

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

2023

Book title:

Twenty-First Young Researchers' Conference - Materials Science and Engineering:
Program and the Book of Abstracts

Publisher:

Institute of Technical Sciences of SASA
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Tel: +381-11-2636994, 2185263, <http://www.itn.sanu.ac.rs>

Conference organizers:

Materials Research Society of Serbia, Belgrade, Serbia
Institute of Technical Sciences of SASA, Belgrade, Serbia

Editor:

Dr. Smilja Marković

Technical Editor:

Aleksandra Stojičić and Dr. Ivana Dinić

Cover page: Smilja Marković

Cover: Nebojša Labus

Printing:

Gama digital centar
Autoput No. 6, 11070 Belgrade, Serbia
Tel: +381-11-6306992, 6306962
<http://www.gdc.rs>

Publication year: 2023

Print-run:

120 copies

CIP - Каталогизacija у публикацији

Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers Conference Materials Sciences and Engineering (21 ; 2023 ; Beograd)

Program ; and the Book of abstracts / Twenty-first Young Researchers' Conference Materials Science and Engineering, November 29 – December 1, 2023, Belgrade, Serbia ; [organizers] Materials Research Society of Serbia & Institute of Technical Sciences of SASA ; [editor Smilja Marković]. - Belgrade : Institute of Technical Sciences of SASA, 2023 (Belgrade : Gama digital centar). - XX, 99 str. ; 23 cm

Tiraž 120. - Registar.

ISBN 978-86-80321-38-7

а) Наука о материјалима -- Апстракти б) Технички материјали -- Апстракти

COBISS.SR-ID 130053385

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

Acknowledgement

The editor and the publisher of the Book of abstracts are grateful to the Ministry of Science, Technological Development and Innovation of the Republic of Serbia for its financial support of this book and The Twenty-First Young Researchers’ Conference - Materials Sciences and Engineering, held in Belgrade, Serbia.

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Assisted phytostabilization of Pb-contaminated soil using brushite-metakaolin geopolymer materials and *Festuca rubra*

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Lead (Pb) is one of the most common environmental pollutants and high concentrations of this element can cause numerous symptoms of phytotoxicity. Inorganic amendments immobilize metal/metalloid ions and reduce their bioavailability in the soil by increasing pH or by adsorbing them. Adsorption mechanisms include chemical precipitation, ion exchange, and crystal growth. In this experiment, geopolymer materials were newly synthesized from a natural raw kaolinite clay with 2, 4, and 6 wt % (GPB2, GPB4, and GPB6) of pure brushite addition. Previous research has shown that brushite-metakaolin geopolymer materials can be successfully synthesized and that they have significant efficiency in removing lead ions from aqueous solutions. Plant samples were grown under controlled conditions in eight different series using commercial substrate and seeds. Four series contained lead-contaminated soil and were treated with brushite-metakaolin geopolymer materials, while the other four series, which contained uncontaminated soil, were also treated with brushite-metakaolin geopolymer materials and served as control series. The plant samples were taken after six weeks. Lead concentrations in the different plant and soil samples were analyzed using an absorption spectrophotometer (AAS). BCF, BAF and TF were calculated from the results obtained. Moreover, physiological and biochemical experiments were carried out and total antioxidant capacity, total phenols, free proline and photosynthetic pigments (chlorophyll a, chlorophyll b, and carotenoids) contents were measured in different plant samples. The results show different responses to metal/metalloid toxicity in the control and treated plant samples, confirming that there is a significant influence of brushite-metakaolin geopolymer materials on the phytostabilization efficiency of *Festuca rubra*. Phytostabilization is an eco-friendly and cost-effective technique that allows the metals/metalloids to be immobilized in the soil by plants, preventing their migration into the surrounding ecosystem and reducing the chances of them entering the food chain.