Contract No:

This document was prepared in conjunction with work accomplished under Contract No. DE-AC09-08SR22470 with the U.S. Department of Energy (DOE) Office of Environmental Management (EM).

Disclaimer:

Improvements in Iodine and Ruthenium Removal from Advanced Liquid Processing System (ALPS) Multi-nuclide Removal Facility

Objective

SRNL has considerable experience in designing, engineering, and operating systems for removing iodine-129 (I-129) and ruthenium-106 (Ru-106) from waste streams that are directly analogous to the Advanced Liquid Processing System (ALPS) waste streams. SRNL proposes to provide the technical background and design and engineering support for an improved I-129 and Ru-106 removal system for application to ALPS on the Fukushima Daiichi Nuclear Power Station (NPS).

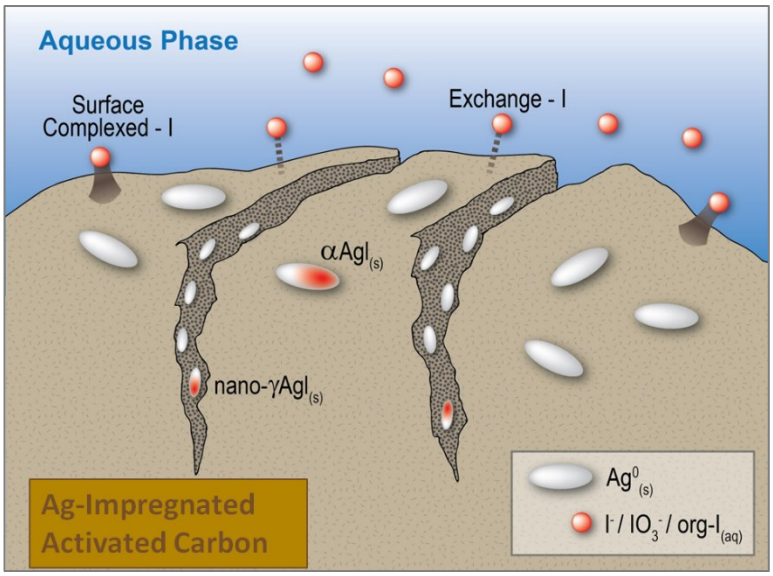
Problem

Understanding how key ALPS treatments alter iodine speciation is necessary to identify appropriate iodine immobilization technologies, especially at trace levels. SRNL also has had success separating ruthenium isotopes from large volumes of high-level waste by converting all the aqueous ruthenium into a species that was readily extracted by resins.

Technology

SRNL has developed an analytical method for analyzing iodine speciation (I-, IO3-, and organo-I) at ambient concentrations (µg/L levels or 0.01 Bq/L levels). SRNL has demonstrated this method to develop highly effective sorbents and removal procedures for all three iodine species in aqueous environments ranging from pH 3 to 11 and for ionic strengths of 10-3 to 100 molar. This method is based on an understanding of the speciation of these radionuclides and their interaction with ALPS-type sorbents. In addition to improving I0129 and Ru-106 removal from the ALPS waste stream, SRNL experience would be helpful in predicting how future design changes to the ALPS treatment train will impact I-129 and Ru-106 removal. This effort could also yield additional sorbents as a polishing step in the ALPS treatment train.

SRNL Contact
Dr. Andrew Z. Skibo
Andrew.Skibo@srnl.doe.gov
Office: 803-819-8402
Cell: 803-335-9583



I-129 can exist as multiple species in the same solution and its tendency to bind to sorbents, such as Ag-Impregnated Activated Carbon, is highly species-dependent.