The Serbian Ceramic Society
Vinča Institute of Nuclear Sciences, University of Belgrade
Institute for Multidisciplinary Research, University of Belgrade
Institute of Physics, University of Belgrade

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CHEMICAL STABILITY AND ELECTRICAL PROPERTIES OF Nb DOPED $BaCe_{0.9}Y_{0.1}O_{3-\delta}$ AS A HIGH TEMPERATURE PROTON CONDUCTOR FOR IT-SOFC APPLICATION

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$BaCe_{0.9-x}Nb_xY_{0.1}O_{3-\delta}$ (where x = 0.01, 0.03 and 0.05) fine powders were synthesized by auto-combustion reaction to investigate the influence of Nb concentration on chemical stability and electrical properties of $BaCe_{0.9}Y_{0.1}O_{3-\delta}$. The dense electrolyte pellets were formed from powders after being uniaxially pressed and sintered at 1600ºC for 5h. Chemical stability in a CO_2 atmosphere at 750ºC was determined by X-ray powder diffraction. Conductivities of the sintered samples have been measured within the temperature range of 500-750ºC in different atmospheres (dry and wet argon, wet hydrogen). The highest conductivities were obtained at 750ºC in wet hydrogen reaching the value of $3{,}26 \cdot 10^{-3}$ $Sm \cdot cm^{-1}$.

SYNTHESES OF Pb-CERAMIC FROM ZEOLITE PRECURSORS: XRPD REFINEMENT AND SEM/EDS ANALYSIS

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The Pb-ceramic was syntheses by process of thermally induced phase transformation of Pb-exchange LTA and FAU zeolites. Both frameworks collapse into amorphous intermediate products after heating between 600 and 650 ^{o}C. Prolonged heating of the intermediate product over 1100^{o}C results directly in formation of a disorder Pb feldspar$_{LTA}$ [a =8.4171(4) Å, b=13.0532(4) Å, c=7.1722(4) Å, β=115.35(3)°] and Pb-feldspar$_{FAU}$ [a=8.426(4) Å, b=13.0608(4) Å, c=7.1773(4) Å, β=115.36(3)°] phase. The phase conversions in the temperature range investigated were followed by thermal (DTA/TGA), XRPD, and SEM/EDS analyses. The results showed that the Pb-ceramic could be obtained by process of thermally induced phase transformation of Pb-exchange zeolites.