THE UNIVERSITY OF ARIZONA

Arizona State University

MateriAlZ Seminar Series

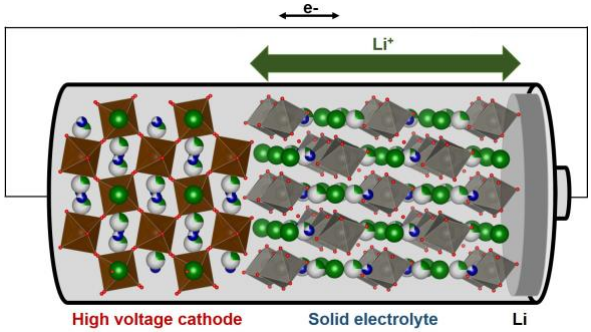
Designing synthetic strategies and *in situ* monitoring for next-generation battery materials

Friday, October 30, 2020, 11:00 am MST

Abstract

All solid-state batteries present highly promising opportunities for safer energy storage. High ionic conducting solid electrolytes may overcome some of the limitations of organic polymer electrolytes, where safety concerns limit the electrochemical stability window, to provide a way to increase energy densities in a safe manner. However, resistance to ion mobility across the solid-solid electrode-electrolyte interface remains a bottle-neck to be overcome in realising this technology. The synthetic approach employed can potentially influence conductivities (and hence battery performance) exhibited by solid electrolytes and this talk will detail our efforts to maximise these properties through developments in our synthetic approaches.

Recent synthetic results on systems such as the NASICONs, garnets and perovskites where electrodes and electrolytes with similar crystal structures are applied, will be discussed. Comprehensive characterisation across multiple length scales of these systems will be presented, as well as recently developed *in situ* muon spin relaxation measurements interrogating lithium-ion diffusion will be shown. These results will showcase how careful synthetic design can enable performance and a comprehensive analysis provides greater insight into materials properties.



Representation of an all solid-state battery

Prof. Serena Corr

University of Sheffield

Serena is Professor and Chair in Functional Nanomaterials at the Departments of Chemical and Biological Engineering and Materials Science and Engineering. She obtained her BA and PhD in Chemistry from Trinity College Dublin. Following postdoctoral work in the USA at UC Santa Barbara with Professor Ram Seshadri, and tenured academic positions in Kent and Glasgow, she moved to Sheffield in 2018. Her research focuses on the design, synthesis and characterization of functional nanomaterials in particular for applications in energy storage and the environment, with an emphasis on understanding their intimate structure-property interplay. Her work has been recognised by awards from learned societies including the Royal Society of Chemistry and has attracted >£15M in grant funding as principle investigator.

Zoom link: https://asu.zoom.us/j/82115500095