

Feifei Shi

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Education

University of California, Berkeley, Berkeley, CA 2015
Ph.D. in Mechanical Engineering.
Dissertation: *Electrochemical and mechanical processes at surfaces and interfaces of advanced materials for energy storage*
Fudan University, Shanghai, China 2010
B.S. in Chemistry, Honors.

Professional Experience

Pennsylvania State University, University Park, PA 2019 to present
Assistant professor, Energy and Mineral Engineering, Penn State University
Stanford University, Stanford, CA 2016-2019
Postdoctoral research fellow
Lawrence Berkeley National Lab, Berkeley, CA 2010-2015
Graduate student researcher
University of California, Berkeley, Berkeley, CA 2010-2015
Graduate student researcher

Research interests

Electrochemical energy conversion and storage; Catalysis; Surface chemistry, Synchrotron techniques, Spectroscopy, In-situ diagnostic characterization

Honors

J&J WiSTEM2D Scholars, Johnson & Johnson 2022
George H. Deike, Jr. Research Grant, Penn State University 2021
Virginia S. and Philip L. Walker Faculty Fellow, Penn State University 2019
Chinese Government Award for Outstanding Self-Financed Students Abroad 2016
Conference Travel Grant, UC Berkeley 2015
John and Janet McMurtry Fellowship, UC Berkeley 2013
Honors for B.S. degree, Fudan University 2010
Sumitomo Corporation Scholarship, Fudan University 2008 &2009

Professional activities

- Guest Editor, *Energy & Environmental Materials (EEM)*, Special Issue on New Energy Materials and Device, 2020.
- Guest Editor, *Frontiers in Energy Research*, Special Issue on Solid-State Electrolytes for Next-generation Energy Storage, 2019
- Discussion Leader, “*Energy Generation and Storage*”, Gordon Research Seminar, Ventura, CA, 2019
- Organizer for 2021 Spring MRS meeting, Symposium: *In-Situ/Operando Characterization of Solid-Liquid Interfaces for Sustainable Energy, Water and Environment*.
- NSF Panel reviewer in “*Electrochemical system program*” and “*SBIR/STTR program*” since 2021
- Journal reviewer of *Science, Nature Comm, Joule, Nano letter, Journal of Materials Chemistry A, Carbon, Catalysis Letter, Journal of Electrochemical Society, and Energy & Environmental Materials*.

Products most closely related to this project (h-index 41 from Google Scholar June 2021)

1. Wang, J.; Sun, Y.; Lai, J.; Pan, R.; Fan, Y.; Wu, X.; Ou, M.; Zhu, Y.; Fu, L.; **Shi, F.** *; Wu, Y., Two-dimensional graphitic carbon nitride/N-doped carbon with a direct Z-scheme heterojunction for photocatalytic generation of hydrogen. *Nanoscale Advances* **2021**, *3* (23), 6580-6586.
2. Chen A.; Qu, C; Shi, Y; **Shi, F.***, Manufacturing strategies for solid electrolyte in batteries. *Frontiers in Energy Research*, 2020, *8*, 571440
3. Wu, D. S., Zhou, G., Mao, E., Sun, Y., Liu, B., Wang, L., Wang, J., **Shi, F.**, & Cui, Y. (2020). A novel battery scheme: Coupling nanostructured phosphorus anodes with lithium sulfide cathodes. *Nano Research*, 1-6
4. Li, G., Chen, W., Zhang, H., Gong, Y., **Shi, F.**, Wang, J., Zhang, R., Chen, G., Jin, Y., Wu, T., & others (2020). Membrane-Free Zn/MnO₂ Flow Battery for Large-Scale Energy Storage. *Advanced Energy Materials*, *10*(9), 1902085.
5. Boyle, D. T., Kong, X., Pei, A., Rudnicki, P. E., **Shi, F.**, Huang, W., Bao, Z., Qin, J., & Cui, Y. (2020). Transient Voltammetry with Ultramicroelectrodes Reveals the Electron Transfer Kinetics of Lithium Metal Anodes. *ACS Energy Lett.*, *5*(3), 701--709.
6. Wang, J.; Huang, W.; Pei, A.; Li, Y.; **Shi, F.**; Yu, X.; Cui, Y., Improving cyclability of Li metal batteries at elevated temperatures and its origin revealed by cryo-electron microscopy. *Nat. Energy* **2019**, *4* (8), 664-670.
7. **Shi, F.**; Ross, P. N., Solid electrolyte interphase in lithium-based batteries. *Inorganic Battery Materials*, John Wiley & Sons, Ltd: Chichester, UK, 2018. (Invited Book chapter)
8. **Shi, F.**; Pei, A.; Boyle, D. T.; Xie, J.; Yu, X.; Zhang, X.; Cui, Y., Lithium metal stripping beneath the solid electrolyte interphase. *Proc. Natl. Acad. Sci* 2018, *115* (34) 8529-8534
9. Wu, D. S.; **Shi, F.**; Zhou, G.; Zu, C.; Liu, C.; Liu, K.; Liu, Y.; Wang, J.; Peng, Y.; Cui, Y., Quantitative investigation of polysulfide adsorption capability of candidate materials for Li-S batteries. *Energy Storage Materials* 2018, *13*, 241-246.
10. Zhang, X.; Xie, J.; **Shi, F.**; Lin, D.; Liu, Y.; Liu, W.; Pei, A.; Gong, Y.; Wang, H.; Liu, K.; Xiang, Y.; Cui, Y., Vertically aligned and continuous nanoscale ceramic-polymer interfaces in composite solid polymer electrolytes for enhanced ionic conductivity. *Nano Lett.* 2018, *18* (6), 3829-3838.
11. Xie, J.; Wang, J.; Lee, H. R.; Yan, K.; Li, Y.; **Shi, F.**; Huang, W.; Pei, A.; Chen, G.; Subbaraman, R.; Christensen, J.; Cui, Y., Engineering stable interfaces for three-dimensional lithium metal anodes. *Sci. Adv.* 2018, *4* (7).
12. **Shi, F.**; Pei, A.; Vailionis, A.; Xie, J.; Liu, B.; Zhao, J.; Gong, Y.; Cui, Y., Strong texturing of lithium metal in batteries. *Proc. Natl. Acad. Sci* 2017, *114*, 12138-12143.
13. **Shi, F.**; Ross, P. N.; Somorjai, G. A.; Komvopoulos, K., The chemistry of electrolyte reduction on silicon electrodes revealed by in situ ATR-FTIR spectroscopy. *J. Phys. Chem. C* 2017, *121* (27), 14476-14483.
14. Jin, Y.; Zhou, G.; **Shi, F.**; Zhuo, D.; Zhao, J.; Liu, K.; Liu, Y.; Zu, C.; Chen, W.; Zhang, R.; Huang, X.; Cui, Y., Reactivation of dead sulfide species in lithium polysulfide flow battery for grid-scale energy storage. *Nat. Commun.* 2017, *8* (1), 462.
15. Zhao, J.; Liao, L.; **Shi, F.**; Lei, T.; Chen, G.; Pei, A.; Sun, J.; Yan, K.; Zhou, G.; Xie, J.; Liu, C.; Li, Y.; Liang, Z.; Bao, Z.; Cui, Y., Surface fluorination of reactive battery anode materials for enhanced stability. *J. Am. Chem. Soc.* 2017, *139* (33), 11550-11558.
16. Pei, A.; Zheng, G.; **Shi, F.**; Li, Y.; Cui, Y., Nanoscale nucleation and growth of electrodeposited lithium metal. *Nano Lett.* 2017, *17* (2), 1132-1139.
17. **Shi, F.**; Song, Z.; Ross, P. N.; Somorjai, G. A.; Ritchie, R. O.; Komvopoulos, K., Failure mechanisms of single-crystal silicon electrodes in lithium-ion batteries. *Nat. Commun.* 2016, *7*, 11886.