Glenn T. Seaborg Center Seminar

Chemistry at the edge: actinide interactions with (poly)aminopolycarboxylates

Jenifer C. Braley

Colorado School of Mines

Wednesday, March 2, 2016
4:00 pm – 5:00 pm
Bldg. 70A, Room 3377

Research using (poly)aminopolycarboxylate (APC) ligands to achieve trivalent actinide/lanthanide separation has expanded significantly due to the development of derivative TALSPEAK solvent extraction processes that either simplify organic phase speciation (i.e. TALSQueak)[1] or streamline processing steps through combining neutral and organic phase extractants (i.e. TRUSPEAK or ALSEP)[2,3]. Courtesy their applications in over fifty years of actinide separation science, the best defined interactions of actinides with soft donors in aqueous solutions involve APC ligands. These interactions are usually defined in terms of stability constants, especially for the trans-americium actinides, with minimal dialogue regarding enthalpic and entropic contributions to the binding. While crystallographic, x-ray spectroscopic and computational techniques have provided support for covalency in actinide-ligand interactions[4]; examination of covalency trends for the trans-amercium actinides can become rapidly limited due to material availability, radiological hazards and experimental data to validate computational models. Consideration of APC thermodynamic data with heavier actinides could be instructive regarding fundamental f-element science. The benefit of producing lanthanide-normalized linear free energy diagrams, modeling previous actinide separations and review of actinide/N-donor complexation thermodynamics is considered. A first peek at data collected in the new on-campus radiochemistry facilities with trans-americium actinides is also provided.

Bio: Professor Braley joined the faculty at Colorado School of Mines in the fall of 2012 after a two-year employment at Pacific Northwest National Laboratory. During her undergraduate research, she studied the solid-state synthesis of *f*-block elements at Colorado State University with Professor Peter Dorhout. In 2006 she joined the group of Professor Ken Nash at Washington State University (WSU). Here she examined the fundamental solution chemistry of the f-elements relevant to solid-liquid and liquid-liquid separations chemistry. While in graduate school, she was able complete an intership at Eichrom Technologies with Dr. Phil Horwitz and bolstered her understanding of extraction chromatographic (solid-liquid) separations. She has joined the faculty at Colorado School of Mines to educate students on the fundamental and applied concerns of nuclear chemistry and radiochemistry (including the nuclear fuel cycle, nuclear forensics, and radioisotope production). As a member of the Nuclear Engineering Program at Mines, she actively engages the U.S. Geological Survey 1 MW TRIGA Nuclear Reactor on the Denver Federal Center to accomplish research and educational goals.

Host: Rebecca Abergel (510) 486-5249 RJAbergel@lbl.gov Admin. Asst: Catherine Mendez (510) 486-5587
Ernest Orlando Lawrence Berkeley National Laboratory One Cyclotron Road, Berkeley, California 94720