

Wednesday, August 21 2019, 4:10-5:00PM, WEB 1230

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Engineering Materials to Endure for Millenia in the Earth's Crust

The United States has spent more than half a century developing the nation's nuclear arsenal and nuclear energy infrastructure. The scale of these activities has, and will continue to result in radioactive waste that poses health, environmental, and proliferation hazards. These radioactive wastes are generally corrosive liquids containing fission products, actinide elements, precipitates, and nitrate, nitrite, hydroxide, carbonate, and phosphate ions. These wastes must be processed so that the radioactive and hazardous constituents are safely sequestered from the biosphere for thousands of years. Ultimately, the long-term performance (i.e., durability) is the single most important criteria in determining the waste form of choice, but the fundamental chemical and physical processes that manifest in materials under extreme environments (e.g., high radiation dose) and across time and length scales are not well understood. The compositional variability and complexity of waste inventories, combined with the demanding performance requirements for the waste form, prohibit a singular approach to nuclear waste processing and stabilization. Moreover, the inextricable connections between processing, properties, and performance in material systems requires a balanced approach to the materials science and engineering of waste form materials that will endure for years to come.

Dr. Jake Amoroso is a Principal Engineer for the Savannah River National Laboratory in Aiken, South Carolina. Dr. Amoroso is a principal investigator and program manager for collaborative projects between the Savannah River National Laboratory and universities, businesses, National Laboratories, and international organizations. He leads research for the Department of Energy's Offices of Nuclear Energy, Environmental Management, and Science. Dr. Amoroso has served as a Chief Scientific Officer for the International Atomic Energy Agency and currently leads the Savannah River National Laboratory's engagement with Japanese organizations on the continued stabilization and clean-up at the Fukushima Daiichi Nuclear Power Plant. Dr. Amoroso earned a Ph.D. in Materials Science and Engineering in 2010 and a B.S. in Glass Engineering Science in 2003, both from Alfred University in Alfred, New York.

