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Research Report

Development of Cesium Recovery System for High Efficiency and Volume Reduction - Behavior of Cesium salt in Combustion Treatment of Prussian Blue -

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Summary

Radioactive cesium is concentrated into fly ash by burning of municipal solid wastes including radioactive cesium emitted from Fukushima I Nuclear Power Plant. Washing the fly ash with water dissolves radioactive cesium (Cs) into the water. We have investigated the process of removing Cs from the contaminated water by Prussian blue nano-particle (PBN) which selectively adsorbs Cs. In our Cs recovery system, after combustion treatment of PBN including Cs, the water-soluble Cs salt is obtained by rinsing the burned PBN with water. In this paper, we report the study of composition analysis of the water-soluble Cs salt from the burned PBN and optimization of procedures and methods of the combustion apparatus and extract operation of Cs salt. The composition analysis of Cs salt indicated the salt composed of $CsNO_3$ mainly and a small amount of Na_2CO_3 and $NaNO_3$. We succeeded to suppress the Cs vaporization by controlling temperature of the combustion apparatus under 400°C, and to obtain the Cs salt in a high extraction rate of 95% by washing the burned PBN with water and 0.5N HNO_3 aqueous solution.

Key Words: Cesium, Prussian blue, Combustion, Volume reduction