

CHEMICAL SYNTHESIS AND SINTERING OF Al_2O_3 - CeO_2 NANOPOWDER

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Abstract

In the present work, Al_2O_3 - CeO_2 composite nanopowders were synthesized via co-precipitation method using metal chlorides, aluminum powder and NH_4OH as precipitant agent and the sinterability of synthesized powders was investigated. The results showed that the transformation of transition phases of alumina to - Al_2O_3 takes place at 1200 °C. The activation energy of Al_2O_3 - CeO_2 nanocrystallite growth during calcination was measured to be 32.4 kJ/mol. TEM images showed that the powders was composed of nanoparticles in the range of 3070 nm. The densification of composites started at about 1200 °C. The relative density of sintered Al_2O_3 - CeO_2 composites was measured to be 95 % at 1600 C. Microstructural observation showed that grain growth occurs in the samples. CeO_2 particles about 500nm were located between the grains.

Keywords: Chemical synthesis; Nanostructures; Alumina-Ceria; Sintering

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