
ALTERNATIVE PYROCHEMICAL REPROCESSING OF USED NUCLEAR FUEL USING MOLYBDATE MELTS

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Abstract

Reprocessing of used nuclear fuel using molybdate melts containing molybdenum trioxide (MoO_3) and sodium molybdate (Na_2MoO_4) is an interesting alternative to chloride/fluoride-based pyrochemical processes. All U, TRU and the majority of the fission products are soluble in the molybdate melt. Through proper control of the salt composition, uranium can be selectively precipitated while fission products remain in the melt. The separation process based on the mixture of MoO_3 and Na_2MoO_4 is achieved because the fission products are much more soluble in the molybdate melt than UO_2 . Moreover, the very low solubility of UO_2 in Na_2MoO_4 can be used for additional purification from most of the fission products. Small-scale experiments using gram quantities of uranium have been performed. X-Ray diffraction was used to identify the major uranium species that are formed at various salt compositions. Initial data for separation factors with respect to selected fission products in uranium product will be reported.