

Original

Analysis of Adsorption States of Cesium in Cement System Materials and Application to Volume Reduction of Waste Concrete

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Summary

The objective of this study is to clarify the adsorption states of radioactive cesium in cement materials in order to propose the effective decontamination and volume reduction method. Adsorption chemical form, depth, strength were analyzed for actual contaminated cement roof tile collected in Fukushima Prefecture. As for chemical form, it was suggested that Cs which was adsorbed directly on the cement materials in ionic state contributes largely to surface contamination. As for depth distribution, it was suggested that penetration depth of Cs was about 1 to 2 mm from the surface. As for adsorption strength, about 80% of Cs on the cement tile is strongly adsorbed on the cement surface as fixed state. These results show that Cs was strongly adsorbed on the surface of the material, and physical decontamination methods of surface polishing was considered to be effective. Based on the results, surface polish treatment by wet type ball mill was conducted for the simulated concrete rubbles contaminated with ¹³⁷Cs. It was shown that the radioactive concentration of 80% of concrete rubbles were decreased effectively. Toward practical application of this method to mass-processing, surface polishing volume reduction system using magnetic force control was proposed.

Key Words: Waste concrete, Cesium, Adsorption state, Volume reduction
