

Evaluation of Trapping Characteristics of Cesium and Iodine from Pyroprocessing of Spent Fuel

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An accumulation of spent fuel has brought a considerable interest due to its energy and environmental issue. Pyroprocessing has been investigated as a non-proliferation method which reduces volume and radioactivity of spent fuel. In head-end process of pyroprocessing, spent fuel pellets are treated with high heat to provide suitable form of UO_2 for electrolytic reduction, and various radioactive off-gases are released. Among these gases, Cs-137 and I-129 are considered as important fission products due to high radioactivity and heat generation for Cs and long half-life for I, and therefore effective capture of Cs/I is strongly required. Generally, Cs reacts with aluminosilicate to form $CsAlSi_2O_6$ or $CsAlSiO_4$, providing highly stable structure. KAERI had developed silica-alumina (SA) filters and had confirmed its high trapping efficiency. In addition, Ag-functionalized zeolite (AgX) is widely used to capture I to form AgI. In this study, an off-gas trapping system was designed to evaluate trapping characteristics of Cs/I that are vaporized from Cs_2CO_3/CsI and passes through SA and AgX filters followed by ULPA filter and scrubbers.