

The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research (IMSI), 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
Center for Green Technologies, Institute for Multidisciplinary Research,
University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade
Faculty of Technology, University of Novi Sad

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

PROGRAMME and the BOOK of ABSTRACTS

5CSCS-2019

5th Conference of
the Serbian Society for Ceramic Materials
June 11-13.2019. Belgrade Serbia

Edited by:
Branko Matović
Zorica Branković
Aleksandra Dapčević
Vladimir V. Srdić

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SPECIAL THANKS TO



Република Србија
МИНИСТАРСТВО ПРОСВЕТЕ,
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА



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WELCOME MESSAGE

The 5th Conference of the Serbian Society for Ceramic Materials: 5CSCS-2019 aims to review the knowledge, experience and share new ideas among the professionals, industrialists and students from research areas of ceramic materials and by taking an active part in discussions and technical sessions at the conference. The conference provides exhibitor booths for the companies and the institutions to showcase their services, products, innovations, innovative ideas and research work & results.

The conference includes all aspects of ceramics: modelling, synthesis, properties, processing and applications of bulk, films, powders, nanomaterials, composites providing a platform for academic exchange among participants from universities, institutes, companies around the region in the field of ceramics research as well as to explore a new direction for future development. The conference has an elemental feature to the distinguished motive speakers, plenary speeches, young investigators, poster presentations, oral presentations, technical workshop, and scientific sessions.

The conference is hosted and organized by the Serbian Society for Ceramic Materials, and co-organized by the Institute for Multidisciplinary Research - 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, Institute of Physics - University of Belgrade, Faculty of Mechanical Engineering - University of Belgrade, Center for Green Technologies of the Institute for Multidisciplinary Research - University of Belgrade, Faculty of Technology and Metallurgy - University of Belgrade, Faculty of Technology - University of Novi Sad.

We are grateful for the support of the Ministry for education, science and technological development of the Republic of Serbia. We would also like to express our sincere thanks to the conference organizers, session chairs, presenters, exhibitors and all the conference attenders for their efforts and enthusiastic support in this exciting time in Belgrade. I look forward to meeting you and interacting with you at Conference.

Branko Matovic,
President of the Serbian Society for Ceramic Materials

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PROPERTIES OF VARIOUS MULTIFERROIC COMPOSITES PREPARED BY MIXING METHOD

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Multiferroic composites with formula $\text{Ba}(\text{Ti}_{0.95}\text{Zr}_{0.05})\text{O}_3\text{-Ni}_{0.7}\text{Zn}_{0.3}\text{Fe}_2\text{O}_4/\text{CoFe}_2\text{O}_4/\text{Ni}_{0.7}\text{Cu}_{0.01}\text{Sm}_{0.05}\text{Zn}_{0.29}\text{Fe}_{1.95}\text{O}_4$ (BTZ(95-5)-NZF/CF/NCSZF) were prepared by mixing chemically obtained NZF, CF, NCSZF and BTZ(95-5) powders in the planetary mill for 24 h. All powders were prepared by the auto-combustion method starting from metal nitrates, titanium(IV) isopropoxide, zirconium(IV) oxynitrate and citric acid solution. Citric acid was added as a fuel and also as a complexing agent [1]. The optimization of sintering process was performed and the powders were pressed and sintered at 1250 °C for 4 h. X-ray measurements of obtained composites confirmed the presence of NZF, CF, NCSZF, BTZ(95-5) phases without the presence of any intermediate phases or impurities. Impedance analysis of all investigated samples has shown two semicircular arcs due to the presence of different relaxation processes that originated from the grain and grain boundary contributions. The results of polarization vs. electric field measurements have shown the influence of magnetic phases type and concentration on the ferroelectric properties of the composites. Due to high conductivity of ferrite phases and presence of interfacial polarization, the shapes of these curves differed from the conventional ferroelectric materials [2]. The values of remnant polarization were: 0.72, 0.34, 0.013 $\mu\text{C}/\text{cm}^2$ for the composites BTZ(95-5)-NZF, BTZ(95-5)-CF, BTZ(95-5)-NCSZF, respectively and for the saturation polarization were 1.2, 0.6 and 0.023 $\mu\text{C}/\text{cm}^2$. In comparison with BTZ(95-5) this values are lower, $P_r = 1.1 \mu\text{C}/\text{cm}^2$ and $P_s = 4.5$. However, due to the existence of non-saturated ferroelectric loops, the comparison of P_r and P_s was done at the appropriate field strength.

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