

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 boundary line.

# PROGRAMME and the BOOK of ABSTRACTS

## 5CSCS-2019

5<sup>th</sup> 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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**Faculty of Technology and Metallurgy, University of Belgrade**  
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**5CSCS-2019**

Edited by:  
**Branko Matović**  
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**Aleksandra Dapčević**  
**Vladimir V. Srdić**

**SPECIAL THANKS TO**



Република Србија  
МИНИСТАРСТВО ПРОСВЕТЕ,  
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА



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## WELCOME MESSAGE

The 5<sup>th</sup> 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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## **OPTICAL AND STRUCTURAL INVESTIGATION OF Cr<sub>2</sub>O<sub>3</sub> THIN FILMS: THE EFFECT OF THICKNESS FOR POSSIBLE APPLICATION FOR DIFFERENTIAL PHOTODETECTORS**

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We report experimental study of Cr<sub>2</sub>O<sub>3</sub> thin films (60, 300, 350 nm) deposited on silicone and glass substrate using Balzers Sputtron II System. The structural and optical properties are investigated by means of AFM, XRD, UV-VIS, Raman and infrared spectroscopy, in order to determine suitability of as-obtained films as potential active layers in novel differential inorganic photodetectors. AFM measurements reveal that the films are well-deposited, without presence of any cracks and voids. The wide structures on XRD spectra indicate that the degree of crystallinity in our films is low. UV-VIS measurements reveal strong red shift of absorption maxima with reducing the film thickness. IR and Raman spectroscopy show dependence of characteristic vibrations on film thickness but also on substrate. Our results indicate the Cr<sub>2</sub>O<sub>3</sub> film of 300 nm thickness is the best candidate for photoactive semiconducting layer in differential photodetectors.

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## **PHOTOCATALYTIC ACTIVITY OF BiFeO<sub>3</sub>-BASED POWDERS**

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Bismuth-ferrite (BiFeO<sub>3</sub>) is studied a lot in recent years due to its specific multiferroic properties. Thanks to the optical bandgap energy of 2.3-2.8 eV [1], BiFeO<sub>3</sub>-based materials are also interesting for photocatalytic and solar energy applications. Sol-gel methods were used to produce BiFeO<sub>3</sub> and BiFeO<sub>3</sub>-modified

diatomaceous earth. These powders were characterized, and their visible light photocatalytic activity for decomposition of some organic dyes was tested in acidic, close-to-neutral and alkaline conditions. Fenton-like catalysis was also tested for those materials. Influence of synthesis method, microstructure, ageing and composition on dye degradation helped in proposing the mechanism of adsorption and photocatalytic processes.

1. G. Catalan, J.F. Scott, *Adv. Mater.*, **21** (2009) 2463

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## **NANOCRYSTALLINE IRON-MANGANITE (FeMnO<sub>3</sub>) APPLIED FOR HUMIDITY SENSING**

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Nanocrystalline iron manganite was synthesized using a sol-gel self-combustion method with glycine as fuel, followed by calcination at 900 °C for 8 hours. Structural characterization was performed using X-ray diffraction (XRD) and field emission scanning electron microscopy (FESEM). It confirmed the formation of nanocrystalline iron-manganite with a perovskite structure. Humidity sensing properties of bulk and thick film samples of the obtained nanocrystalline iron manganite powder were analyzed. Organic vehicles were added to the powder to form a thick film paste that was screen printed on alumina substrate with test PdAg interdigitated electrodes. Impedance response of bulk and thick film samples was analyzed in a humidity chamber in the relative humidity range 30-90% in the frequency range 42 Hz to 1 MHz in view of applying iron-manganite for humidity sensing applications.