, D., Li, Y., Dai, S., Chen, G., Wang, K., Wang, et al
2020
- **Incorporating the nanoscale encapsulation concept from liquid electrolytes into solid-state lithium-sulfur batteries.** *Nano letters*
Gao, X., Zheng, X., Wang, J., Zhang, Z., Xiao, X., Wan, J., Ye, Y., Chou, L., Lee, H. K., Wang, J., Vila, R. A., Yang, Y., Zhang, et al
2020
- **Synergistic enhancement of electrocatalytic CO₂ reduction to C₂ oxygenates at nitrogen-doped nanodiamonds/Cu interface.** *Nature nanotechnology*
Wang, H., Tzeng, Y., Ji, Y., Li, Y., Li, J., Zheng, X., Yang, A., Liu, Y., Gong, Y., Cai, L., Li, Y., Zhang, X., Chen, et al
2020
- **Active Sulfur Sites in Semimetallic Titanium Disulfide Enable CO₂ Electroreduction** *ACS CATALYSIS*
Allabour, A., Coskun, H., Zheng, X., Kibria, M., Strobel, M., Hild, S., Kehrer, M., Stifter, D., Sargent, E. H., Stadler, P.
2020; 10 (1): 66–72
- **Electrochemical generation of liquid and solid sulfur on two-dimensional layered materials with distinct areal capacities.** *Nature nanotechnology*
Yang, A. n., Zhou, G. n., Kong, X. n., Vilá, R. A., Pei, A. n., Wu, Y. n., Yu, X. n., Zheng, X. n., Wu, C. L., Liu, B. n., Chen, H. n., Xu, Y. n., Chen, et al
2020
- **Electrochemical generation of liquid and solid sulfur on two-dimensional layered materials with distinct areal capacities** *Nature Nanotechnology*
Yang, A., Zhou, G., et al
2020
- **Highly active oxygen evolution integrated with efficient CO₂ to CO electroreduction.** *Proceedings of the National Academy of Sciences of the United States of America*

- Meng, Y., Zhang, X., Hung, W., He, J., Tsai, Y., Kuang, Y., Kenney, M. J., Shyue, J., Liu, Y., Stone, K. H., Zheng, X., Suib, S. L., Lin, et al
2019
- **Surface-engineered mesoporous silicon microparticles as high-Coulombic-efficiency anodes for lithium-ion batteries** *NANO ENERGY*
Wang, J., Liao, L., Lee, H., Shi, F., Huang, W., Zhao, J., Pei, A., Tang, J., Zheng, X., Chen, W., Cui, Y.
2019; 61: 404–10
 - **Atomically engineering activation sites onto metallic 1T-MoS₂ catalysts for enhanced electrochemical hydrogen evolution** *NATURE COMMUNICATIONS*
Huang, Y., Sun, Y., Zheng, X., Aoki, T., Pattengale, B., Huang, J., He, X., Bian, W., Younan, S., Williams, N., Hu, J., Ge, J., Pu, et al
2019; 10
 - **Atomically engineering activation sites onto metallic 1T-MoS₂ catalysts for enhanced electrochemical hydrogen evolution.** *Nature communications*
Huang, Y., Sun, Y., Zheng, X., Aoki, T., Pattengale, B., Huang, J., He, X., Bian, W., Younan, S., Williams, N., Hu, J., Ge, J., Pu, et al
2019; 10 (1): 982
 - **Breathing-Mimicking Electrocatalysis for Oxygen Evolution and Reduction** *JOULE*
Li, J., Zhu, Y., Chen, W., Lu, Z., Xu, J., Pei, A., Peng, Y., Zheng, X., Zhang, Z., Chu, S., Cui, Y.
2019; 3 (2): 557–69
 - **Reversible and selective ion intercalation through the top surface of few-layer MoS₂.** *Nature communications*
Zhang, J., Yang, A., Wu, X., van de Groep, J., Tang, P., Li, S., Liu, B., Shi, F., Wan, J., Li, Q., Sun, Y., Lu, Z., Zheng, et al
2018; 9 (1): 5289
 - **Reversible and selective ion intercalation through the top surface of few-layer MoS₂** *NATURE COMMUNICATIONS*
Zhang, J., Yang, A., Wu, X., van de Groep, J., Tang, P., Li, S., Liu, B., Shi, F., Wan, J., Li, Q., Sun, Y., Lu, Z., Zheng, et al
2018; 9
 - **Atomic-level structure engineering of metal oxides for high-rate oxygen intercalation pseudocapacitance.** *Science advances*
Ling, T., Da, P., Zheng, X., Ge, B., Hu, Z., Wu, M., Du, X., Hu, W., Jaroniec, M., Qiao, S.
2018; 4 (10): eaau6261
 - **Highly Emissive Green Perovskite Nanocrystals in a Solid State Crystalline Matrix.** *Advanced materials*
Quan, L. N., Quintero-Bermudez, R., Voznyy, O., Walters, G., Jain, A., Fan, J. Z., Zheng, X., Yang, Z., Sargent, E. H.
2017; 29 (21)
 - **Enhanced Solar-to-Hydrogen Generation with Broadband Epsilon-Near-Zero Nanostructured Photocatalysts.** *Advanced materials*
Tian, Y., García de Arquer, F. P., Dinh, C., Favraud, G., Bonifazi, M., Li, J., Liu, M., Zhang, X., Zheng, X., Kibria, M. G., Hoogland, S., Sinton, D., Sargent, et al
2017
 - **Modest Oxygen-Defective Amorphous Manganese-Based Nanoparticle Mullite with Superior Overall Electrocatalytic Performance for Oxygen Reduction Reaction** *SMALL*
Dong, C., Liu, Z., Liu, J., Wang, W., Cui, L., Luo, R., Guo, H., Zheng, X., Qiao, S., Du, X., Yang, J.
2017; 13 (16)
 - **Theory-driven design of high-valence metal sites for water oxidation confirmed using in situ soft X-ray absorption** *Nature Chemistry*
Zheng, X., Zhang, B., De Luna, P., Liang, Y., Comin, R., Du, X., Sargent, E.
2017
 - **Enhanced electrocatalytic CO₂ reduction via field-induced reagent concentration** *NATURE*
Liu, M., Pang, Y., Zhang, B., De Luna, P., Voznyy, O., Xu, J., Zheng, X., Dinh, C. T., Fan, F., Cao, C., de Arquer, F. P., Safaei, T. S., Mepham, et al
2016; 537 (7620): 382–?
 - **Engineering surface atomic structure of single-crystal cobalt (II) oxide nanorods for superior electrocatalysis** *NATURE COMMUNICATIONS*
Ling, T., Yan, D., Jiao, Y., Wang, H., Zheng, Y., Zheng, X., Mao, J., Du, X., Hu, Z., Jaroniec, M., Qiao, S.
2016; 7
 - **Strongly Coupled Nafion Molecules and Ordered Porous CdS Networks for Enhanced Visible-Light Photoelectrochemical Hydrogen Evolution** *ADVANCED MATERIALS*

Zheng, X., Song, J., Ling, T., Hu, Z. P., Yin, P., Davey, K., Du, X., Qiao, S.
2016; 28 (24): 4935-4942

● **Homogeneously dispersed multimetal oxygen-evolving catalysts.** *Science*

Zhang, B., Zheng, X., Voznyy, O., Comin, R., Bajdich, M., García-Melchor, M., Han, L., Xu, J., Liu, M., Zheng, L., García de Arquer, F. P., Dinh, C. T., Fan, et al
2016; 352 (6283): 333-337