

Commentary

**Super Volume Reduction of Radioactive Cesium-contaminated Wastes by
using Cesium Adsorbent
- Ion Exchanger and Ion Exchange Reaction -**

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●**Summary**● This article mentions the super-volume reduction process for reducing the amount of final radioactive disposals by one-thouthands of the initial ^{137}Cs -contaminated wastes which were collected after the Fukushima Daiichi Nuclear Power Plant accident. The process is composed of four successive processes, viz, to transfer Cs from the original waste to fly ash by pyroprocessing decontamination, to transfer Cs from the fly ash to water by washing, to transfer Cs from the water to a Cs adsorbent by ion chromatography, and to convert the spent adsorbent to a final radioactive disposal by solidifying it with geopolymer or a transition metal phosphate glass. Since the ion chromatographic process plays a major role in the volume reduction process, based on the physicochemical analysis of the ion exchange process between Cs^+ ions and Cs adsorbents, the method of calculating the maximum amount of Cs adsorption from the ionic composition of the water used for washing the ash, the mechanism of the selective Cs adsorption, and the mathematical method for designing and analyzing the ion chromatographic process are given. The methods of converting the spent Cs adsorbent to the final radioactive disposals are also given.

Key Words: radioactive Cs-contaminated waste, volume reduction, ion exchange, transition metal ferrocyanide, final disposal

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