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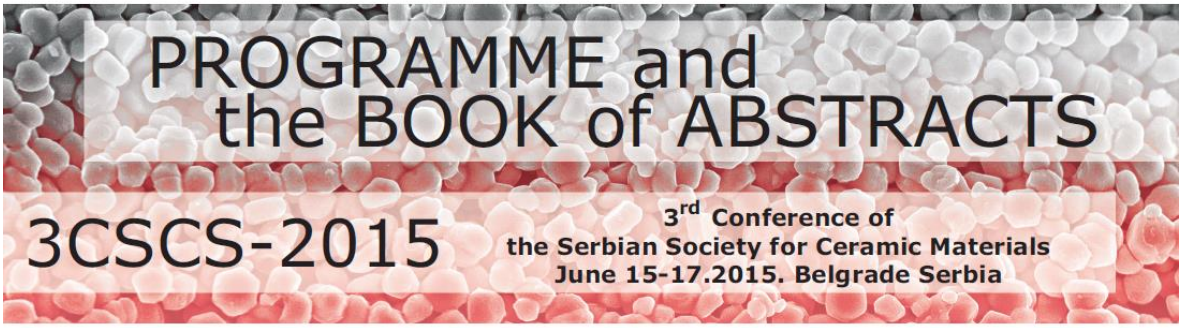
The Academy of Engineering Sciences of Serbia
Institute for Multidisciplinary Research - University of Belgrade
Institute of Physics - University of Belgrade
Vinča Institute of Nuclear Sciences - University of Belgrade



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O-1

Eu DOPED BARIUM CERIUM OXIDE AS A PROMISING ELECTROLYTE FOR INTERMEDIATE TEMPERATURE SOFCs

Aleksandar Radojković[1], Slavica Savić[1], Nataša Jović[2], Jovana Ćirković[1], Zorica Branković[1], Goran Branković[1]

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$BaCe_{0.9}Eu_{0.1}O_{2.95}$ (BCE) powder was synthesized by citric-nitric autocombustion method. According to Rietveld analysis, BCE also possesses slightly larger unit cell volume than mostly investigated $BaCe_{0.9}Y_{0.1}O_{2.95}$ (BCY), which allows higher proton mobility through the perovskite lattice. Sinterability of $BaCeO_3$ is enhanced by doping with Eu since dense electrolyte microstructure with 1–2 μm grains can be obtained at temperatures below 1500 ºC. Conductivity measurements revealed separate bulk and grain boundary contributions to the total electrolyte conductivity below 200 ºC. The grain boundary conductivity was one order of magnitude higher than the bulk conductivity, indicating the blocking effect of the grain boundaries to the mobility of charge carriers. As this effect ceased with temperature, it was possible to determine only total conductivities above 500 ºC. Conductivity of BCE in a wet hydrogen atmosphere at 600 ºC reached 1.2×10^{-2} S/cm, which can be considered as one of the highest conductivities among $BaCeO_3$ based proton conductors. Thus, doping of $BaCeO_3$ with europium offers multiple improvements that can eventually lead to decrease in operating temperature of SOFCs based on this type of proton conducting electrolyte