

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 of Excellence for Green Technologies, Institute for Multidisciplinary  
Research, University of Belgrade  
Faculty of Technology and Metallurgy, University of Belgrade

# PROGRAMME and the BOOK of ABSTRACTS

6CSCS-2022

6<sup>th</sup> Conference of  
the Serbian Society for Ceramic Materials  
June 28-29. 2022. Belgrade Serbia

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

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**Session 5: High temperature phenomena, sintering, microstructure design and mechanical properties**

Chair: Peter Tatarko, Branko Matović

**11.50 – 12.10 h, Invited lecture, I-13**

Peter Tatarko, *DEVELOPMENT OF HIGHLY TEXTURED DIBORIDE CERAMICS USING MAGNETIC AND ELECTRIC FIELDS*

**12.10 – 12.30 h, Invited lecture, I-14**

Ravi Kumar, *UNDERSTANDING DEFORMATION IN PRECURSOR DERIVED CERAMICS AT DIFFERENT LENGTH SCALES*

**12.30 – 12.45 h, Oral presentation, O-9**

Branko Matović, *SYNTHESIS AND CHARACTERIZATION OF HAFNIUM CARBIDE BASED CERAMICS*

**12.45 – 13.00 h, Oral presentation, O-10**

Jelena Vukašinić, *EFFECT OF THE SINTERING TECHNIQUE ON THE PROPERTIES OF Sb-DOPED BaSnO<sub>3</sub> CERAMICS*

**Session 6: Traditional ceramics**

Chair: Tatjana Volkov-Husović, Eniko Volceanov

**13.00 – 13.20 h, Invited lecture, I-15**

Jelena Maletaškić, *GLASS-CERAMICS OBTAINED FROM CAO-TiO<sub>2</sub>-SiO<sub>2</sub> (SPHENE)*

**13.20 – 13.40 h, Invited lecture, I-16**

Tatjana Volkov Husović, *BLAST FURNACE REFRACTORIES: PAST, PRESENT AND FUTURE*

**13.40 – 15.00 h, Lunch break**

**15.00 – 15.45 h, Poster Session 2 (Posters P26 – P47)**

**15.45 – 16.00 h, Marija Egerić, YOUNG CERAMISTS NETWORK**

**16.00 – 16.15 h, Closing ceremony**

**20.00 h, Conference dinner**



O-10

## EFFECT OF THE SINTERING TECHNIQUE ON THE PROPERTIES OF Sb-DOPED BaSnO<sub>3</sub> CERAMICS

Jelena Vukašinović<sup>1</sup>, Milica Počuča-Nešić<sup>1</sup>, Aleksandar Malešević<sup>1</sup>,  
Vesna Ribić<sup>2</sup>, Sandra Drev<sup>2</sup>, Aleksander Rečnik<sup>2</sup>, Slavko Bernik<sup>2</sup>,  
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Barium stannate, BaSnO<sub>3</sub> (BSO), a cubic perovskite-type oxide with its interesting structural, optical and electrical properties has wide application as an electrode material, thermally stable capacitor, transparent conductive oxide, photocatalyst, humidity and gas sensor material [1]. Partial substitution of Sn by Sb in BSO leads to drastic changes primarily in its electrical properties, resulting in metallic-like conductivity of doped ceramics. Major problems concerning the synthesis of Sb doped BSO (BSSO) are connected to the phase composition and density of final ceramic material.

This study covers the comprehensive investigation of structural, microstructural and electrical properties of the Sb-doped BaSn<sub>1-x</sub>Sb<sub>x</sub>O<sub>3</sub> ( $x = 0.00, 0.04$  and  $0.08$ , BSSO) ceramic materials obtained by two different sintering techniques: conventional sintering (CS) and Spark Plasma sintering (SPS). The relative densities of the BSSO-CS ceramic samples sintered at 1600 °C for 3 h was in the range of 79–96 %. On the other side, the relative densities of BSSO-SPS ceramic samples in the range of 86–96 % were obtained at 1200 °C, with sintering time of only 5 minutes.

The XRD analysis confirmed that cubic BaSnO<sub>3</sub> is a major phase in all BSSO samples. The presence of tetragonal Ba<sub>2</sub>SnO<sub>4</sub> as a secondary phase was detected in BSSO-SPS ceramic samples, with its content decreasing upon Sb-doping. As expected, the grain size of the samples sintered at higher temperatures (BSSO-CS) is larger in comparison with BSSO-SPS ceramic samples, which was confirmed by Scanning Electron Microscopy (SEM). SEM analysis also revealed the layered structure within the grains of BaSn<sub>0.92</sub>Sb<sub>0.08</sub>O<sub>3</sub>-CS sample while HRTEM analysis confirmed the existence of the low angle grain boundaries (LAGBs) in the SPSed sample with the same composition.

The electrical resistivity decreased upon Sb doping, and all doped BSSO samples showed the linear  $I$ - $U$  characteristic in the temperature range of 25–150 °C. The semiconductor behavior of all BSSO-CS and BSSO-SPS ( $x = 0.00$  and  $0.04$ ) ceramic samples was confirmed through the existence of semicircles in their impedance spectra. On the other hand, the BaSn<sub>0.92</sub>Sb<sub>0.08</sub>O<sub>3</sub> sample showed the metallic-like behavior resulting from the loss of the electrostatic barriers at LAGBs, which is manifested through the absence of the semicircle in its impedance spectra.

1. H. Mizoguchi, P. Chen, P. Boolchand, *et al.*, *Chem. Mater.*, **25** (2013) 3858.