School of Molecular Sciences
Arizona State University

SMS Fall 2021 Seminar Series

Friday Sept 17 | 2:30pm | Zoom*

One is the Loneliest Number:
Multivalent and Multielectron Processes for Next-Generation Batteries

Rechargeable Li-ion batteries revolutionized energy storage but the fundamental limitations imposed by intercalation chemistry and the cost associated with common components in Li-ion cells drive the need for new, less expensive batteries. The search for these so called “beyond Li-ion” technologies include systems based on alternative charge storage mechanisms that promise high theoretical capacity. Our lab focuses on multielectron redox using both monovalent and multivalent working ions. We work on all aspects of the cell from the anode, cathode, and electrolyte to the interfaces between. We will discuss how to solubilize multivalent cations in electrolyte solvents and the effect of electrolyte speciation on the associated metal anode electrochemistry. We will also take a fundamental look at multivalent ion diffusion in the solid-state: a cornerstone process for the function of multivalent batteries. A few possible cathode chemistries will be discussed that invoke redox induced solid-state phase transitions that cause a range of structural changes.

Kimberly A. See, PhD

Assistant Professor, Caltech

Kimberly See is an Assistant Professor of Chemistry in the Division of Chemistry and Chemical Engineering at Caltech. She was born and raised in Colorado and received her B.S. in Chemistry from the Colorado School of Mines. Kim pursued her PhD in Chemistry at the University of California, Santa Barbara where she worked with Profs. Ram Seshadri and Galen Stucky. Kim was awarded the St. Elmo Brady Future Faculty Postdoctoral Fellowship at the University of Illinois at Urbana-Champaign and worked with Prof. Andrew Gewirth in the Department of Chemistry. Now, her group at Caltech studies new chemistry for next-generation energy storage with a focus on Earth abundant, inexpensive materials. She focuses on the electrochemistry associated with multivalent and multielectron processes.

**ZOOM: https://asu.zoom.us/j/87081218152*