Absence of Dopant Segregation to the Surface of Scandia and Yttria Co-Stabilized Zirconia

The surface composition of sintered scandia and yttria co-stabilized zirconia was analyzed with x-ray photoelectron spectroscopy. The samples were sintered at 1300°C or 1500°C in flowing dry or moisturized air. It was found that Sc2O3 does not segregate to the surface, unlike the Y2O3 in yttria stabilized zirconia. The probable reason for this is that due to its size the Sc3+ ion fits better in the zirconia lattice than Y3+ does. The difference in surface composition may be the explanation for the observed increased tolerance toward sulfur of Ni-ScYSZ compared to Ni-YSZ cermets.

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