

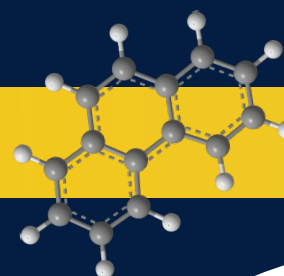
# CHEMISTRY SEMINAR

Using Electrochemistry  
to Probe f-element Ion  
Absorption at Metal  
Oxide Surfaces

3:45 pm  
Thursday, May 7  
RNS 310



The f-elements are critical in many technologies including electronics, catalysis, magnetism, and clean energy. Unfortunately, these elements occur in low abundance worldwide, and both their mining and disposal have detrimental environmental impact. Research has therefore been motivated in the reclamation of these elements from waste streams and in understanding their fate and transport in the environment. In this presentation, we explore the use of electrochemistry to understand the interactions of a lanthanide ion ( $\text{Ce}^{4+}$ ) and two actinide ions ( $\text{U}^{4+}$  and  $\text{UO}_2^{2+}$ ) at fluorine-doped tin oxide (FTO) surfaces. We will also see how cyclic voltammetry provides an exceptional way of monitoring these kinds of adsorption reactions in situ and of identifying mechanistic details about the reactions. These electrochemical measurements coupled with other surface-sensitive techniques such as X-ray photoelectron spectroscopy have provided in-depth insight into the adsorption of redox-active metal ions to tin oxide surfaces.



Molly MacInnes received a Bachelor of Arts in chemistry from Oberlin College in 2013. She then spent 6 months on a DAAD RISE Pro fellowship at BASF in Ludwigshafen, Germany. Upon returning to the US she taught one semester of high school chemistry and then started a PhD in inorganic chemistry at the University of Michigan studying electrochemical water splitting. She did a postdoctoral research experience at the Los Alamos National Lab where she gained experience in f-element chemistry and molten salt (very hot!) electrochemistry. Since 2022, she has been an assistant professor of analytical chemistry at Grinnell College.



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