

Calculation on Cs Compounds Behavior of Cs-Te-O Systems with Voloxidation Condition

박소영, 박병홍*
한국교통대학교
(b.h.park@ut.ac.kr*)

Pyroprocessing with voloxidation is known to treat spent nuclear fuels (SNFs) with proliferation resistance. Voloxidation which is carried out at high temperatures and under gas flow conditions removes some fission products contained in SNFs and has been developed as a pretreatment process for pyroprocessing. One of the significant elements in SNFs is cesium, which could be eliminated in voloxidation process because Cs is taken into consideration as a semi-volatile element on account of its relatively low boiling point, which can bring about difficult control when a severe accident occurs. Te which is one of the elements of SNFs creates various Cs-Te oxides forming Cs_2TeO_3 , Cs_2TeO_4 , $\text{Cs}_2\text{Te}_2\text{O}_5$ and Cs_2TeO_9 .

In this study, two compounds of Cs-Te oxides were selected to calculate the behavior of the compound in Cs-Te-O systems after using Tpp diagram which can confirm the stable components depending on partial pressure of Cs and O_2 under a given temperature. Cs_2TeO_3 and Cs_2TeO_4 were decided as a result of Tpp diagram and we estimated equilibrium amounts of compounds with respect to the sorts of gas flows under temperature including 500 °C, 1000 °C and 1400 °C.