

Controlling *f*-Element Redox with Heterometallic Effects and Crown Ether Chelation

Seminar

Monday
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3:00 – 4:00 p.m.

Beaupre Center,
Room 105



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Redox chemistry strongly influences the reactivity and speciation of the lanthanides and actinides. Particular oxidation states often display unique properties and, therefore, understanding these states and their interconversion can assist with development of new strategies to control their chemical properties. Consequently, coordination chemistry and electroanalytical methods have a great deal to offer in facilitating studies of actinide-containing systems—from detection of particular species to targeted generation of reactive intermediates of relevance to mechanistic studies. In this presentation, two strategies for controlling *f*-element redox chemistry will be discussed: formation of heterobimetallic complexes and encapsulation of redox-active actinides in crown ether ligands. The structural and redox properties of a family of cerium complexes featuring high coordination numbers will be discussed, highlighting the power of generating shared polyhedral faces between metal centers to engender widely tunable reduction potentials. And, the synthesis, characterization, and redox properties of a series of complexes featuring the uranyl ion (UO_2^{2+}) encapsulated in a transition-metal-templated crown ether will be discussed, demonstrating the dramatic role that crown binding can have over redox properties. Structures of two compounds from X-ray diffraction analysis that will be discussed are shown below.

