

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



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

November 29 – December 1, 2023, Belgrade, Serbia

Program and the Book of Abstracts

**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 - Каталогизација 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

Scientific and Organizing Committee

Committee President

Smilja Marković Institute of Technical Sciences of SASA, Belgrade, Serbia

Vice-presidents

Ivana Dinić Institute of Technical Sciences of SASA, Belgrade, Serbia

Sonja Jovanović Institute of Nuclear Sciences “Vinča”, Belgrade, Serbia

Dorđe Veljović Faculty of Technology and Metallurgy, Belgrade, Serbia

Members

Katarina Cvetanović Institute of Chemistry, Technology and Metallurgy, Belgrade, Serbia

Tatiana Demina Enikolopov Institute of Synthetic Polymeric Materials, Russian Academy of Sciences

Xuesen Du Chongqing University, Chongqing, China

Nenad Filipović Institute of Technical Sciences of SASA, Belgrade, Serbia

Dragana Jugović Institute of Technical Sciences of SASA, Belgrade, Serbia

Marijana Kraljić Roković Faculty of Chemical engineering and Technology, Zagreb, Croatia

Snežana Lazić Universidad Autónoma de Madrid, Spain

Lidija Mančić Institute of Technical Sciences of SASA, Belgrade, Serbia

Bojan Marinković Pontifical Catholic University of Rio de Janeiro, Rio de Janeiro, Brazil

Marija Milanović Faculty of Technology, Novi Sad, Serbia

Miloš Milović Institute of Technical Sciences of SASA, Belgrade, Serbia

Jelena Mitrić Institute of Physics, Belgrade, Serbia

Nebojša Mitrović Faculty of Technical Sciences, Čačak, Serbia

Irena Nikolić Faculty of Metallurgy and Technology, Podgorica, Montenegro

Marko Opačić Institute of Physics, Belgrade, Serbia

Alexander Osmolovskiy Lomonosov Moscow State University, Moscow, Russia

Vuk Radmilović	Faculty of Technology and Metallurgy, Belgrade, Serbia
Milan Radovanović	Technical Faculty in Bor, Serbia
Vladimir Rajić	Institute of Nuclear Sciences “Vinča”, Belgrade, Serbia
Julietta Rau	Institute of the Structure of Matter of the Italian National Research Council (ISM-CNR), Rome, Italy
Ana Stanković	Institute of Technical Sciences of SASA, Belgrade, Serbia
Boban Stojanović	Faculty of Sciences, Kragujevac, Serbia
Ivana Stojković Simatović	Faculty of Physical Chemistry, Belgrade, Serbia
Srečo Škapin	Institute Jožef Stefan, Ljubljana, Slovenia
Konrad Terpiłowski	Department of Interfacial Phenomena, Institute of Chemical Sciences, Faculty of Chemistry, Maria Curie-Skłodowska University in Lublin, Poland
Vuk Uskoković	TardigradeNano, Irvine, CA, USA
Rastko Vasilic	Faculty of Physics, Belgrade, Serbia
Ljiljana Veselinović	Institute of Technical Sciences of SASA, Belgrade, Serbia

Conference Secretary

Aleksandra Stojičić Institute of Technical Sciences of SASA, Belgrade, Serbia

Conference Technical Committee

Katarina Aleksić, Marko Jelić, Rauany Cristina Lopes Francisco, Tamara Matić, Nina Tomić.

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.

5-2

Microplastics in urban soils of Belgrade: Abundance and potential sources

Ivana Mikavica¹, Dragana Randelović¹, Miloš Ilić², Milena Obradović¹, Jovica Stojanović¹,
Jelena Mutić²

¹*Institute for Technology of Nuclear and other Mineral Raw materials, Belgrade, Serbia*

²*University of Belgrade, Faculty of Chemistry, Belgrade, Serbia*

Microplastics (MPs), the long-lasting anthropogenic contaminant omnipresent in the environment, have become a threat to ecosystems' function and living organisms' health, potentially harming the food chain globally. The presence of MPs emerged on a worldwide scale, while the evidence of microplastic particles is already being detected in human tissues. Terrestrial environments are sinks for plastic deposition and are one of the main routes of MPs reaching the groundwater and water bodies. In this regard, urban soils could significantly contribute to overall plastic pollution even though it has been mostly neglected by the research investigations carried out so far. Herein, we investigated MPs abundance in the soils of Belgrade, a city located in the northeast of Serbia, the capital and the most populated city in Serbia. Two sampling points chosen to represent the pollution gradient were the city center zone, close to the highway (BG1), and Košutnjak, the urban forest area around 7 km distant from the center (BG2). MPs extraction was performed using a density separation method, by saturated NaCl solution (1.2 g cm⁻³). Before extraction, soil organic matter was digested by 30% H₂O₂. Found average concentration of MPs was 400 items per kg of dry soil sampled in BG1. Soil from Košutnjak contained no MPs according to our findings. MPs abundance found in sampled soils from Belgrade is in agreement with previous reports analyzing urban areas. Isolated plastic particles were identified and counted using a polarizing microscope (Carl Zeiss Jena Pol-U). All found items were white/transparent fragments, characterized afterward by ATR-FTIR spectroscopy using a Thermo Scientific Nicolet iS50 spectrophotometer. Detected polymer types were polystyrene (PS) and phosphorylated cardanol prepolymer (PCP), suggesting the insulation, packing, and rubber materials as potential pollution sources. Transportation, overload of customer goods and packaging, construction, and building activities are the prevailing anthropogenic origins of MPs accumulation in urban environments. Further investigations will aim to reveal the relations between MPs and other pollutants and the potential impact on soil biota.