



Sundaram

Community Science and Technology Seminar to feature vitrification

Recognizing the versatility and durability of glass, scientists have adapted it to “vitrify” or permanently immobilize radioactive wastes at the Hanford Site and elsewhere for safe permanent disposal.

Vitrification is the topic of the next Community Science and Technology Seminar Series event, Wednesday, March 19, at 7 p.m. in the Columbia Basin College Theater. S. K. Sundaram, a materials scientist at the Department of Energy’s Pacific Northwest National Laboratory, will present an overview of vitrification — its history, the science behind it and the innovative technologies that have been developed. The seminar, sponsored by PNNL and CBC, is free and open to the public.

Vitrification is a proven method of waste disposal that combines waste materials with glass-forming chemicals to form molten glass that then solidifies, immobilizing the waste. The final waste form resembles obsidian and is a non-leaching, durable material that effectively traps the waste inside. Sundaram will elaborate on the vitrification process, which includes pretreatment, formulation and melting, and the importance of each step in ensuring the waste is immobilized in an acceptable waste form that meets all the requirements for safe disposal.

Vitrification has been selected as the prime technology to immobilize and safely dispose of the radioactive waste generated by weapons production and nuclear research at several sites around the country for as long as 50 years. At Hanford, the waste has been stored in single- and double-shell tanks. The underground steel tanks designed to hold this waste material and prevent it from contaminating the surrounding environment were never intended to be a long-term solution. Some of the tanks have leaked.

“As scientists, we have a responsibility to find solutions to the ‘legacy’ waste problem confronting present and future generations,” Sundaram said. “Vitrification is an ideal technology for immobilizing the wastes at Hanford and elsewhere. It is adaptable to changes in the composition of the waste while still offering the desired waste-form properties.”

PNNL has been involved in vitrification research and development for more than 30 years. A good share of the laboratory’s work in vitrification has focused on developing formulations that produce effective and durable waste glass and optimize the vitrification process. Because of its expertise, PNNL is providing ongoing research and engineering support to Bechtel National as it moves ahead with construction of the vitrification plant to immobilize the radioactive waste stored in the tanks at Hanford.

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Sundaram joined PNNL in 1994 and is currently involved in three major areas of research. In the area of millimeter/submillimeter wave technology, he has made significant contributions by developing advanced techniques for non-contact measurement of materials properties and process parameters in adverse environments. He is currently working on integrated infrared photonic materials and devices. He is also generating international interest in the emerging area of ultrafast (femtosecond/attosecond) materials science and engineering. Sundaram has a doctorate from the School of Materials Science and Engineering at Georgia Institute of Technology in Atlanta. He is also a visiting scientist with Plasma Science Fusion Center at Massachusetts Institute of Technology and a visiting scholar with the Department of Engineering and Applied Sciences at Harvard University.

The Community Science and Technology Seminar Series is supported by the Columbia River Exhibition of History, Science and Technology and by the local chapter of Sigma Xi, the international honor society of scientific and engineering research. ■