UO2-CeO2 소결체의 크립거동
Creep Behavior of UO2-CeO2 Sintered Pellet

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요약

혼합산화물인 UO2-CeO2 펠렛의 CeO2 함량(3.25 및 5wt%), 밀도(95~98%T.D.), 결정립크기(7~36㎛) 그리고 dopant 첨가량(SiO2 ; 0.005wt%, Li2O ; 0.1wt%) 에 따른 크립변형거동을 조사하였다. 응력지수, n 은 응력에 따라 두 개의값으로 나타났다. 하나는 저응력 구간에서 n=0.97~2.26 이며, 다른 하나는 고응력 구간에서 n=3.40~8.90 이었다. 전자인 경우 크립거동은 확산기구에 의해 율속되며, 후자인 경우에는 전위이동기구에 의해 율속되는 것으로 나타났다. UO2-CeO2 소결체에 대한 크립활성화에너지는 CeO2 함량이 증가할수록 증가하는 것으로 관찰되었다.

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Point Defects in Uranium Oxides

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Abstracts

In order to understand defect and impurity mechanism in UO2, we carried out the calcuation of defect clusters of UO2 in the one-electron approzimation, using a semi-empirical tight-binding formalism. Two simple defect cluster models for the oxidation of UO2+x, 2:1:2 and 2:2:2 cluster, were considered. The virtual crystal approximation(VCA) was applied to calculate the electronic structure for both clusters.

We constructed the Green's function of the defect sates and present quanities which are closely related to the Greens function. The local and total densities of sates for uranium and two different types (dislocation and interstitials) of defect oxygen, O', O'' are calculated. As excess oxygen entered the lattice three main changes were identkfied: (i) Fermi energies are shifted to higher energy ; 3.4 eV for 2:1:2 and 2.1 eV for 2:2:2. (ii) The peaks of total density of states are shifted to higher energy (iii) The small peaks of local density of states moved to midgap within the corresponding bulk band gap.