SEPARATION OF GROUP I AND II FISSION PRODUCTS FROM LiCl WASTE SALTS DELIVED ELECTROLYTIC REDUCTION PROCESS OF USED OXIDE FUEL

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Abstract

During the electrolytic reduction of used oxide nuclear fuel, Group I and Group II fission products are oxidized into chlorides and partition into the molten chloride salt electrolyte, LiCl. These fission products are both highly radioactive and heat generative. Thus, LiCl containing these fission products must be disposed of in durable waste forms that are compatible with the environment inside of a geologic repository for thousands of years, which results in the formation of significant volumes of the final waste form for disposal. The purpose of this research is to develop technology for purifying the LiCl waste salt by means of layer melt crystallization process. Layer melt crystallization process no needs any chemicals or ion-exchange matrix for purifying LiCl waste salt. It just uses solubility difference of impurities between solid and melt phase. By layer melt crystallization, Group I and II FPs in LiCl waste salt can be concentrated with in small portion of LiCl waste salt, so minimization of final waste amount of LiCl waste salt can be achieved. In this present study, the effects of operating conditions such as cooling intensity, molten salt temperature and crystallization time on Group I and II fission products separation and pure LiCl salt recover rate were analyzed by using the lab-scale(3kg-LiCl/batch) layer melt crystallization apparatus.