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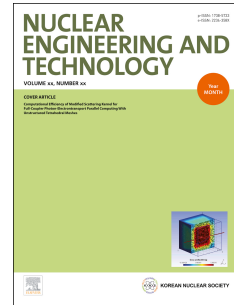
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Decontamination of Radioactive Wastewater by Two-Staged Chemical Precipitation

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Abstract

This paper presented two-staged chemical precipitation for radioactive wastewater by using chemical agents. The total amount of radioactive wastewater was 35 m³ and main radionuclides were Cs-137, Cs-134 and Co-60. Initial radioactivity concentration of the liquid waste was 2264, 17 and 9 Bq/liter for Cs-137, Cs-134 and Co-60 respectively. Potassium ferro cyanide, nickel nitrate and ferrum nitrate were selected as chemical agents at high pH levels 8-10 according to the laboratory jar tests. After the process, radioactivity was precipitated as sludge at the bottom of the tank and decontaminated clean liquid was evaluated depending on discharge limits. By this precipitation method decontamination factors were determined as 66.5, 8.6 and 9 for Cs-137, Cs-134 and Co-60 respectively. By using the potassium ferrocyanide about 98% of the Cs-137 was removed at pH 9. At the bottom of the tank, radioactive sludge amount from both stages was totally 0.98 m³. It was transferred by sludge pumps to cementation unit for solidification. By chemical processing, 97.2 % of volume reduction was achieved. The potassium ferrocyanide in two staged precipitation method could be used successfully in large-scale applications for removal of Cs-137, Cs-134 and Co-60.

Keywords: Radioactive, wastewater; chemical precipitation; decontamination; potassium ferrocyanide

1. Introduction

Removal of radioactive contaminants from radioactive liquid waste is one of the basic methods of radioactive waste management. By this method, a majority of liquid waste could be reused or safely discharged to the environment. One of the removal processes is chemical precipitation and separation of the

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