

Department Seminar

Wednesday, October 29, 2025

11:00am – 12:pm PT

SME 248



Dr. Linqin Mu, PhD

*“Advanced Characterization of Cathode
Materials in Rechargeable Batteries”*

Assistant Professor

School for Engineering of Matter, Transport and
Energy
Arizona State University

Abstract: Intercalation chemistry underpins modern rechargeable batteries, but the intricate interplay among structural stability, ion transport, mechanical integrity, and electrochemical performance continues to challenge the design of next-generation cathode materials. Thus, addressing these challenges across relevant time and length scales is essential to the rational design of materials for both liquid- and solid-state systems. In this talk, I will present our recent understanding of degradation mechanisms in layered cathode materials utilizing comprehensive spectroscopic, imaging, and diffraction techniques. I will also discuss ion-exchange pathways and their consequences for phase evolution and mesoscale heterogeneity across multiple length scales. Then, I will introduce our ongoing efforts in polyanion-based cathode design for sodium-ion batteries, which provide new opportunities for cost-effective and sustainable energy storage. Together, these studies show how mechanism-guided, multiscale design accelerates the development of durable, high-performance rechargeable batteries.

Bio: Linqin Mu is an Assistant Professor in the Materials Science and Engineering program within the School of Engineering for Matter, Transport, and Energy at Arizona State University. She earned her Ph.D. in Physics from the Institute of Physics, Chinese Academy of Sciences, in 2016. Before joining ASU, she was a Postdoctoral researcher at Virginia Tech and later served as an Assistant Research Professor at the University of Oregon. Her research leverages advanced electrochemical diagnostics and synchrotron-based techniques to guide the design of low-cost, high-performance materials for energy storage and mineral recovery. Dr. Mu's fundamental and mechanistic research on cathode materials conducted during her Ph.D. and postdoctoral training has resulted in patents licensed to companies developing Na-ion and Li-ion batteries. In addition, she contributes significantly to understanding the degradation mechanisms of battery materials across multiple length scales, resulting in over 50 peer-reviewed publications in leading journals such as Nature Communications, Advanced Materials, Journal of the American Chemical Society, Advanced Energy Materials, Angewandte Chemie International Edition.

Seminar Host: Zheng Chen