

**Vitrification of Surrogate Non-radioactive Waste Using a Bench-Scale Cold Crucible
Melter**

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Abstract

KEPCO(Korea Electric Power Corporation) is responsible for safe operation of nuclear power plants. One of its social responsibility is, thus, the safe storage and ultimately, complete isolation of radioactive waste from the environment. However, selection of disposal site is very difficult in Korea as well as in other countries with vast amount of land. In this regard, NETEC/KEPCO launched a research project for developing a high volume reduction technology, i.e., vitrification process. The objective of this paper is to present test results which were obtained in a small scale cold crucible melter(CCM) in order to acquire basic design parameters for design of the pilot plant of 1/4 scale of the commercial vitrification plant. The tests were performed in Marcoule, France using the induction melter of diameter of 300 mm combined with an off-gas treatment system. Ion exchange resin, combustible dry waste, and boron concentrates were simulated and vitrified. The experiments showed that the direct vitrification process could effectively destroy organic compounds in the waste and the off-gas could be treated in compliance with the environmental regulation. Maximum capacity of the CCM was found to be 12 kg/h. Off-gas characteristics such as flow rate, temperature and dust concentration had been measured, based on which the pilot vitrification plant of the maximum throughput of 50 kg/h was designed. It is under construction to be completed by the first half of the year and pilot tests will be carried out with a view to develop vitrification process for commercial plant.