

OPTIMIZATION OF THE EXTRACTION OF ^{137}Cs AND ^{90}Sr FROM HIGH LEVEL LIQUID WASTE

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Abstract

It is anticipated that in future, when nuclear waste repositories will be constructed in many countries, the separation of individual components and their separate handling or burial will become urgent. This persuasion stems from options of retrievability, individual burying, and possible further use of individual radionuclides.

The two main processes for the extraction separation of the title radionuclides are so called “dicarbollide process” (developed in NRI and industrially used in Russia) and “FPEX process” (being developed in USA). The two reference processes differ in used extraction agents, characteristics of extraction, and possibly in level of chemical and radiation stability. Whereas “dicarbollide process”, using highly stable dicarbollide anion, is to be viewed as a classical, new processes use cationic organic selective ligands, i.e. special crown ethers for extraction of ^{90}Sr and calixcrowns for ^{137}Cs extractions. The “dicarbollide process” was in detail studied before in NRI and our institute participated also actively in development of selective ligands for extraction of Cs in the frame of Japanese ARTIST project proposed and developed by one of us (S.T.)

The main obstacles in both types of processes lie in the choice of suitable solvent. In this report, we present some results for two ecological variants of dicarbollide solvents. Further, we compare and evaluate some alcohol solvents for systems with selective ligands and extraction of ^{137}Cs and ^{90}Sr .

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