Applied Research Center Lecture Series featuring

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Savannah River Nuclear Solutions

"Chemistry under Challenging Conditions"

Nov. 14, 2016 | 11:00AM | MMC Campus | CP Room 103

This event is open to the public. **Refreshments will be provided.**

Managing the storage, retrieval, and disposition of legacy high-level nuclear waste and developing advanced nuclear fuel separation processes are challenging endeavors due to the complex chemical matrices and high radiation fields. At the Savannah River Site, the legacy waste from nuclear materials production are mixtures of precipitated metal hydroxides and hydrous metal oxides and highly alkaline salt solutions. The strategy for disposition of the waste is to separate the solids and treat the liquid fraction and remove more than 99% of the radioactivity. The solids and the separated radionuclides are then incorporated into a highly durable borosilicate glass. The decontaminated liquid is then disposed of in a cement-based waste form. In contrast to the highly alkaline legacy wastes, aqueous reprocessing of irradiated nuclear fuels features dissolution in concentrated nitric acid. The highly acidic solutions are then processed to recovery uranium and other actinides as well as key fission products. This presentation will describe the chemical processes developed for treating legacy high-level nuclear wastes and reprocessing of irradiated nuclear fuels.

David received a BS in Chemistry from the University of North Carolina at Chapel Hill and PhD in Inorganic Chemistry from Vanderbilt University. After positions in the chemical industry, David joined the research staff at the Savannah River Laboratory in 1984. Research interests include ion-exchange and chromatographic techniques for the separation and recovery of metal ions with an emphasis on the disposition of high-level nuclear waste, waste waters, and advanced nuclear fuel cycles; actinide and fission product chemistry in high ionic strength media; development of novel ion-exchange materials for medical applications; and electrochemical processes for hydrogen production. These activities have led to the development of a sodium titanate ion exchanger that is currently used at the Savannah River Site for the removal of strontium and actinides from high-level nuclear wastes, a new class of peroxotitanate materials and novel nanotitanate materials that exhibit enhanced metal ion removal, metal deliver, and photocatalytic properties.