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Vitrification of the borate waste surrogate using fly ash as an additive

Jiawei Sheng, Kwansik Choi*, Myung-Chan Lee
Radwaste Treatment Research Group
Nuclear Environment Technology Institute
P.O.Box 149, Yusong, Taejon, 305-600,
KOREA

ABSTRACT

Borate waste is the main waste from nuclear power plants. Glass is an acceptable waste form because of its ability to accept a wide range of components into its network structure. Vitrification of borate waste from nuclear power plants is an attractive approach from the viewpoint of environment and safety. Fly ash is a headache waste generated from the coal combustion power stations. Fly ash contains high contents of SiO_2 and Al_2O_3, which are also the most important glass structure formers. This project takes fly ash as a main additive to vitrify borate waste. Na_2O, the only non-waste additive was added, in order to decrease the melting temperature. The experimental results indicate that glasses with ~ 60 wt% of fly ash, ~ 30 wt% of borate waste, and ~ 10 wt% of Na_2O have good chemical durability and good processability. This approach not only obtained the minimum cost, but also find a treatment method for the industrial waste.