

The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research, University of Belgrade
Institute of Physics, University of Belgrade
Center of Excellence for the Synthesis, Processing and
Characterization of Materials for use in Extreme Conditions
"CEXTREME LAB" - Institute of Nuclear Sciences "Vinča",
University of Belgrade
Faculty of Mechanical Engineering, University of Belgrade

A microscopic image of ceramic grains, showing a transition from white to red. The grains are spherical and densely packed. The top half is white, and the bottom half is red, with a horizontal boundary line.

PROGRAMME and the BOOK of ABSTRACTS

4CSCS-2017

4th Conference of
the Serbian Society for Ceramic Materials
June 14-16.2017. Belgrade Serbia

Edited by:
Branko Matović
Zorica Branković
Dušan Bućevac
Vladimir V. Srdić

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M. Vuković, Z. Branković, D. Poleti, G. Branković MECHANICAL AND COUPLED MECHANICAL-ULTRASONIC ACTIVATION OF HIGH BREAKDOWN FIELD ZnO VARISTORS	88
M. Vuksanović, B. Međo, M. Rakin, T. Volkov Husovic, Z. Stević, R. Jančić Heinemann COMPARISON OF ANALYTICAL AND NUMERICAL RESULTS OF ALUMINA CERAMIC MATERIALS BEHAVIOR UNDER THE BRAZILIAN DISK TEST	89
M. Pavlović, M. Dojčinović, J. Majstorović, S. Martinović, M. Vlahović, Z. Stevic, T. Volkov Husović IMPLEMENTATION OF IMAGE ANALYSIS ON COMPARISON OF CAVITATION EROSION DEGRADATION OF MULITE AND CIRCON SAMPLES BASED	90
J. Čirković, D. Luković Golić, A. Radojković, A. Dapčević, M. Čizmić, Z. Branković, G. Branković PHOTODEGRADATION OF ORGANIC DYE USING BiFeO ₃ PARTICLES SYNTHESIZED BY ULTRASOUND ROUTE	91
D. Luković Golić, A. Radojković, A. Dapčević, J. Čirković, N. Tasić, D. Pajić, Z. Marinković Stanojević, Z. Branković, G. Branković THE EFFECT OF GADOLINIUM SUBSTITUTION ON THE STRUCTURAL, FERROELECTRIC AND MAGNETIC PROPERTIES OF BISMUTH FERRITE CERAMICS	92
N. Ilić, J. Bobić, V. Spasojević, B. Stojanović INFLUENCE OF DOPING ION VALENCE AND SIZE ON PROPERTIES OF BiFeO ₃ MATERIALS	93
A. Volceanov, Z. Ghizdavet, D. Nastac, M. Eftimie, B. Stefan, I. Stanciu MICROSTRUCTURE OF SOME CLINKERS THROUGH THEIR FRACTAL DIMENSION	93
M. Momčilović, J. Đorđević, A. Zarubica, M. Randelović ELECTROCHEMICAL BEHAVIOUR OF SERPENTINITE AND FORSTERITE IN FERRI/FERRO CYANIDE BENCHMARK REDOX SYSTEM	94
A. Radojković, D. Luković Golić, J. Čirković, A. Dapčević, D. Pajić, F. Torić B-SITE DOPING AS A STRATEGY FOR TAILORING BiFeO ₃ PROPERTIES	95
V. Ribić, A. Rečnik, Z. Branković, G. Branković DFT SCREENING OF DOPANTS TRIGGERING THE FORMATION OF BASAL- PLANE INVERSION BOUNDARIES IN ZnO	96
R. Pacheco-Contreras, J.O. Juárez-Sánchez, Á. Posada-Amarillas, M. Dessens-Félix, A. Fortunelli STRUCTURES OF TRIMETALLIC Ag _l Au _m Pt _n ($l+m+n=13, 19, 33$ and 38) CLUSTERS	97
S. Perać, S.M. Savić, Z. Branković, S. Bernik, G. Branković ENHANCEMENT OF THERMOELECTRIC PROPERTIES INDUCED BY Cu SUBSTITUTION IN NaCo ₂ O ₄	98

P-28

THE EFFECT OF GADOLINIUM SUBSTITUTION ON THE STRUCTURAL, FERROELECTRIC AND MAGNETIC PROPERTIES OF BISMUTH FERRITE CERAMICS

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$\text{Bi}_{1-x}\text{Gd}_x\text{FeO}_3$ ($x = 0.01; 0.05; 0.075; 0.09; 0.10; 0.20; 0.30$) powders were synthesized by hydro-evaporation method. The optimization of sintering conditions indicated that temperature of 870 °C and time of 2 hours (after pressing at 9 t/cm²) provided the densest ceramics samples (up to 88 % of theoretical density) and the lowest amount of secondary phases (≤ 5.5 wt.%). The increase of gadolinium content resulted in polar-to-nonpolar ($R3c \rightarrow Pnma$) structural phase transition at about $x = 0.10$, which was reflected on deterioration of ferroelectric property. Structural analysis indicated decrease of unit cell volume with the increase of x , but the (Bi,Gd)–Fe distance did not exhibit regularity in change. The bismuth ferrite ceramics samples doped with $x = 0.075$ and $x = 0.09$ of gadolinium showed the greatest lattice distortion along the [111] axis. These samples also exhibited larger values of remnant electric polarization and less leakage processes than the pure bismuth ferrite ceramics samples. Magnetic behavior of $\text{Bi}_{1-x}\text{Gd}_x\text{FeO}_3$ samples revealed that the weak ferromagnetic moment strengthened with increase of the gadolinium content.