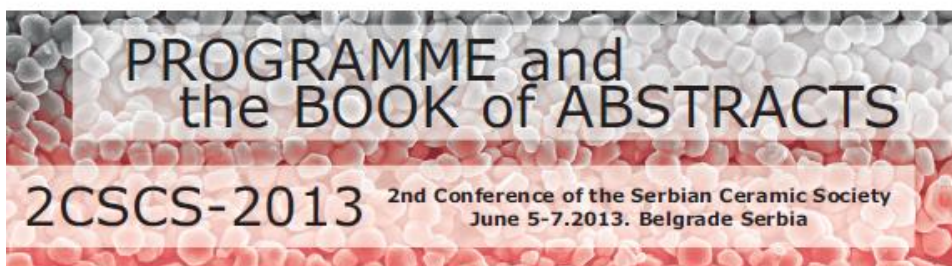


The Serbian Ceramic Society
The Academy of Engineering Sciences of Serbia
Institute for Multidisciplinary Research - University of Belgrade
Institute of Physics - University of Belgrade
Vinča Institute of Nuclear Sciences - University of Belgrade



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Zorica Branković

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**CHEMICAL STABILITY ENHANCEMENT OF DOPED
BaCe_{0.9}Y_{0.1}O_{3-δ} AS AN ELECTROLYTE FOR PROTON
CONDUCTING SOFCs**

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BaCe_{0.9-x}Nb_xY_{0.1}O_{3-δ} and BaCe_{0.9-x}Ta_xY_{0.1}O_{3-δ} (where x = 0.01, 0.03 and 0.05) powders were synthesized by solid-state reaction method to investigate the influence of dopant and concentration on chemical stability and electrical properties of the sintered samples. The dense electrolyte pellets were formed from the powders after being uniaxially pressed and sintered at 1550°C for 5h. The electrical conductivities determined by impedance measurements in temperature range of 550-750 °C in wet hydrogen atmosphere showed a decreasing trend with increase of Nb and Ta content. On the other hand, stability of the sintered samples treated in 100% CO₂ at 700 °C for 5h determined by X-ray analysis was enhanced with increased concentrations of Nb and Ta. It was found that BaCe_{0.87}Nb_{0.3}Y_{0.1}O_{3-δ} is the optimal composition that satisfies the opposite demands for electrical conductivity and chemical stability, reaching 8.0·10⁻³ Sm·cm⁻¹ in wet hydrogen at 650 °C compared to 1.0·10⁻² Sm·cm⁻¹ for undoped electrolyte. Similar results obtained by doping with Nb and Ta can be explained by almost equal size and same valence of Nb and Ta cations, as well as their similar electronegativities. The electrolyte characteristics are strongly dependent on these properties, whereas doping with Nb showed slightly higher conductivities for each dopant concentration.