

Compositionally Complex Fluorite and Spinel Electrocatalysts

Dr. Katharine Page

Materials Science and Engineering Department, University of Tennessee Knoxville, Knoxville, TN 37996 USA

Neutron Scattering Division, Oak Ridge National Laboratory, 1 Bethel Valley Road, Oak Ridge, TN 37831

***kpage10@utk.edu**



**Chemistry
Seminar on
Electrocatalysts**

**Monday
September
30 at 4 pm in
303 Schrenk**

**Please contact
Dr. Amitava
Choudhury at
choudhurya@mst.edu
for further
information.**

Abstract: Integration of renewable feedstocks into the current energy infrastructure drives the development of electrocatalysts that can maintain high surface areas and selective electrocatalytic activities under a variety of challenging chemical and environmental conditions. Recently, several compositionally complex oxides (CCOs) have been reported with intriguing and tunable electrocatalytic properties. We present recent studies on compositionally complex Rare Earth cerate oxygen evolution reaction (OER) electrocatalysts and bifunctional OER and oxygen reduction reaction (ORR) spinel ferrite electrocatalysts. A combination of local to long-range electron, x-ray and neutron scattering probes are employed to investigate their complex configurational diversity and associated structure-property trends. Relationships are explored between the cation site preferences, chemical-short-range order, and promising electrocatalytic properties achieved in the families through compositional tuning and variation in synthesis/processing conditions. Experimentally derived models are supported by Density Functional Theory calculations. This work highlights the advances that may be required in computational and experimental approaches to guide structure-property tuning in emerging CCO OER and ORR electrocatalysts. Current challenges and future opportunities in this arena will be discussed.

About the speaker: Katharine Page is an Assistant Professor of Materials Science and Engineering at the University of Tennessee Knoxville, and a Joint Faculty member with the Neutron Scattering Division at Oak Ridge National Laboratory. She works at the intersection of energy materials research and the advancement of X-ray and neutron scattering methods. She received her PhD in 2008 from the Materials Department at the University of California, Santa Barbara. She was a Director's Postdoctoral Fellow and an Instrument Scientist at the Lujan Neutron Scattering Center, Los Alamos National Laboratory through 2014, and then an Instrument Scientist within the Diffraction Group at Oak Ridge National Laboratory until 2019. She has published over 160 peer-reviewed journal articles, delivered over 50 invited talks, and organized dozens of workshops, schools and tutorial sessions on scattering techniques for the scientific community. She is a recipient of the Department of Energy (DOE) Early Career Award, the National Science Foundation (NSF) CAREER Award, and the Presidential Early Career Award for Scientists and Engineers (PECASE). She is currently a co-Principal Investigator in the HEISs DOE Energy Frontier Research Center as well as an Integrated Research Group Deputy Leader within UTK's MRSEC: Center for Advanced Materials and Manufacturing (CAMM).

**MISSOURI
S&T**