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Original

Fundamental Study on Cs Recovery Technology from Plant-based Waste by Hydrothermal Treatment Process Using Subcritical Water and Adsorption Coagulation-sedimentation Process

Hideharu TAKAHASHI*, Keita KANAZAWA, Tatsuya FUKUDA, Takeshi OGATA**, Yusuke INABA, and Kenji TAKESHITA

Research Laboratory for Nuclear Reactors, Tokyo Institute of Technology
(2-12-1-N1-2, Ookayama, Meguro-ku, Tokyo 152-8550, Japan)

Summary

In the Fukushima Dai-ichi NPP accident, large amounts of volatile radioactive nuclides, such as ^{131}I, ^{134}Cs and ^{137}Cs, were released to the atmosphere and huge areas surrounding the nuclear site were contaminated by the radioactive fallout and a large amount of contaminated waste was generated. A treatment technology is required to recover Cs from the waste and reduce the volume of final waste. In this study, the applicability of hydrothermal treatment process and adsorption coagulation-sedimentation process as the contaminated plant-based waste treatment technology was discussed. In the experiment, as the plant-based waste, simulated contaminated plant-based waste containing non-radioactive cesium was used. Transfer rate of cesium to the liquid phase by the hydrothermal treatment was 86.9%. This test showed that the hydrothermal treatment is effective for the decontamination of polluted plant-based waste. Furthermore, by washing the solid phase with distilled water after hydrothermal treatment, the transfer rate of cesium to the liquid phase is improved, up to 96.6%. Moreover, the adsorption coagulation-sedimentaion was carried out to its liquid phase containing cesium. The almost whole amount of cesium, 99.7%, was recovered. Although the experiment of actual polluted plant-based waste containing radioactive cesium needs to be conducted, the experimental results suggest that the cesium recovery process combining the hydrothermal treatment process using subcritical water and the adsorption coagulation-sedimentation process can be effective for the removal of Cs from contaminated plant-based waste.

Key Words: Cesium, Volume reduction, Hydrothermal treatment, Adsorption coagulation-sedimentation, Plant-based waste