

PROMETHIUM SEPARATIONS USING EICHROM Ln RESIN

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ABSTRACT

Promethium-147 analyses have been performed at the Savannah River Site (SRS) on waste tank solutions, vitrified high level waste from the Defense Waste Processing Facility, well waters, soils, and job control wastes (lab gloves, wipes, etc.). For many of these analyses, initial liquid-liquid extractions using bis(2-ethylhexyl) phosphoric acid ester (HDEHP) and subsequent ion chromatography provided radiochemical separation preceding liquid scintillation counting of the low-energy (224 keV) beta emitter. Since the need for such analyses is expected to continue, we are interested in evaluating new methods if they are potentially more cost effective.

Following the introduction of lanthanide extraction chromatography columns (Ln Resin) by Eichrom Inc., the Savannah River Technology Center initiated a program to evaluate the columns. The ability of this HDEHP-based extraction resin to separate Pm-147 from long-lived radionuclides common to SRS processes and their wastes was of primary interest. We tested separation of promethium from actinide and other lanthanide elements, and used both counting and inductively coupled plasma techniques to evaluate the separations. This paper presents separation results obtained using Eichrom Ln Resin and it compares these results to those obtained by ion chromatography and other classic column separations for the lanthanides.