

INSTITUTE OF TECHNICAL SCIENCES OF SASA  
MATERIALS RESEARCH SOCIETY OF SERBIA

*Programme and the Book of Abstracts*

**TWENTY-FIRST YOUNG RESEARCHERS' CONFERENCE  
MATERIALS SCIENCE AND ENGINEERING**

Belgrade, November 29 – December 1, 2023



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**November 29 – December 1, 2023, Belgrade, Serbia**

**Program and the Book of Abstracts**

**Materials Research Society of Serbia  
&  
Institute of Technical Sciences of SASA**

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## **Aim of the Conference**

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

## **Topics**

Biomaterials  
Environmental science  
Materials for high-technology applications  
Materials for new generation solar cells  
Nanostructured materials  
New synthesis and processing methods  
Theoretical modelling of materials

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### Results of the Conference

Beside printed «Program and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal “Tehnika – Novi Materijali”. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2024.

### Sponsors



**ANALYSIS**  
LABORATORY EQUIPMENT

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<sup>3</sup>*University of Belgrade, Institute for Multidisciplinary Research, Kneza Višeslava 1, 11030 Belgrade, Serbia*

**13.45 – 14.00 Ni-MoO<sub>2</sub> as electrocatalyst for hydrogen evolution reaction**

A. Petricevic<sup>1</sup>, Jelena Gojic<sup>1</sup>, Mila Krstajic Pajic<sup>1</sup>, T. Rauscher<sup>2</sup>, Christian Immanuel Bernaecker<sup>2</sup>, Vladimir Jovic<sup>3</sup>

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**14.00 – 14.15 The influence of ZnCl<sub>2</sub> on the capacitance of hydrothermally synthesized vine shoots-derived carbon**

Minea Kapidžić<sup>1</sup>, Jana Mišurović<sup>1</sup>, Veselinka Grudić<sup>1</sup>, Milica Vujković<sup>2</sup>

<sup>1</sup>*University of Montenegro – Faculty of Metallurgy and Technology, Cetinjski put bb, 81000 Podgorica, Montenegro,* <sup>2</sup>*University of Belgrade – Faculty of Physical Chemistry, Studentski trg 12-16, 11158, Belgrade, Serbia*

**14.15 – 14.30 Hydrothermal carbonization of olive mill waste to electrode materials**

Sonja Kastratović<sup>1</sup>, Minea Kapidžić<sup>1</sup>, Danilo Marković<sup>1</sup>, Veselinka Grudić<sup>1</sup>, Milica

Vujković<sup>2</sup>, Jana Mišurović<sup>1</sup>

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**14.30 – 14.45 Break**

**14.45 – 16.15 13<sup>th</sup> Session – Materials for High-technology Application II**

**Chairpersons: Dr. Marina Vuković and Natalia Majewska**

**14.45 – 15.00 Environmentally friendly cell with a rechargeable CF/AgCl-PPy cathode**

Aleksandra S. Popović, Branimir N. Grgur

*TMF, University of Belgrade, Serbia, Karnegijeva 4*

**15.00 – 15.15 The effect of homogenization conditions on microstructure and recrystallization behavior of AA5182 alloy**

Aleksandar Čitić<sup>1</sup>, Miljana Popović<sup>2</sup>, Tamara Radetić<sup>2</sup>, Muhamad Ghulam Isaq Khan<sup>2</sup>

<sup>1</sup>*Military-technical Institute, Belgrade, Serbia,* <sup>2</sup>*Faculty of Technology and Metallurgy, University of Belgrade, Serbia*

**15.15 – 15.30 Geopolymerisation of the kaolin from Bosnia and Herzegovina: Synthesis, characterization and potential application in high-tech ceramics**



13-2

**The effect of homogenization conditions on microstructure and recrystallization behavior of AA5182 alloy**

Aleksandar Ćitić<sup>1</sup>, Miljana Popović<sup>2</sup>, Tamara Radetić<sup>2</sup>, Muhamad Ghulam Isaq Khan<sup>2</sup>

<sup>1</sup>*Military-technical institute, Belgrade, Serbia*

<sup>2</sup>*Faculty of Technology and Metallurgy, University of Belgrade, Serbia*

There is renewed interest in microstructure development at the different stages of the thermo-mechanical processing (TMP) of the 5xxx series aluminum alloys due to the increased demand for sheet material with excellent mechanical properties and formability. This study investigates how homogenization conditions affect the processes of dissolution and precipitation of secondary phases and, further down the processing line, the recrystallization behavior of Al-Mg alloy AA5182. The development of the microstructure from the as-cast state through different stages of TMP was followed by hardness and electrical resistance measurements as well as optical and scanning electron microscopy. As-cast alloy had a dendritic microstructure with Mg<sub>2</sub>Si and Fe/Mn-containing microconstituents. During homogenization at temperatures below 500 °C, partial coagulation of Mg<sub>2</sub>Si microconstituents as well as Mg<sub>2</sub>Si precipitation at the interfaces of Fe/Mn-based microconstituents and as dispersoids occurred. Besides, fine Mn-based dispersoids precipitated in the dendrite cores. Treatment above 500 °C resulted in coagulation and, for a longer treatment time, almost complete dissolution of the Mg<sub>2</sub>Si phase. After homogenization for shorter times, i.e., 4-16 h at 550 °C, coarse rod-like Al<sub>6</sub>(Mn, Fe) dispersoids were observed in the regions close to the interdendritic boundaries. Extending homogenization time resulted in their coarsening and globularization and, finally, dissolution. In dendrite centers, much finer Mn-based dispersoids precipitated, which coarsen with extending homogenization time. Lab hot-rolling was conducted on the samples that underwent various homogenization treatments. It was found that the recrystallization degree and grain morphology are strongly affected by homogenization conditions. Homogenization at low-temperature (16 h/ 490 °C) or for a short time (4 h/550 °C) resulted in a partial recrystallization. Samples homogenized at 550 °C for 16 h or longer appeared recrystallized with only a few long deformed grains in the sheet center, although homogenization with very long treatment times (96 h) resulted in coarser grains.

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