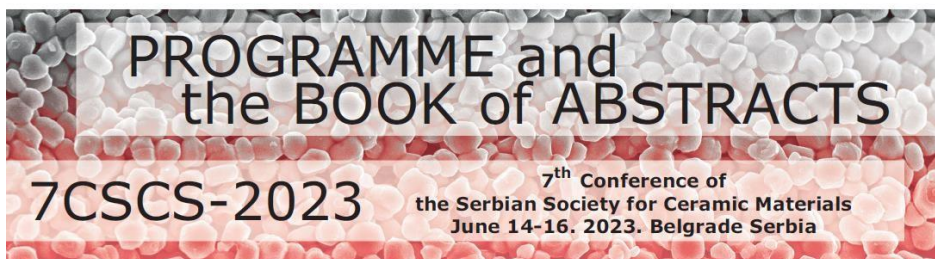


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Institute of Physics, University of Belgrade  
Center of Excellence for the Synthesis, Processing and Characterization of  
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Nuclear Sciences "Vinča", University of Belgrade  
Faculty of Mechanical Engineering, University of Belgrade  
Center of Excellence for Green Technologies, Institute for Multidisciplinary  
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Faculty of Technology and Metallurgy, University of Belgrade



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**Branko Matović**  
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**Vladimir V. Srdić**

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**Research, University of Belgrade**  
**Faculty of Technology and Metallurgy, University of Belgrade**

# **PROGRAMME AND THE BOOK OF ABSTRACTS**

**7<sup>th</sup> Conference of The Serbian Society for  
Ceramic Materials**

**June 14-16, 2023**  
**Belgrade, Serbia**  
**7CSCS-2023**

Edited by:  
**Branko Matović**  
**Jelena Maletaškić**  
**Vladimir V. Srdić**

**SPECIAL THANKS TO**



**Република Србија  
МИНИСТАРСТВО НАУКЕ,  
ТЕХНОЛОШКОГ РАЗВОЈА И ИНОВАЦИЈА**



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## WELCOME MESSAGE

On behalf of the organizers and organizing committee of the 7<sup>th</sup> Conference of the Serbian Society for Ceramic Materials (7CSCS-2023), I would like to extend my warmest welcome to all of you for attending the 7CSCS-2023. 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. 7CSCS-2023 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 102 abstracts with researchers from 15 countries.

The Conference will feature three plenary lectures, 30 invited talks and 64 oral and poster presentations as well as exhibitions of some new ceramic materials and devices. 7CSCS-2023 includes Ceramic Powders, Characterization and Processing, High Temperature Phenomena, Sintering, Microstructure Design and Mechanical Properties, Advanced Materials For Energy-Related Applications, Traditional Ceramics and Engineering Materials, Computing In Materials Science, Materials for Environmental Technology, Catalytic Materials, Materials for Sensing Devices, Ceramic Composites, Membranes And Multimaterials and Electro And Magnetic Ceramics. Exhibitions from company sponsors will be held at the Conference as well.

We are grateful for the support from the Ministry of Science, Technological Development and Inovation 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.

7CSCS-2023 President

Branko Matović

## Content

<b>Program - Wednesday, June 14, 2023</b> .....	<b>17</b>
<b>Program - Thursday, June 15, 2023</b> .....	<b>20</b>
<b>Program - Friday, June 16, 2023</b> .....	<b>23</b>

### PLENARY LECTURES

<b>Neven Barišić</b> OPTICAL CONDUCTIVITY OF CUPRATES IN A NEW LIGHT .....	<b>29</b>
<b>Johann Christian Schön</b> THIN FILMS AND MONOLAYERS - PREDICTION, MODELING, AND EXPERIMENTS .....	<b>30</b>
<b>Miladin Radović</b> TOWARDS SAFER AND SCALABLE SYNTHESIS OF MXene .....	<b>31</b>

### INVITED LECTURES

<b>Zoltán Lenčéš</b> TRANSLUCENT/TRANSPARENT SPINEL PHOSPHORS FOR SOLID STATE LIGHTING AND PHOTOCATALYTIC APPLICATIONS.....	<b>32</b>
<b>Ravi Kumar</b> COOLING RATE DEPENDENT MECHANICAL AND THERMAL PROPERTIES OF ENTROPY STABILIZED OXIDES .....	<b>33</b>
<b>Ankit Srivastava</b> IN-SITU ANALYSIS OF DAMAGE TOLERANCE MECHANISMS IN LAYERED CRYSTALS.....	<b>34</b>
<b>Peter Tatarko</b> NEW HIGH-ENTROPY CERAMICS FOR EXTREME ENVIRONMENT APPLICATIONS.....	<b>35</b>
<b>Jelena Mitrović</b> CORRELATION BETWEEN THE MICROSTRUCTURE AND ELECTRICAL PROPERTIES OF Sb-DOPED BaSnO <sub>3</sub> CERAMICS .....	<b>36</b>
<b>Jelena Bobić</b> TWO-PHASE AND THREE-PHASE FLEXIBLE THICK FILMS: POTENTIAL USE AS ENERGY STORAGE AND ENERGY HARVESTING SYSTEMS .....	<b>37</b>

<b>Nataša Džunuzović</b> ENHANCING THE REACTIVITY OF THE INDUSTRIAL FLY ASH IN THE PROCESS OF ALKALI ACTIVATION.....	38
<b>Tatjana Volkov-Husović</b> CAVITATION EROSION RESISTANCE OF REFRACTORY CERAMICS FOR FOUNDRY COATINGS APPLICATION.....	39
<b>Snežana Vučetić</b> ECO-LOGICAL: DESIGN OF CERAMIC MATERIALS BASED ON THE INDUSTRIAL WASTES.....	40
<b>Dasari L.V.K. Prasad</b> DATA-MINING FOR NOVEL CERAMIC MATERIALS.....	41
<b>K.C. Hari Kumar</b> THERMODYNAMIC MODELLING OF CaO-MgO SYSTEM.....	42
<b>Yuri Rostovtsev</b> QUANTUM SENSORS FOR GAS MIXTURE DETECTION .....	43
<b>Dejan Zagorac</b> SCANDIUM OXYCHLORIDE (ScOCl): STRUCTURE PREDICTION USING A MULTI-METHODOLOGICAL APPROACH.....	44
<b>Jovana Ćirković</b> PHOTOCATALYTIC DEGRADATION OF MORDANT BLUE 9 BY SINGLE- PHASE BiFeO <sub>3</sub> NANOPARTICLES .....	45
<b>Matejka Podlogar</b> BIO AND PHOTOCATALYTIC DEGRADATION OF TEXTILE FIBER-BASED MICROPLASTICS.....	46
<b>Uroš Čakar</b> THE INFLUENCE OF TECHNOLOGICAL PROCESS ON THE CONTENT OF NATURAL ACTIVE PRINCIPLES FROM FRUIT WINES AND ITS BENEFICIAL HEALTH EFFECTS.....	47
<b>Malcolm Watson</b> ADSORBENT MATERIALS: RECENT ADVANCES IN WATER TREATMENT.....	48
<b>Slavica Lazarević</b> SEPIOLITE-BASED NANOMATERIALS: STRUCTURE, PROPERTIES, AND APPLICATIONS FOR THE REMOVAL OF POLLUTANTS FROM WATER SOLUTIONS.....	49
<b>Samo B. Hočevar</b> DEVELOPMENT OF DISPOSABLE TRACE METAL SENSORS, BIOSENSORS, AND GAS SENSORS USING VARIOUS MODIFICATION MATERIALS AND SCREEN-PRINTED ELECTRODES.....	50
<b>Nikola Tasić</b> POINT-OF-INTEREST ELECTROCHEMICAL DETECTION OF SARS-CoV-2 VIRUS.....	51

<b>Jelena Isailović</b> INCORPORATION AND STABILIZATION OF $Ti_3C_2T_x$ MXENE INTO THE SENSITIVE $H_2O_2$ GAS SENSING PLATFORM.....	52
<b>Waltraud M. Kriven</b> MULTIFUNCTIONAL, REFRACTORY, GEOPOLYMER COMPOSITES.....	53
<b>Konstantina Lambrinou</b> DEGRADATION OF CVD SiC DURING SYNERGISTIC PROTON IRRADIATION/CORROSION TESTS.....	54
<b>Kamila Komędera</b> MOSSBAUER SPECTROSCOPY OF $BiFeO_3$ -BASED COMPOUND.....	55
<b>Slavko Bernik</b> INFLUENCE OF PARTICULAR DOPANTS ON THE CHARACTERISTICS OF A NOVEL $ZnO-Cr_2O_3$ -BASED VARISTOR CERAMIC.....	56
<b>Tomislav Ivek</b> COLOSSAL MAGNETORESISTANCE AND METASTABILITY IN $La_{1-x}Ca_xMnO_3$ ( $0.5 \leq x \leq 0.75$ ) THIN FILMS.....	57
<b>Zoran Jovanović</b> PLD GROWTH OF FUNCTIONAL OXIDES ON rGO-BUFFERED SILICON SUBSTRATE.....	58
<b>Nikola Kanas</b> RECENT PROGRESS ON OXIDE THERMOELECTRIC MATERIALS AND DEVICES.....	58
<b>Sanja Perac</b> THERMOELECTRIC $Cu$ DOPED SODIUM COBALTITE – STRUCTURAL, MAGNETIC AND MECHANICAL PROPERTIES.....	59
<b>Dorota Chudoba</b> NANOMATERIALS IN APPLICATION IN BIOMEDICINE.....	78

## ORAL PRESENTATIONS

<b>Sanita Ahmetović</b> SYNTHESIS AND CHARACTERIZATION OF PURE AND Sm-, Zr-doped $TiO_2$ NANOFIBERS AND ITS PHOTOCATALYTIC ACTIVITY.....	61
<b>Jovana Acković</b> CRYSTALLOGRAPHIC INVESTIGATION OF THE IRON PHOSPHATE TUNGSTEN BRONZE (Fe-PWB).....	62
<b>Manuel Gruber</b> EXPLORING THE USE OF ADVANCED CERAMICS FOR SPARK PLUG ELECTRODES OF LARGE GAS ENGINES.....	63

<b>Inga Zhukova</b> DESIGN, SYNTHESIS, AND MECHANICAL PROPERTIES OF DIBORIDE STRUCTURES WITH DIFFERENT MOLAR RATIOS OF TRANSITION METALS (Ti-Zr-Hf-Nb-Ta).....	64
<b>Miloš Dujović</b> DEFORMATION AND FRACTURE RESPONSE OF SINGLE CRYSTAL MAX PHASES.....	65
<b>Mirjana Vijatović Petrović</b> ENHANCED PROPERTIES OF PVDF COMPOSITES BY ACTIVE PHASE SILANIZATION.....	66
<b>Priyanka Reddy</b> NOVEL ELECTRONIC MATERIALS ON THE VERGE OF METALLICITY AND IONICITY.....	67
<b>Damjan Vengust</b> OVERCOMING SYNTHESIS AND DENSIFICATION CHALLENGES TO IMPROVE THE PROPERTIES OF PMN-33PT PIEZOELECTRIC CERAMICS.....	68
<b>Zvezdana Baščarević</b> DURABILITY OF HIGH VOLUME FLY ASH BINDERS.....	68
<b>Jelena Rakić</b> CHEMICAL ACTIVATION OF HIGH VOLUME FLY ASH BINDERS BY SELECTED SODIUM SALTS.....	69
<b>Jelena Zagorac</b> COMPUTATIONAL DISCOVERY OF NEW FEASIBLE CRYSTAL STRUCTURES IN $Ce_3O_3N$ .....	70
<b>Iva Toković</b> EXPERIMENTAL STUDY AND DFT CALCULATION OF $LaMnO_3$ BASED THIN FILMS.....	71
<b>Milan Pejić</b> STRUCTURAL PROPERTIES OF MULTICOMPONENT SOLID SOLUTIONS WITH PYROCHLORE STRUCTURE ON DFT LEVEL.....	72
<b>Uroš Lačnjevac</b> $TiO_2$ NANOTUBE ARRAYS DECORATED WITH IR NANOPARTICLES FOR ENHANCED HYDROGEN EVOLUTION ELECTROCATALYSIS.....	73
<b>Stefan T. Jelić</b> SYNTHESIS OF BISMUTH VANADATE PHOTOCATALYST WITH ENHANCED ADSORPTION PROPERTIES.....	74
<b>Sara Joksović</b> THE DEVELOPMENT OF COST-EFFECTIVE CARBON-BASED TRANSPARENT ELECTRODES IN THE MID-INFRARED REGION.....	75
<b>Aleksandar Malešević</b> HIGH-TEMPERATURE HUMIDITY SENSING ABILITY OF INDIUM-DOPED BARIUM CERATE.....	76

**Zaklina Burghard**

A STRAIGHTFORWARD METHOD FOR SCROLLING PLANAR MATERIALS INTO FREE-STANDING 3D STRUCTURES WITH A SIGNIFICANT REDUCTION IN AREA FOOTPRINT..... 77

**Aleksandar Radojković**

TUNING OF FERROELECTRIC PROPERTIES OF BiFeO<sub>3</sub> CERAMICS BY CATION SUBSTITUTIONS AT BI-SITE AND FE-SITE..... 79

**POSTER PRESENTATIONS**

**Bratislav Todorović**

ELECTRON SPIN RESONANCE OF VANADYL IONS IN THE KAOLINITE STRUCTURE: KGa-1 KAOLINITE (GEORGIA, USA)..... 80

**Milena Rosić**

SYNTHESIS, CHARACTERIZATION AND PHOTOCATALYTIC EXAMINATION OF Co<sub>0,9</sub>Ho<sub>0,1</sub>MoO<sub>4</sub> NANOPOWDERS..... 81

**Tijana B. Vlašković**

SYNTHESIS AND CRYSTAL STRUCTURE OF Ca<sub>0,9</sub>Er<sub>0,1</sub>MnO<sub>3</sub>..... 82

**Božana Petrović**

Mg SUBSTITUTED HYDROXYAPATITE FOR APPLICATION IN BONE TISSUE ENGINEERING..... 83

**Aleksa Luković**

CHARACTERIZATION OF HIGH-ENTROPY A<sub>2</sub>B<sub>2</sub>O<sub>7</sub> PYROCHLORE OBTAINED VIA COMBUSTION SYNTHESIS AND POST-CALCINATION..... 84

**Marija Prekajski Đorđević**

ENTROPY-STABILIZED OXIDES OWNING FLUORITE STRUCTURE: PREPARATION AND SINTERING..... 85

**Jelena Mitrović**

THE INFLUENCE OF SPARK PLASMA SINTERING TEMPERATURE ON THE PROPERTIES OF Sb-DOPED BARIUM STANNATE CERAMICS..... 86

**Vladimir Pavkov**

ANDESITE BASALT AS A NATURAL RAW MATERIAL FOR OBTAINING GLASS-CERAMIC..... 87

**Jana Mužević**

METAL-ORGANIC PEROVSKITES [C(NH<sub>2</sub>)<sub>3</sub>][MII(HCOO)<sub>3</sub>] (M = Cu, Mn and Co).. 88

**Aleksandar Maslarević**

THERMAL SPRAYING OF Ti<sub>2</sub>AlC COATINGS..... 89

**Željko Mravik**

STRUCTURAL MODIFICATION OF GRAPHENE OXIDE/12 TUNGSTO-PHOSPHORIC ACID COMPOSITES VIA ION BEAM IRRADIATION FOR IMPROVED ELECTROCHEMICAL CHARGE STORAGE..... 90

<b>Tamara Škundrić</b> AB INITIO INVESTIGATION OF THE NOVEL Cr <sub>2</sub> SiN <sub>4</sub> COMPOUND UNDER EXTREME PRESSURE CONDITIONS.....	91
<b>Dejan Zagorac</b> THEORETICAL STUDY OF AlN/BN MIXED CHEMICAL SYSTEMS AND THEIR MECHANICAL PROPERTIES.....	92
<b>Tamara Škundrić</b> ENERGY LANDSCAPE EXPLORATION AND CRYSTAL STRUCTURE PREDICTION OF TWO NOVEL COMPOUNDS IN THE Cr-Si-N SYSTEM.....	93
<b>Jelena Zagorac</b> ZnO/ZnS CORE/SHELL NANOSTRUCTURES: EXPERIMENTS COMBINED WITH AB INITIO CALCULATIONS.....	94
<b>Milan Pejić</b> ENERGY LANDSCAPE AND CRYSTAL STRUCTURE INVESTIGATIONS OF LANTHANUM FLUORO SULFIDE LaFS.....	95
<b>Dragana Jordanov</b> ELECTRONIC PROPERTIES OF PREDICTED Y <sub>2</sub> O <sub>2</sub> S USING AB INITIO CALCULATIONS .....	96
<b>Dušica Jovanović</b> DFT STUDY OF GLUTAMINE (L) MOLECULE INTERACTION WITH THE 001 AND 101 ANATASE SLAB SURFACES IN A VACUUM.....	97
<b>Dušica Jovanović</b> DFT STUDY OF NEW HYBRID ORGANIC-INORGANIC PEROVSKITES: GUANIDINIUM-BX <sub>3</sub> SUBSTITUTED BY B = (Sn <sup>2+</sup> , Ge <sup>2+</sup> , Ba <sup>2+</sup> , Zn <sup>2+</sup> ) AND X = (I <sup>-</sup> , Br <sup>-</sup> ).....	99
<b>Vladimir Dodevski</b> EXAMINATION OF IQOS RESIDUE, ENVIRONMENTAL IMPACT AND POTENTIAL APPLICATION.....	100
<b>Vladimir Dodevski</b> EXAMINATION OF DIFFERENT RAW MATERIALS, AS PRECURSORS FOR OBTAINING CARBON MATERIALS.....	101
<b>Sanja Krstić</b> SUPERCAPACITIVE PROPERTIES OF CARBON MATERIALS ACTIVATED BY ALKALI METAL HYDROXIDES OBTAINED FROM SUCROSE.....	102
<b>Nenad Nikolić</b> ZnMn <sub>2</sub> O <sub>4</sub> AS A CATHODE MATERIAL IN AN AQUEOUS SOLUTION OF ZnCl <sub>2</sub> AND Mn(NO <sub>3</sub> ) <sub>2</sub> FOR Zn-ION BATTERIES.....	103
<b>Miroslav Hnatko</b> ELECTROCHEMICAL FABRICATION OF TiO <sub>2</sub> NANOTUBE ARRAYS IN FLUORIDE-FREE SYSTEM.....	104
<b>Željka Milovanović</b> PREPARATION AND CHARACTERIZATION OF SEPIOLITE/ZrO <sub>2</sub> COMPOSITES FOR PHOSPHATE REMOVAL FROM AQUEOUS SOLUTIONS.....	105

<b>Bojana Simović</b> Ag/ZnO NANOCOMPOSITES FOR PHOTOCATALYTIC APPLICATION.....	106
<b>Tijana Stamenković</b> CHARACTERIZATION AND PHOTOCATALYTIC ACTIVITY OF NEWLY SYNTHESIZED Er AND Yb DOPED SrGd <sub>2</sub> O <sub>4</sub> NANOPHOSPHORUS.....	107
<b>Marija Egerić</b> METAL ORGANIC FRAMEWORK/POLYAMIDE ELECTROSPUN NANOFIBERAS MEAN FOR CONGO RED DYE PHOTOCATALYTIC DEGRADATION.....	108
<b>Marko Jelić</b> INFLUENCE OF SWIFT HEAVY ION IRRADIATION ON PHYSICOCHEMICAL PROPERTIES OF BISMUTH-VANADATE.....	109
<b>Bojan Miljević</b> PHOTOCATALYTIC EFFICIENCY ASSESSED IN SOLID STATE PHASE APPLICATION.....	110
<b>Milinko Perić</b> DEVELOPMENT OF Ti <sub>3</sub> C <sub>2</sub> T <sub>x</sub> FOR PHOTOCATALYTIC WATER PURIFICATION..	111
<b>Dragana Milošević</b> THE INFLUENCE OF THERMAL ANNEALING OF Pt-BASED THIN FILMS ON ELECTRO-OXIDATION OF FORMIC ACID.....	112
<b>Mihael Brezak</b> SYNTHESIS OF Eu AND Yb BASED DIRAC SEMIMETALS.....	113
<b>Tijana Stamenković</b> ENHANCEMENT OF UP-CONVERSION LUMINESCENT CHARACTERISTICS OF Yb <sup>3+</sup> /Ho <sup>3+</sup> Co-DOPED Bi <sup>3+</sup> BASED SrGd <sub>2</sub> O <sub>4</sub> NANOPARTICLES.....	113
<b>Svetlana Butulija</b> BACTERIAL CELLULOSE (BC)-CeO <sub>2</sub> NANOCOMPOSITE FILM FOR CHRONIC WOUND TREATMENT.....	114
<b>Jelena Maletaškić</b> SYNTHESIS AND CHARACTERIZATION OF REINFORCED ALUMINA COMPOSITES.....	115
<b>Danica Maksimović</b> ALUMINUM-BASED COMPOSITES REINFORCED WITH CERAMIC FIBERS.....	115
<b>Branko Matović</b> SPS DENSIFICATION OF B <sub>4</sub> C-SiC COMPOSITES.....	117
<b>Milena P. Dojčinović</b> INVESTIGATING NTC THERMISTOR, FERROELECTRIC AND ELECTRIC PROPERTIES OF Fe <sub>2</sub> TiO <sub>5</sub> .....	118
<b>Milena Rosić</b> INFLUENCE OF Gd-DOPING ON ELECTRICAL PROPERTIES IN Ca <sub>1-x</sub> Gd <sub>x</sub> MnO <sub>3</sub> (x=0.05, 0.1, 0.15, 0.2) PEROVSKITES.....	119



<b>Milena Rosić</b> EFFECT OF CoMoO <sub>4</sub> NANOPOWDERS SYNTHESIZED BY GLYCINE NITRATE PROCEDURE AND CALCINATED AT 450 °C ON BRIGGS-RAUSCHER OSCILLATORY DYNAMICS.....	<b>120</b>
<b>Milica Vujković</b> WHAT HAPPENS WHEN BiFeO <sub>3</sub> UNDERGOES POTENTIODYNAMIC POLARIZATION? .....	<b>121</b>
<b>Maria Čebela</b> INFLUENCE OF Ag DOPING ON THE MORPHOLOGICAL AND MAGNETIC PROPERTIES IN CuO NANOPOWDERS.....	<b>122</b>
<b>Karolina Siedliska</b> HYPERFINE INTERACTIONS IN THE HEXAGONAL STRUCTURE OF CuFeO <sub>2</sub> DELAFOSSITE.....	<b>123</b>
<b>Maria Čebela</b> SYNTHESIS, STRUCTURE AND MAGNETIC PROPERTIES OF Fe <sub>2</sub> TiO <sub>5</sub> .....	<b>124</b>
<b>Author Index</b>	<b>125</b>

lead based and lead free flexible films as well as potential use of those films as energy storage and energy harvesting systems were considered.

1. S. Guo et al., *Micromachines*, **11** (2020) 1076.

I-7

## **ENHANCING THE REACTIVITY OF THE INDUSTRIAL FLY ASH IN THE PROCESS OF ALKALI ACTIVATION**

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Over the past few decades a new group of binding materials, geopolymers, have emerged as an alternative to traditional binding materials such as Portland cement. Geopolymers are obtained by the process of alkali activation of various aluminosilicate materials, both natural and synthetic. Of particular importance is the possibility of alkali activation of the industrial waste material such as fly ash. Fly ash (FA) is generated in the process of coal combustion in thermal power plants. In Serbia a small part of fly ash is recycled while the rest is landfilled, causing a serious environmental pollution. Alkali activation represents a process by which fly ash can safely be converted into a useful binding material, suitable for the construction purposes. Geopolymers (or alkali-activated materials) based on fly ash are known for their good compressive strength and good durability in aggressive environments, when properly designed. However, the limiting factor for wider use of fly ash in the process of alkali activation and geopolymers synthesis is its low reactivity and consequent low compressive strength of binding elements. Our research has shown that the reactivity of fly ash in the process of alkali activation can be enhanced by the appropriate choice of the reaction conditions – by mechanical activation of fly ash and by blending with more reactive material such as blast furnace slag (BFS). Both options were explored in this paper and comparison was performed. Mechanical activation of fly ash was conducted in a planetary ball mill, while blends of fly ash and blast furnace slag were prepared with different ratios (FA/(FA+BFS) = 1; 0,75; 0,50; 0,25; 0). Alkali activation was carried out at 95°C by use of sodium silicate solution as an activator. In both cases significant increase of geopolymer compressive strength was observed in respect to the geopolymer based on the initial fly ash. Optimal geopolymer strength was correlated with the chemical composition of the binding gel. Empirical values of optimal gel composition could serve as a basis for tailoring properties of alkali-activated binders based on different precursors. Both alkali-activated systems represent promising routes for geopolymer technology development.