**Prof. Thomas E. Albrecht**

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**Biographical Sketch**

Thomas Albrecht is a University Distinguished Professor and Director of the Nuclear Science & Engineering Center at the Colorado School of Mines. He is also jointly appointed as a Scientist at Idaho National Laboratory and at Los Alamos National Laboratory. He is a Fellow of the Royal Society of Chemistry and the AAAS and winner of several American Chemical Society awards including the Glenn T. Seaborg Award for Nuclear Chemistry as well as the American Crystallographic Association, M. J. Buerger Award. His research interests focus on the chemistry, physics, and materials science of radioactive elements, especially heavy elements like berkelium and californium. Professor Albrecht received his Ph.D. in Chemistry from Northwestern University and was a post-doctoral fellow at the University of Illinois.

**Chemistry Beyond Plutonium: How Relativity Alters Electronic Structure in Heavy Elements**

**Abstract**

Elements beyond plutonium are rich testbeds for probing how relativistic effects alter electronic structure and hence molecular structure, physical properties, and reactivity. Curium, berkelium, californium, and einsteinium are the final elements for which bulk properties such as X-ray diffraction, optical spectroscopy, and magnetism can be measured, albeit with great difficulty. These measurements have proven to be well worth the effort and have revealed evidence for a break in the fundamental properties of actinide elements that starts in the actinide series at californium and strengthens through einsteinium, fermium, and mendelevium. Establishing the onset of this step-function in chemistry required challenging experiments with the highly unstable isotope berkelium-249. The evaluation of these experimental results with relativistic quantum mechanical theory has helped to explain these unusual observations. This lecture will conclude with current efforts to push the boundaries of chemistry deeper into the periodic table.

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