



FRIDAY, OCT 15TH | 3:30 PM | via WebEx

Accelerated Synthesis and Local Structure Characterization of Ceramic Materials

VICKY DOAN-NGUYEN—Assistant Professor, Materials Science and Engineering, Mechanical and Aerospace Engineering, Chemistry and Biochemistry (courtesy), Center for Electron Microscopy and Analysis, Ohio State University

Abstract: Elucidating structure-property relations provides the foundation for rational materials design. Furthermore, the properties and performance of materials are governed by the local structure, which can deviate from their average structure. In this seminar, I will discuss accelerated synthesis using microwave heating of ceramic materials whose properties are governed by their local structure. I will discuss the use of X-ray pair distribution functions for probing local structures of vanadium dioxide and lithium thioborates. The latter family of compounds consist of emerging lightweight Li-ion battery solid electrolytes. Development of synthesis for solid electrolytes is needed to enable the use of Li metal anodes and supplant the use of liquid electrolytes. Advanced characterization has been required to correlate structural properties such as site disorder, crystallinity, and particle size with electrochemical performance. Accelerated heating of ceramic solid electrolytes is also a promising path to scaling up synthesis. The challenges for synthesizing lithium thioborates include the reaction of lithium and boron with fused silica ampoules. Thus, my group aims to synthesize these materials with accelerated microwave-assisted heating and address these challenges to understand the role of crystallinity on electrochemical performance. Additionally, I will discuss the role of Li_2S and glass content on activation energy and ionic conductivity as well as general design principles for Li-ion fast conductors.

Biography: Prof. Vicky Doan-Nguyen is an Assistant Professor in the Departments of Materials Science & Engineering and Mechanical & Aerospace Engineering. She joined OSU in August 2017 as part of the Discovery Themes' Materials and Manufacturing for Sustainability Initiative. As part of OSU's Center for Electron Microscopy and Analysis (CEMAS), her cross-cutting research includes synthesis, *in-situ* structural characterization, and functional testing of smart materials as well as advanced materials for energy storage and conversion. Before joining OSU, she was a UC President's Postdoctoral Fellow at UCSB with Prof. Ram Seshadri and Bruce Dunn (UCLA). She received her Ph.D. at the University of Pennsylvania working in the Christopher Murray Group and B.S. in Chemistry at Yale University. She has been recognized by the American Physical Society with the Ovshinsky Sustainable Energy Fellowship, the American Crystallographic Association with the Margaret C. Etter Lecturer Award and the Oak Ridge Associated Universities Ralph E. Power Junior Faculty Enhancement Award. VDN is also spearheading and contributing to projects on development of K-12 STEM education in the Columbus area.