Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. He has expertise in synthesis and characterization of electrode and electrolyte materials. His research concern on the development of next-generation battery systems including Mg-sulfur batteries and solid-state batteries. He has experience in the synthesis of nano materials for battery electrodes, electrode fabrication, battery assembly and battery testing. Dr. He specializes in electrochemical characterizations such as galvanostatic cycling of batteries, cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). Additionally, he is experienced with various materials characterization techniques such as X-ray powder diffraction (XRD), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT-IR), Ultraviolet-visible spectroscopy (UV-Vis), inductively coupled plasma - optical emission spectrometry (ICP-OES), Raman spectroscopy and thermogravimetric analysis (TGA). Dr. He also has experiences on forced fault test on PCBA.

Prior to joining Exponent, Dr. He was a Graduate Research Assistant at University of Notre Dame. He worked on multiple projects related to Mg-sulfur batteries and polymer solid-state batteries including nanostructured sulfur cathodes for Mg-sulfur batteries, Mg-S flow batteries, the failure mechanism of Mg-S batteries and the development of silicone based high transference number polymer electrolytes.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, University of Notre Dame, 2023

M.S., Chemical Engineering, University of Notre Dame, 2020

B.S., Chemistry, Nankai University, China, 2017

Publications

He, P. and Schaefer, J.L. The Key Role of Magnesium Polysulfides in the Development of Mg-S Batteries. ACS Energy Lett. 2022, 7, 4352–436.

He, P.; Ford, H.O.; Gonzalez, S.; Rodriguez, S.; Oliver, A. G.; Schaefer, J.L. Stability and Disproportionation of Magnesium Polysulfides and the Effects on the Mg-polysulfide Flow Battery. J. Electrochem. Soc. 2021, 168, 110516.

Ford, H. O.; Doyle, E. S.; He, P.; Boggess, W. C.; Oliver, A. G.; Wu, T.; Sterbinsky, G. E.; Schaefer, J. L. Self-Discharge of Magnesium-Sulfur Batteries Leads to Active Material Loss and Poor Shelf Life, Energy

and Environmental Science. 2021, 14, 890–899.

He, P.; Ford, H. O.; Merrill, L. C.; Schaefer, J. L. Investigation of the Effects of Copper Nanoparticles on Magnesium-Sulfur Battery Performance: How Practical Is Metallic Copper Addition? ACS Appl. Energy Mater. 2019, 2 (9), 6800–6807.

Ford, H. O.; Merrill, L. C.; He, P.; Upadhyay, S. P.; Schaefer, J. L. Cross-Linked Ionomer Gel Separators for Polysulfide Shuttle Mitigation in Magnesium-Sulfur Batteries: Elucidation of Structure-Property Relationships. Macromolecules 2018, 51 (21), 8629–8636.

Zhong, Y.; Yin, L.; He, P.; Liu, W.; Wu, Z.; Wang, H. Surface Chemistry in Cobalt Phosphide-Stabilized Lithium-Sulfur Batteries. J. Am. Chem. Soc. 2018.

Jing, Y.; Tang, Q.; He, P.; Zhou, Z.; Shen, P. Small Molecules Make Big Differences: Molecular Doping Effects on Electronic and Optical Properties of Phosphorene. Nanotechnology 2015, 26 (9).

Presentations

He, P.; Schaefer, J.L., In-situ Crosslinked Gel Polymer Electrolytes for Lithium batteries. ACS Fall 2022, 08, 2022.

He, P.; Ford, H.O.; Gonzalez, S.; Rodriguez, S.; Schaefer, J.L. Systematic study of the role of Mg polysulfides in the Mg-S battery. ACS Spring 2021, 05, 2021.

He, P.; Ford, H. O.; Merrill, L. C.; Schaefer, J. L., The Magnesium-Sulfur Battery with High Rate and Improved Capacity Using Cu Nanoparticle Additives. 235th ECS Meeting, Dallas, TX., 05, 2019.