

Analysis of iodine in simulated cement waste form

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Korea Atomic Energy Research Institute is planning to transfer cement waste form to a final disposal facility. The final disposal facility meets the acceptance criteria of immersion, compressive strength, and radionuclide inventory of radioactive wastes. Of these, radionuclide inventory is important in the determination of radioactive waste levels. ^{129}I , a long-lived radioisotope of iodine ($t_{1/2}=1.57 \times 10^7$ y), is generated from the fission of uranium in nuclear reactors. Iodine can be absorbed, accumulate in organisms, and exhibit low energy emission compared with cesium, and cobalt. Therefore, it is essential to an accurately separate and analyze iodine radioactive waste.

In this study, we focused on the determination of iodine in simulated cement waste form containing KI for the recovery of iodine. We performed cement waste form sieved through a different particle size ($0.5 \text{ mm} < \phi < 6.35 \text{ mm}$). For the separation of iodine from solid samples with low iodine content, such as soil, sediment, and cement, for sample decomposition associated with solvent extraction using CHCl_3 for separation of iodine from the matrix. The separation of iodine in cement waste particles was therefore carried out using an acid leaching method using KI containing cement particles. We observed that cement particle size decreased at 6.35 mm to 0.5 mm with iodine yield decrease at $90.6 \pm 4.40\%$ to $56.1 \pm 2.67\%$.

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