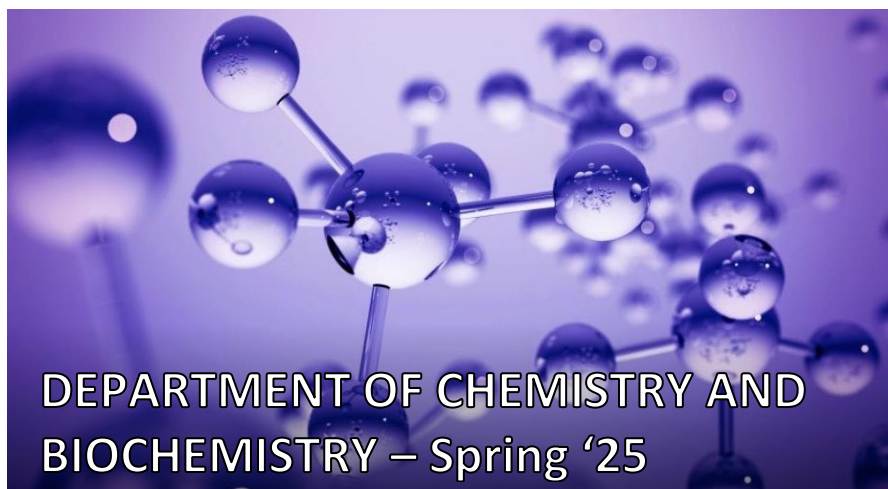




THE SALZBERG CHEMISTRY SEMINAR SERIES



The City College
of New York



Monday, April 28 2025 @ 12:00 noon – MR1027

Uranium and Heavy Metals in Fracking Flowback

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Abstract: Hydraulic fracturing for unconventional oil and gas recovery exposes shale to large volumes of acidic fracking fluid. As a result, components of shale including heavy metals and naturally occurring radioactive material are released into the fluid, some of which returns to the surface. This contamination presents appreciable disposal challenges and environmental risks. This work explores the mechanism of elemental release to fluid as well as novel methods of retaining some elements in the solid phase. Elements explored in depth include arsenic, uranium, and rare earth elements. Experiments indicate that organic ligands such as bipyridine are capable of sequestering >95% of uranium in novel solid phases, and less toxic ligands such as histidine are also somewhat effective. Inorganic sorption of metals on hydroxyapatite and formation of uranium-phosphate minerals is also observed. The applicability of these methods to fracking conditions is explored.

Biography: Alison Keimowitz is an Associate Professor of Chemistry at Vassar College, and also serves as the director of the Environmental Studies program. She received her MS from Yale University in Physical Chemistry and then her PhD from Columbia University (Lamont-Doherty Earth Observatory) in Geochemistry. Her research examines heavy metal contamination in water as well as the processes that control the movement of metals between solid and aqueous media.

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