

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 Vasilić	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.

09.45 – 10.00 Study of abnormal grain growth in cold-rolled AA5182 Al-Mg alloy

M. Ghulam Isaq Khan¹, Filip Rajković², Miljana Popović¹, Dejan Prelević², Aleksandar Čitić³, Tamara Radetić¹

¹Faculty of Technology & Metallurgy, University of Belgrade, Serbia, ²Faculty of Mining & Geology, University of Belgrade, Serbia, ³Military-Technical Institute, Belgrade, Serbia

10.00 – 10.15 Analysis of the change in structural parameters of mechanically alloyed Cu composite materials using different milling methods

Marko Simić¹, Emilija Nidžović¹, Željko Radovanović², Jovana Ružić¹

¹Department of Materials, “Vinča” Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade, ²Faculty of Technology and Metallurgy, University of Belgrade

10.15 – 10.30 Synthesis and high-temperature / high-pressure exposure of compositionally complex rock-salt-type transitional metal (carbo)nitrides

Dharma Teja Teppala¹, Shrikant Bhat², Leonard Keil¹, Jan Bernauer¹, Johannes Peter³, Hans-Joachim Kleebe³, Emanuel Ionescu^{1,4}

¹Institute for Material Science, Technical University of Darmstadt, 64287 Darmstadt, Germany, ²Photon Science, DESY, 22607 Hamburg, Germany, ³Institute for Applied Geosciences, Technical University of Darmstadt, 64287 Darmstadt, Germany, ⁴Fraunhofer IWKS, Brentanostrasse 2a, 63755 Alzenau, Germany

10.30 – 10.45 Break

**10.45 – 12.15 11th Session – New Synthesis and Processing Methods II
Chairpersons: Dr. Miloš Milović and Katarina Rondović**

10.45 – 11.00 Metabolic insights through nondestructive monitoring: A case study on *Vriesea carinata*

Sara V. Ristić, Anđelija N. Mladenović, Gorana D. Madžarević, Marija M. Petković Benazzouz, Katarina M. Miletić

Faculty of Physics, University of Belgrade, Belgrade, Serbia

11.00 – 11.15 Continuous monitoring of leaf optical properties for the early pathogen detection in sweet chestnut

Anđelija N. Mladenović, Gorana D. Madžarević, Sara V. Ristić, Marija M. Petković Benazzouz, Katarina M. Miletić

Faculty of Physics, University of Belgrade, Belgrade, Serbia

11.15 – 11.30 Real-time detection of early signs of Mg and N deficiency in hydroponically grown *Ocimum basilicum*: An innovative optical approach with nutrient recovery insights

Gorana D. Madžarević, Anđelija N. Mladenović, Sara V. Ristić, Marija M. Petković Benazzouz, Katarina M. Miletić

10-4

Study of abnormal grain growth in cold-rolled AA5182 Al-Mg alloy

M. Ghulam Isaq Khan¹, Filip Rajković², Miljana Popović¹, Dejan Prelević²,
Aleksandar Čitić³, Tamara Radetić¹

¹*Faculty of Technology & Metallurgy, University of Belgrade, Serbia*

²*Faculty of Mining & Geology, University of Belgrade, Serbia*

³*Military-Technical Institute, Belgrade, Serbia*

Studies of recrystallization and grain growth phenomena have a long history, but the causes of abnormal grain growth (AGG) are not well understood. We report on the results of the study of the occurrence of AGG in Al-Mg alloy AA5182. The industrially produced hot band underwent various routes of thermo-mechanical processing: inter-annealing, cold rolling with reductions ranging from 40-85% followed by isochronal anneal (1h) in the temperature range 350-520°C or isothermal treatment at 480°C for various times. The microstructural characterization was conducted by optical microscopy in polarized light and FEG SEM, while the EBSD technique was used for microtexture analysis of the selected states. The results showed that the temperature for the onset of the AGG decreases as the degree of cold reduction increases. The abnormal grains start to appear in the regions close to the surface, i.e., within 1.5 mm from it in the inter-annealed 12 mm thick hot band or 700 μm in the case of cold rolled sheet with 64% reduction. Initially equiaxed, abnormal grains show strong growth anisotropy with much faster growth in the rolling than in the normal direction. Growth anisotropy was attributed to the rod-like shape and alignment of Al₆Mn dispersoids through Zener pinning. With extended annealing, bands of abnormal grains form parallel to the surfaces. Microtexture analysis of the sample with incipient abnormal grains showed the presence of retained rolling texture components in the form of R-fibre. In contrast, the incipient abnormal grains appear to have orientations of cube variants, the texture components which are at or below random level. Since the texture is similar throughout the sheet, it is likely that the AGG starts first in the surface region due to the non-uniform deformation and distribution of the intermetallic particles.

Acknowledgment: This work was supported in part by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Contract No. 451-03-47/2023-01/200135). F. R. and D.P. were financed by the Science Fund of the Republic of Serbia through project RECON TETHYS (7744807). We also gratefully acknowledge the help of the Science Fund of the Republic of Serbia in granting the EBSD instrument and software.

