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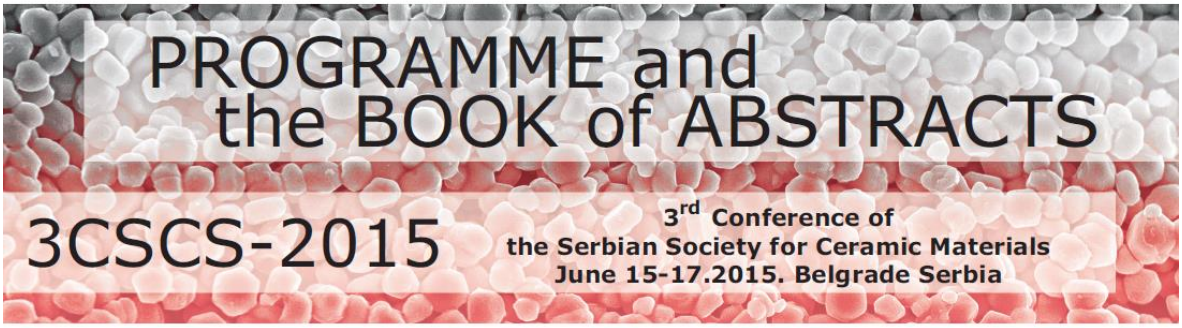
Vinča Institute of Nuclear Sciences - University of Belgrade



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ORAL PRESENTATIONS

O-2

STRUCTURAL, FERROELECTRIC AND MAGNETIC PROPERTIES OF $BiFeO_3$ SYNTHESIZED BY HYDRO-EVAPORATION AND SONOCHEMICALLY ASSISTED HYDROTHERMAL METHODS

Danijela Luković Golić[1], Aleksandar Radojković[1], Jovana Ćirković[1], Nikola Tasić[1], Damir Pajić[2], Goran Branković[1], Zorica Marinković Stanojević[1], Zorica Branković[1]

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Multiferroic bismuth ferrite ($BiFeO_3$) powders were synthesized using hydro-evaporation (HE) and sonochemically assisted hydrothermal (HT) method to investigate how different synthesis methods affect the properties of the powders and sintered samples. The structural and microstructural analyses revealed that all the samples contain secondary phases, $Bi_{25}FeO_{40}$ and $Bi_2Fe_4O_9$, but their contribution depends on conditions of thermal treatment (calcination and sintering). The densest (88% and 95 % of theoretical density for HE and HT sample, respectively) ceramics were obtained after pressing of powders at 9 t/cm^2 followed by sintering at 820 °C for 2 h. Ferroelectric properties of sintered samples were correlated with grain size and density, while the presence of charge defects indicated distortion of crystal lattice. Magnetic measurements of M(H) for both sintered samples showed small deviation from linearity. The sample sintered from HT powder exhibited greater remnant electric polarization as well as greater value of magnetization as a function of temperature. Also, after cooling in magnetic field this sample indicated the asymmetric magnetic hysteresis loop (exchange bias effect). Although both samples showed weak electric ($P_r \leq 1$ μC/cm^2) and magnetic polarization ($M \leq 0.01$ emu/g) at room temperature, ceramics obtained from HT powder was overall superior with respect to multiferroic properties.