Desalination and Water Treatment
www.deswater.com

38 (2012) 59–64
January

doi: 10/5004/dwt.2012.2296

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Selective separation of Cs(I) extraction from actual high level waste using a solvent containing calix [4]-bis 2,3-naphtho-crown-6

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Received 17 February 2011; Accepted 18 April 2011

ABSTRACT

Solvent extraction studies were carried out on the selective separation of radio-cesium from actual high level waste (HLW) using calix [4]-bis-2,3-naphtho-crown-6 (CNC) in nitrobenzene - toluene mixture. The separation studies were carried out in two stages. In the first stage, a 100 times diluted HLW was used and the purity was ascertained by gamma ray spectrometry using a HPGe detector. Quantitative separation of radio-cesium (monitored by Cs-137 gamma peak at 661 keV) was observed with almost no contamination from any of the other fission products present. In the second stage, actual HLW was used for the Cs separation study. Four stages of extraction and two stages of stripping using distilled water gave >99% recovery. About 10 mCi Cs was recovered by this method. Reusability of the solvent was also carried out and though there was no loss in selectivity, slight decrease in the extraction efficiency was observed after the reagent was allowed to be in contact with the HLW for 10 d.

Keywords: Cesium recovery; High level waste; Separation; Solvent extraction; Calix-crown; Radio-cesium; Waste management

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Proceedings of DAE-BRNS Biennial Symposium on Emerging Trends in Separation Science and Technology, Kalpakkam, India, March 1–4, 2010