

Original

## Fundamental Study on Cs Elution Technique from Vermiculite by Hydrothermal Treatment Using Cellulose-based Biomass

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### Summary

A large amount of contaminated waste was generated by the Fukushima Dai-ichi nuclear power plant accident. The separation technology of Cs (Cesium) from the waste and its volume reduction are required, considering the capacity of temporary storage site. We have developed the waste volume reduction process by combining the hydrothermal treatment and coagulation-sedimentation, and evaluated the applicability of this process on various kinds of wastes. Through the applicability evaluation, we found that Cs elution by hydrothermal treatment can be effective as for the waste containing organic components, on the other hand, in the case of containing much inorganic components, the elution performance tends to be insufficient.

For the promotion of Cs elution in the latter case, we considered the use of organic acids produced from cellulose-based biomass under subcritical water. In this paper, we used the simulated contaminated clay (vermiculite) containing non-radioactive Cs, and discussed the elution characteristics of Cs to the liquid phase by the hydrothermal treatment, adding the cellulose-based biomass. Further we discussed the elution characteristics of Cs using some organic acids and the applicability of ferrocyanide adsorbent on the recovery process of the eluted Cs. Experimental results showed that the hydrothermal treatment with cellulose-based biomass can be effective for the promotion of Cs elution from the contaminated clay. Moreover, we found that Cs elution by hydrothermal treatment can be promoted by adding some organic acids, and the eluted Cs can be recovered by ferrocyanide adsorbent.

**Key Words:** Cesium, Volume reduction, Hydrothermal treatment, Subcritical water, Cellulose-based biomass

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