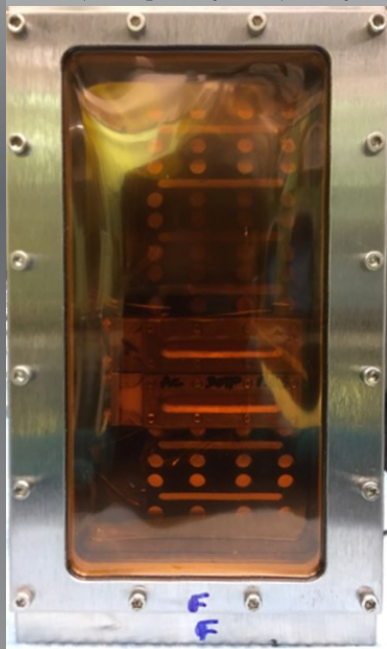
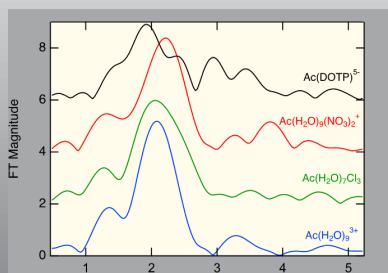


DEPARTMENT OF CHEMISTRY AND CHEMICAL BIOLOGY COLLOQUIUM

Presented by **Dr. Benjamin Stein, Los Alamos National Laboratory**

Friday, April 5<sup>th</sup>, 2019, at 4:00pm in the Science and Math Learning Center, Room 102

# Actinium-225 in the Treatment of Metastatic Cancers



Actinium-225 ( $t_{1/2}=10$  days) is a promising isotope for the treatment of metastatic cancers. During the decay of Ac-225 (and daughters), a total of 4 alpha particles are emitted, which gives Ac-225 uniquely high cytotoxicity. However, the use of Ac-225 has been hindered by both by an insufficient supply and a limited understanding of fundamental Ac chemistry. LANL is part of the “Tri-Lab” effort to develop a proton accelerator production capability that utilizes proton irradiation of naturally occurring thorium. In addition to addressing production, we have also been engaged in a cutting-edge research program focused on developing a wide variety of spectroscopic and physical techniques to interrogate the chemistry of Ac. Contrary to Ac-225, Ac-227 ( $t_{1/2}=22$  years) is available in microgram amounts, enabling the use of more “traditional” inorganic chemistry techniques. We have developed multiple spectroscopic and theoretical approaches to help understand Ac coordination chemistry, in particular X-ray absorption fine structure (XAFS) and nuclear magnetic resonance (NMR), supported by in-depth theoretical thermodynamic computations. Finally, the speaker will give a broad overview of some of the many career paths available at LANL, which has programs that include

such diverse areas such as fundamental R&D, global security, and medical isotope production.

