Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION IX
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 20-21. September 2021.

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Structural And Functional Investigation Of Fe/Pb/Zr-co-doped Barium Titanate Ceramics: From Theory To The Experiment

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Mixtures of high purity powders of 50 mass% Fe, 4 mass% Pb, 3 mass% Zr and 43 mass% $BaTiO_3$ were activated in a rotary ball mill for durations ranging from 30 min to 300 min; samples were then sintered in the air atmosphere for 2 hours at 1200 °C. Crystal structure prediction has been performed using Bond ValenceCalculation (BVC) method.Moreover, theoretical stability of theperovskite structure for synthesized and calculated Fe/Pb/Zr-co-doped barium titanatecompounds has been investigated using the Goldschmidttolerance factor (Gt) and global instability index (GII).It was observed that magnetization of the system decreased after the sintering, with the most dramatic drop of 90.11% belonging to the sample activated for 150 min. In comparison with initial powders, X-ray powder diffractiondata confirmed the presence of newphases of $BaFe_{12}O_{19}$ and $Ba_{1.696}Ti_{0.228}O_3$ in sintered samples. Utilizing the field emission scanning electron microscopy (FESEM), it was found that with the increase of activation time the morphology of the samples progressed from irregural, spherical grains to mostly rod-like ones. Energy dispersive X-ray (EDX) analysis identified the presence of Pb and Zr occupying the same locations on the surface of sintered samples, whilst Fe was uniformly deployed regardless of the activation time.