

Original

Ion Chromatographic Decontamination of ^{137}Cs -enriched Fly Ash Using Poly (vinyl alcohol)-bound Copper Ferrocyanide as Cs Adsorbent

ICHIKAWA Tsuneki^{1,2*}, YAMADA Kazuo², IWAI Ryota³, and KANAZAWA Yukihiro⁴

● **Summary** ● Poly(vinyl alcohol)-bound granulated copper ferrocyanide was found to be a Cs adsorbent suitable for ion chromatographic elimination of Cs from the water extract of ^{137}Cs -enriched fly ash that was generated by pyroprocessing decontamination of ^{137}Cs -contaminated solid wastes. The troublesome leakage of cyanide compounds during the chromatographic process was suppressed by the use of the organic binder. The adsorbent adsorbed 67 g/kg of Cs from the extract of the fly ash containing 10^5 times of Na^+ ions and 3×10^4 times of K^+ ions with respect to Cs^+ ions. Since ^{137}Cs -enriched fly ash contained 11 mg/kg of Cs and most of Cs was water-soluble, the ion chromatographic elimination reduced the weight of the radioactive waste by a factor of more than 5,000. ^{137}Cs -contaminated solid wastes before pyroprocessing decontamination generally contains a few ppm of Cs, so that the total weight reduction factor of more than 10,000 can be easily attained by pyroprocessing decontamination and subsequent ion chromatographic decontamination using poly(vinyl alcohol)-bound copper ferrocyanide as a Cs adsorbent.

Key Words: ^{137}Cs decontamination, volume reduction, ion chromatography, pyroprocessing, copper ferrocyanide, poly(vinyl alcohol), antioxidant

Received October 18, 2019; Accepted January 22, 2020; Recommended by chairpersons in the 8th annual meeting of SRRCE

*Corresponding author: E-mail: tsuneki@eng.hokudai.ac.jp

¹Hokkaido University, Home address: 8-1-27 Tonden 3, Kita-ku, Sapporo, Hokkaido 002-0853, Japan

²National Institute for Environmental Studies, Fukushima Branch, 10-2 Fukasaku, Miharu, Fukushima 963-7700, Japan

³Kanto Chemical Co. Inc., 7-1 Inari 1, Soka, Saitama 340-0003, Japan

⁴Kanto Chemical Co. Inc., 2-1 Muromachi 2, Chuo-ku, Tokyo 103-0022, Japan