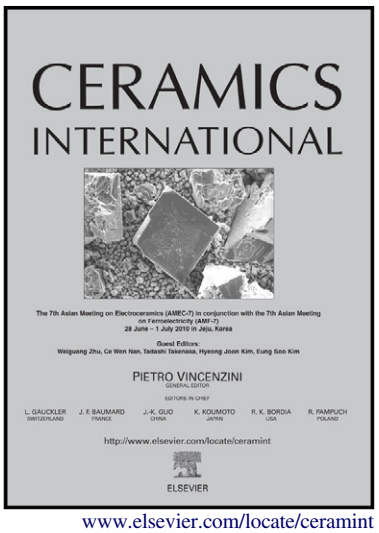

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Abstract

The perovskite proton conductor $BaZr_{0.9}Y_{0.1}O_{2.95}$ (BZY10) shows better chemical stability but lower conductivity than $BaCe_{0.9}Y_{0.1}O_{2.95}$ (BCY10). In this paper we attempted to synthesize BCY10:BZY10 core-shell materials in which BCY10 particles prepared by solid reaction were wrapped by a sol-gel deposited thin layer of BZY10 with ZnO as sintering aid to improve the sinterability of the materials. The effects of the BCY10/BZY10 ratios on the phase purity, microstructure, chemical stability and electrical conductivity of the samples were characterized by XRD, TEM, SEM, TGA and electrochemical impedance spectroscopy, respectively. A dense core-shell structure was formed after sintered at 1300℃ for 10 h. The core-shell samples displayed improved stability against CO_2 and water vapor at high temperature. With BCY10/BZY10 ratio varying from 9:1 to 7:3, the core-shell samples became more stable, and the total conductivities decreased.

Keywords: Core-shell structured $BaCe_{0.9}Y_{0.1}O_{2.95}$: $BaZr_{0.9}Y_{0.1}O_{2.95}$, Sol–gel processes; Perovskites; Ionic conductivity; Impedance spectrum

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