

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

6th 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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Dr Branko Matović
Prof. Aleksandra Dapčević
Prof. Vladimir V. Srdić

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June 28-29, 2022

Belgrade, Serbia

6CSCS-2022

Edited by:
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Aleksandra Dapčević
Vladimir V. Srdić

SPECIAL THANKS TO



Република Србија

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- 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
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WELCOME MESSAGE

On behalf of the organizers and organizing committee of the 6th Conference of the Serbian Society for Ceramic Materials (6CSCS-2022), I would like to extend my warmest welcome to all of you for attending the 6CSCS-2022. The conference is hosted and organized by the Serbian Society for Ceramic Materials, and co-organized by 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, Center of excellence for green technologies, Institute for Multidisciplinary Research - University of Belgrade, and Faculty of Technology and Metallurgy - University of Belgrade.

The goal of the Conference is to provide 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 new direction for future development. 6CSCS-2022 aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of ceramic materials. It also provides the premier inter-multi-trans-disciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in the field of ceramic materials. We have received 75 abstracts with researchers from 17 countries.

The Conference will feature two plenary lectures, 16 invited talks and 57 oral and poster presentations as well as exhibitions of some new ceramic materials and devices. 6CSCS-2022 includes Ceramic powders, characterization and processing, High temperature phenomena, sintering, microstructure design and mechanical properties, Electro and magnetic ceramics, Ceramic composites, membranes and multimaterials, Traditional ceramics and Computing in materials science. Exhibitions from company sponsors will be held at the Conference as well.

We are grateful for the support from the Ministry of Education, Science and Technological Development of the Republic of Serbia. We would also like to express our sincere thanks to the symposia organizers, session chairs, presenters, exhibitors and all the Conference attendees for their efforts and enthusiastic support in this exciting time in Belgrade. I look forward to meeting you and interacting with you at Conference.

6CSCS-2022 President

Branko Matović

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6th Conference of the Serbian Society for Ceramic Materials
June 28-29, 2022, Belgrade, Serbia

PROGRAM of 6CSCS-2022

Day 1. Tuesday - June 28, 2022

08.00 – 09.00 h, Registration

09.00 – 09.15 h, Opening ceremony and welcome addresses

09.15 – 10.00 h, Cocktail

10.00 – 10.30 h, Plenary lecture, PL-1

Yuri Rostovtsev, *QUANTUM COHERENCE IN VARIOUS MATERIALS: TRANSPARENCY, HARMONIC GENERATION, QUANTUM CORRELATIONS, AND FREQUENCY DOWN CONVERSION*

Session 1: Ceramic Powders, Characterization and Processing

Chair: Zorica Branković, Claus Rebholz

10.30 – 10.50 h, Invited lecture, I-1

Claus Rebholz, *THERMAL AND CHEMICAL STABILITY OF BORON NITRIDE NANOSTRUCTURES*

10.50 – 11.10 h, Invited lecture, I-2

Sonja Jovanović, *THE STRUCTURAL AND MAGNETIC PROPERTIES OF COBALT FERRITE NANOPARTICLES: THE INFLUENCE OF HETEROATOMS*

11.10 – 11.30 h, Invited lecture, I-3

Matejka Podlogar, *SOLVOTHERMAL SYNTHESIS OF ZnO NANORODS FOR PHOTOCATALYTIC DEGRADATION OF ORGANIC POLLUTANTS*

11.30 – 12.00 h, Coffee break

Session 1: Ceramic powders, characterization and processing

Chair: Zorica Branković, Claus Rebholz

12.00 – 12.15 h, Oral presentation, O-1

Nikola Ilić, *NATURE OF PHOTOCATALYSIS IN BiFeO₃ SUSPENSIONS – HETEROGENEOUS, HOMOGENEOUS OR DYE-SENSITIZED?*

12.15 – 12.30 h, Oral presentation, O-2

Tamara Matić, *THE INFLUENCE OF HYDROTHERMAL SYNTHESIS TEMPERATURE OF MAGNESIUM DOPED HYDROXYAPATITE ON ITS APPLICATION AS DENTIN SUBSTITUTE*

12.30 – 12.45 h, Oral presentation, O-3

Tijana Stamenković, *THE INFLUENCE OF Yb³⁺ CONCENTRATION ON STRUCTURAL AND LUMINESCENT PROPERTIES OF Tm³⁺ DOPED SrGd₂O₄*

Session 2: Ceramic composites, membranes and multimaterials

Chair: Ravi Kumar, Vladimir Srdić

12.45 – 13.05 h, Invited lecture, I-4

Enikő Volceanov, *DEVELOPMENT OF ELECTROLESS Ni-P-NANOCOMPOSITE COATINGS ON LOW CARBON STEEL THIN STRIP*

13.05 – 13.20 h, Oral presentation, O-4

Irina Kandić, *CHARACTERIZATION OF ACTIVE CARBON MATERIALS OBTAINED FROM BIO WASTE FOR POTENTIAL USE IN WATER PURIFICATION*

13.20 – 14.45 h, Lunch break

14.45 – 15.30 h, Poster Session 1 (Posters P1 – P25)

Session 3: Electro and magnetic ceramics

Chair: Goran Branković, Slavko Bernik

15.30 – 15.50 h, Invited lecture, I-5

Slavko Bernik, *DEVELOPMENT AND CHARACTERISTICS OF A NOVEL ZnO-Cr₂O₃-BASED VARISTOR CERAMICS*

15.50 – 16.10 h, Invited lecture, I-6

Tomislav Ivek, *PROMOTION OF FERROMAGNETISM AND COLLAPSE OF VARIABLE-RANGE HOPPING TRANSPORT IN CERAMIC La_{0.5}Ca_{0.5}MnO₃ CONTROLLED BY GRAIN SIZE*

16.10 – 16.30 h, Invited lecture, I-7

Maria Čebela, *SYNTHESIS AND PROPERTIES OF MULTIFERROIC MATERIALS*

16.30 – 16.50 h, Invited lecture, I-8

Bojan Stojadinović, *SPIN-PHONON COUPLING IN NANOSTRUCTURES REVEALED BY RAMAN SPECTROSCOPY*

16.50 – 17.05 h, Oral presentation, O-5

Danica Piper, *BILAYER (La,Sr)MnO₃ AND (Ba,Sr)TiO₃ THIN FILMS PREPARED BY CHEMICAL SOLUTION DEPOSITION TECHNIQUES*

17.05 – 17.20 h, Oral presentation, O-6

Jelena Vukmirović, *EPITAXIAL GROWTH OF LaMnO₃ THIN FILMS BY POLYMER ASSISTED DEPOSITION TECHNIQUE ON THE DIFFERENT MONOCRYSTALLINE*

Day 2. Wednesday - June 29, 2022

09.00 – 09.30 h, Plenary lecture, PL-2

Ionescu Emanuel, *ADVANCED CERAMICS FOR ENERGY-RELATED APPLICATIONS: PRECURSOR-BASED SYNTHESIS & DESIGN CONCEPTS AND THEIR PERSPECTIVES TOWARDS SUSTAINABILITY*

Session 4: Computing in materials science

Chair: Yuri Rostovtsev, Dejan Zagorac

09.30 – 09.50 h, Invited lecture, I-9

K.C. Hari Kumar, *THERMODYNAMIC MODELLING OF Ta-N SYSTEM*

09.50 – 10.10 h, Invited lecture, I-10

Jelena Zagorac, *EFFECT OF ALUMINUM ADDITION ON THE STRUCTURE AND ELECTRONIC PROPERTIES OF BORON NITRIDE*

10.10 – 10.30 h, Invited lecture, I-11

Adrian Volceanov, *CHEMICAL BONDING IN CERAMICS AND GLASSES*

10.30 – 10.50 h, Invited lecture, I-12

Dejan Zagorac, *BARIUM SULFIDE UNDER PRESSURE: STRUCTURAL CHANGES, BAND GAP ENGINEERING AND MECHANICAL PROPERTIES*

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Dušica Jovanović, *ENERGY LANDSCAPE OF A RELAXED AMINO ACID, GLUTAMINE (L), ON TiO₂ SURFACES*

11.05 – 11.20 h, Oral presentation, O-8

Milan Pejić, *FIRST-PRINCIPLES INVESTIGATION AND STRUCTURE PREDICTION IN HOLMIUM(III) FLUORO-SELENIDE SYSTEM*

11.20 – 11.50 h, Coffee break

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*

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Jelena Vukašinić, *EFFECT OF THE SINTERING TECHNIQUE ON THE PROPERTIES OF Sb-DOPED BaSnO₃ 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-TiO₂-SiO₂ (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

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- P-1.** Tsvetan Dimitrov, *SYNTHESIS AND STUDY OF CHROMIUM-DOPED DIOPSIDE CERAMIC PIGMENTS*
- P-2.** Miluvka Stancheva, *STUDY OF CERAMIC PIGMENTS IN THE SYSTEM $\text{CaO}_x(\text{REE})_{1-x}\text{MgO} \cdot 2\text{SiO}_2$*
- P-3.** Katarina Nikolić, *STRUCTURAL AND CHEMICAL PROPERTIES OF WASTE VITREOUS ENAMELS GENERATED DURING THE PRODUCTION PROCESS OF HEATING DEVICES*
- P-4.** Neda Nišić, *CHARACTERIZATION OF HIGH TEMPERATURE CERAMIC COMPOSITE SEALANTS (CCS) WITH ADDITION OF ALUMOSILICATE BASED WASTE MATERIAL FOR THE POTENTIAL USE IN IT-SOFC*
- P-5.** Marija Prekajski Đorđević, *SURFACE MODIFICATION OF CeO_2 NANOPOWDER*
- P-6.** Vladimir Dodevski, *SYNTHESIS OF OBTAINING SiO_2 FROM BIOMASS, CHARACTERIZATION OF STRUCTURAL AND CHEMICAL PROPERTIES AND THE POSSIBILITY OF POTENTIAL APPLICATION*
- P-7.** Katarina Vojisavljević, *HIERARCHICAL ZnO/SnO_2 HETEROSTRUCTURES VIA HYDROTHERMALLY ASSISTED ELECTROSPINNING TECHNIQUE: SYNTHESIS AND PHOTOCATALYTIC PERFORMANCES*
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- P-11.** Jelena Jovanović, *VISIBLE-LIGHT PHOTOCATALYTIC DEGRADATION OF MORDANT BLUE 9 BY BiVO_4 NANOPOWDER*
- P-12.** Milena Rosić, *INVESTIGATING SORPTIVE ASPECTS OF CoMoO_4 NANOPOWDERS SYNTHESIZED BY SPR METHOD*
- P-13.** Ivan Stijepović, *ION MIGRATION IN SPINEL STRUCTURE IN NICKEL AND ZINC FERRITE NANOPOWDERS SYNTHESISED BY CO-PRECIPITATION AND HYDROTHERMAL METHODS*

P-14. Aleksandar Malešević, *STABILITY AND FUNCTIONALITY OF BaCe_{1-x}In_xO_{3-δ} AS A HIGH TEMPERATURE PROTON CONDUCTING ELECTROLYTE FOR SOLID OXIDE FUEL CELLS*

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LEAD BASED (PZT) AND LEAD FREE (BZT) COMPOSITES FLEXIBLE FILMS AS LOW-ENERGY PIEZOELECTRIC HARVESTERS

Jelena Bobić¹, Nikola Ilić¹, Željko Despotović², Adis Džunuzović¹,
Robertas Grigalaitis³, Ivan Stijepović⁴, Mirjana Vijatović Petrović¹

¹University of Belgrade, Institute for Multidisciplinary Research,
Belgrade, Serbia

²Mihajlo Pupin Institute, University of Belgrade, Belgrade, Serbia

³Faculty of Physics, Vilnius University, Vilnius, Lithuania

⁴Department of Materials Engineering, Faculty of Technology Novi Sad,
University of Novi Sad, Novi Sad, Serbia

Various alternative renewable sources such as solar, wind, thermal energy and mechanical vibrations are available for the energy generations. For the last decades, energy harvesters based on piezoelectricity from mechanical vibration are explored extensively for its functionality in energy technologies [1,2]. Flexible piezoelectric energy harvesters (FPEHs) and energy storage system were fabricated by employing solid state synthesized lead-free BZT ($\text{BaZr}_{0.2}\text{Ti}_{0.8}\text{O}_3$) and PZT ($\text{PbZr}_{0.52}\text{Ti}_{0.48}\text{O}_3$) nanopowders prepared by autocombustion method with polyvinylidene fluoride (PVDF) in different volume percentage ($x\text{BZT/PZT}-(1-x)\text{PVDF}$, $x=30, 40, 50$). Both flexible films with quite homogeneous distribution of piezo-active filler were confirmed by XRD and SEM analysis. In addition, the remnant polarization (P_r) and dielectric constant are also investigated to evaluate the breakdown strength in flexible films. The improved dielectric loss tangent (< 0.02) and dielectric permittivity of 120 at room temperature and frequency 1 MHz of BZT-PVDF (50-50) in comparison with neat PVDF films is found beneficial for both energy harvesting and storage. Calculations of storage energies obtained for the investigated materials revealed an increasing trend with increasing amount of active phase (BZT and PZT). The maximum storage energy of 0.11 J/cm^3 and 0.13 J/cm^3 , and energy efficiency (η) of 72% and 39% was obtained for BZT-PVDF (50-50) and PZT-PVDF (40-60) films, respectively. Test of the force impact showing similar output voltage of around 4 V for both, BZT and PZT flexible films.

1. H. Maiwa, Piezoelectric energy harvesting, in *Piezoelectric Materials*, Ed. T. Ogawa, Intechopen, 2016 <http://dx.doi.org/10.5772/64162>.
2. S. Guo, X. Duan, M. Xie, K. Chin Aw, Q. Xue, *Micromachines*, **11** (2020) 1076