

INSTITUTE OF TECHNICAL SCIENCES OF SASA
MATERIALS RESEARCH SOCIETY OF SERBIA

Programme and the Book of Abstracts

**TWENTIETH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING**

Belgrade, November 30 – December 2, 2022



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MATERIALS SCIENCE AND ENGINEERING**

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

2022

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Programme and the Book of Abstracts

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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 «Programme 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 2023.

Sponsors



ANALYSIS
LABORATORY EQUIPMENT

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Programme
Twentieth Young Researchers Conference
Materials Science and Engineering

Wednesday, November 30, 2022

09.00 – 09.30 Opening Ceremony

09.30 – 11.15 1st Session – Biomaterials I

Chairpersons: Prof. Dr. Bojana Obradović and Francesco Colella

09.30 – 09.45 Evaluation of cytotoxic and hemostatic effects of polymethylmethacrylate, polymethylmethacrylate enriched with chitosan and polymethylmethacrylate enriched with silver chloride

Nemanja Mladenović¹, Milena Kostić², Nikola Gligorijević², Ljubiša Nikolić³, Perica Vasiljević¹

¹Department of Biology and Ecology, Faculty of Science and Mathematics, University of Niš, 18000 Niš, Serbia, ²Department of Prosthodontics, Faculty of Medicine, University of Niš, 18000 Niš, Serbia, ³Faculty of Technology, University of Niš, 16000 Leskovac, Serbia

09.45 – 10.00 Synthesis and characterization of dental inserts based on calcium-phosphate, doped with magnesium, strontium and fluorine ions

Jelena Stanislavljević¹, Tamara Matić², Zvezdana Bašćarević³, Đorđe Veljović¹

¹University of Belgrade – Faculty of Technology and Metallurgy, Belgrade, Serbia, ²University of Belgrade – Innovation Center of Faculty of Technology and Metallurgy, Serbia, ³Institute for Multidisciplinary Research, University of Belgrade, Serbia

10.00 – 10.15 A pH-Sensor scaffold for mapping spatiotemporal gradients in three-dimensional in vitro tumour models

Riccardo Rizzo¹, Valentina Onesto¹, Stefania Forciniti¹, Anil Chandra¹, Saumya Prasad¹, Helena Iuele¹, Francesco Colella^{1,2}, Giuseppe Gigli^{1,2}, Loretta L. Del Mercato¹

¹Institute of Nanotechnology, National Research Council (CNR-NANOTEC), c/o Campus Ecotekne, via Monteroni, 73100, Lecce, Italy

²Department of Mathematics and Physics “Ennio De Giorgi”, University of Salento, via Arnesano, 73100, Lecce, Italy

10.15 – 10.30 Mechanical properties and bioactivity of scaffolds based on calcium-phosphates doped with Mg²⁺, Sr²⁺ and F⁻ ions and coated with chitosan

Teodora Jakovljević¹, Tamara Matić¹, Julijana Tadić², Đorđe Veljović³

¹Innovation Center of Faculty of Technology and Metallurgy, Serbia, ²Vinča Institute of Nuclear Science, University of Belgrade, Serbia, ³University of Belgrade – Faculty of Technology and Metallurgy, Belgrade, Serbia

10.30 – 10.45 Synthesis and characterization of composite resveratrol/selenium nanomaterial, and preliminary assessment of its' antioxidative effect and biocompatibility

Nina Tomic¹, Nenad Filipovic¹, Dragana Mitic Culafic², Magdalena Stevanovic¹

¹*Institute of Technical Sciences of SASA, Knez Mihailova 35/IV 11000 Belgrade, Serbia*

²*University of Belgrade – Faculty of Biology*

10.45 – 11.00 Stability of phospholipid liposomes with encapsulated *Rosa canina* L. seed oil

Natalija Čutović¹, Jelena Živković¹, Katarina Šavikin¹, Branko Bugarski², Aleksandar Marinković², Danica Čujić³, Aleksandra A. Jovanović³

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Karnegijeva 4, 11000 Belgrade, Serbia, ³*Institute for the Application of Nuclear Energy INEP, Banatska 31b, 11080 Zemun, Belgrade, Serbia*

11.00 – 11.15 Encapsulation of nutrients using proteins derived from leaves

Olivera Vukoičić¹, Neda Pavlović², Zorica Knežević-Jugović¹

¹*University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11120 Belgrade, Serbia,* ²*University of Belgrade, Innovation Center of Faculty of Technology and Metallurgy, Karnegijeva 4, 11120 Belgrade, Serbia*

11.15 – 11.30 Break

11.30 – 13.15 2nd Session – Biomaterials II

Chairpersons: Dr. Ivana Drvenica and Ivana Banićević

11.30 – 11.45 Development of a physiologically relevant osteosarcoma model based on alginate scaffolds and perfusion bioreactor

Mia Milošević^{1,2}, Ivana Banićević¹, Marija Pavlović¹, Milena Milivojević³, Milena Stevanović^{3,4,5}, Jasmina Stojkowska^{1,2}, Bojana Obradović¹

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²*Innovation Center of the Faculty of Technology and Metallurgy, Belgrade, Serbia,*

³*University of Belgrade, Belgrade, Institute of Molecular Genetics and Genetic Engineering, Serbia,* ⁴*University of Belgrade, Faculty of Biology, Belgrade, Serbia,* ⁵*Serbian Academy of Sciences and Arts, Belgrade, Serbia*

11.45 – 12.00 Cellular self-assembly in a 3D osteosarcoma culture model based on alginate scaffolds and perfusion bioreactor

Ivana Baničević¹, Ksenia Menshikh², Mia Radonjić¹, Jelena Petrović¹, Radmila Janković³, Milena Milivojević⁴, Milena Stevanović^{4,5,6}, Jasmina Stojkowska^{1,7}, Bojana Obradović¹

¹University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia, ²Center for Translational Research on Autoimmune and Allergic Diseases–CAAD, Università del Piemonte Orientale, Italy, ³University of Belgrade, School of Medicine, Belgrade, Serbia,

⁴University of Belgrade, Institute of Molecular Genetics and Genetic Engineering, Belgrade, Serbia, ⁵University of Belgrade, Faculty of Biology, Belgrade, Serbia, ⁶Serbian Academy of Sciences and Arts, Belgrade, Serbia, ⁷Innovation Center of the Faculty of Technology and Metallurgy, Belgrade, Serbia

12.00 – 12.15 Osteosarcoma *In Vitro*: a Step-by-Step Approach

Ksenia Menshikh¹, Ivana Banicevic², Mia Radonjic², Marta Miola³, Jasmina Stojkowska^{2,4}, Andrea Cochis¹, Bojana Obradovic², Lia Rimondini¹

¹Università del Piemonte Orientale, Center for Translational Research on Autoimmune and Allergic Disease, Novara, Italy, ²University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia, ³Politecnico di Torino, Institute of Materials Engineering and Physics, Turin, Italy, ⁴Innovation Center of the Faculty of Technology and Metallurgy, Belgrade, Serbia

12.15 – 12.30 Optimization of cell culture conditions for neural differentiation of NT2/D1 cells in alginate microfibers

Jelena Pejić¹, Marija Mojsin¹, Jasmina Stojkowska², Milena Stevanović^{1,3,4}, Bojana Obradović⁵, Milena Milivojević¹

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12.30 – 12.45 Glucosomes: Magnetically induced controlled release of glucose modified liposomes

Đorđe Cvjetinović^{1,2}, Zorana Milanović³, Marija Mirković³, Jelena Petrović³, Ana Vesković², Ana Popović-Bijelić², Drina Janković³, Sanja Vranješ-Đurić³

¹Laboratory of Radiochemistry, Paul Scherrer Institut Villigen, Switzerland, ²Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia, ³Vinča Institute of Nuclear Sciences, University of Belgrade, Belgrade, Serbia

12.45 – 13.00 Bioactives preservation of everlasting (*Helichrysum plicatum* L.) flowers extract by freeze drying method and powder characterisation

Zorana Mutavski¹, Nada Čujić Nikolić¹, Milica Radan¹, Dubravka Bigović¹, Smilja Marković², Katarina Šavikin¹

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13.00 – 13.15 Microencapsulation of Oregano and Thyme essential oils with hydroxypropyl- β -cyclodextrin

Snežana Kuzmanović Nedeljković¹, Nada Čujić Nikolić¹, Dubravka Bigović¹, Predrag Petrović², Dejan Pljevljakušić¹, Katarina Šavikin¹, Brankica Filipić³

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13.15 – 14.15 Lunch break

14.15 – 15.45 3rd Session – Biomaterials III

Chairpersons: Dr. Đorđe Veljović and Marta Tavoni

14.15 – 14.30 Bioactive hydroxyapatite/chitosan/poly(vinyl alcohol)/gentamicin composite coating electrodeposited on titanium

Milena Stevanović¹, Ana Janković¹, Marija Djošić², Maja Vukašinović-Sekulić¹, Vesna Kojić³, Vesna Mišković-Stanković⁴

¹*Faculty of Technology and Metallurgy, Karnegijeva 4, Belgrade, Serbia,* ²*Institute for technology of nuclear and other mineral raw materials, Bulevar Franš d'Eperea 86, Belgrade, Serbia,* ³*Oncology Institute of Vojvodina, Faculty of Medicine, University of Novi Sad, Put Dr Goldmana 4, Sremska Kamenica, Serbia,* ⁴*Faculty of Ecology and Environmental Protection, University Union - Nikola Tesla, Cara Dušana 62-64, 11158 Belgrade, Serbia*

14.30 – 14.45 Properties of Ti-O ALD films on CN_x and nanolayer TiAlSiN PVD coatings intended for orthopedic implant applications

Zoran Bobić¹, Vladimir Terek¹, Lazar Kovačević¹, Branko Škorić¹, Attila Csik², Miha Čekada³, Ivan Čapo⁴, Pal Terek¹

¹*University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia,* ²*Institute for Nuclear Research, Debrecen, Hungary,* ³*Jožef Stefan Institute, Ljubljana, Slovenia,* ⁴*University of Novi Sad, Faculty of Medicine, Novi Sad, Serbia*

14.45 – 15.00 Toward new therapies for the treatment of bone cancer: calcium phosphate-based cement as tuneable system for Doxorubicin delivery

Marta Tavoni¹, Massimiliano Dapporto¹, Laura Mercatali², Alessandro De Vita², Anna Tampieri¹, Michele Iafisco¹, Simone Sprio¹

¹*Institute of Science, Technology and Sustainability for Ceramic Materials Development – National Research Council of Italy (ISSMC-CNR), Faenza, Italy,* ²*Osteoncology and Rare Tumors Center, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori, Meldola, Italy*

15.00 – 15.15 Synthesis and Rheological Evaluations of Ion-Doped Calcium Phosphate-Based Bioceramic for Bone Regeneration

Zahid Abbas^{1,2}, Massimiliano Dapporto¹, Anna Tampieri¹, Simone Sprio¹

¹*Istituto di Scienza, Tecnologia e Sostenibilità per lo Sviluppo dei Materiali Ceramici-Consiglio Nazionale Delle Ricerche (ISSMC-CNR), 48018 Faenza, Italy,* ²*University of Bologna, 40126 Bologna, Italy*

15.15 – 15.30 In Vitro Cytotoxicity of Dental Composites: A Systematic Review

Bota Sergiu-David¹, Chețe Sofia¹, Negruț Daria¹, Moldovan Ioana¹, Lăcătușu Răzvan¹, Mate Diana-Denisa¹, Meda Lavinia Negruțiu^{1,2}, Romînu Mihai^{1,2}, Cîrligeriu Laura Elena¹, Sinescu Cosmin^{1,2}

¹*School of Dental Medicine, "Victor Babes" University of Medicine and Pharmacy of Timisoara, 300070 Timisoara, Romania,* ²*Research Center in Dental Medicine Using Conventional and Alternative Technologies, "Victor Babes" University of Medicine and Pharmacy of Timisoara, 300070 Timisoara, Romania.*

15.30 – 15.45 Cartilage regeneration: innovative molecules and systems to improve healing and counteract arthritis

Scalia, A.C.¹, Bonifacio, M.A.², Cochis, A.¹, Cometa, S.³, Scalzone, A.⁴, Gentile, P.⁴, Procino, G.⁵, Milano, S.⁵, De Giglio, E.², Rimondini, L.¹

¹*Department of Health Sciences, University of Piemonte Orientale UPO, Center for Translational Research on Autoimmune and Allergic Diseases (CAAD), Novara, Italy;* ²*Department of Chemistry, University of Bari "Aldo Moro", Bari, Italy;* ³*Jaber Innovation s.r.l., Rome, Italy;* ⁴*School of Engineering, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK;* ⁵*Department of Biosciences, Biotechnologies and Biopharmaceutics, University of Bari "Aldo Moro", Bari, Italy;*

15.45 – 16.00 Break

16.00 – 18.00 4th Session – Theoretical Modeling of Materials

Chairpersons: Dr. Marko Opačić and Iva Toković

16.00 – 16.15 LaMnO₃ thin films: Experimental study and a DFT calculation

Iva Toković¹, Danica Piper¹, Jelena Vukmirović¹, Sara Joksović², Jovana Stanojević², Branimir Bajac², Marija Milanović¹, Stevan Armaković³, Vladimir Srđić¹

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16.15 – 16.30 Influence of layer thickness and external bias variation on intersubband absorption in n-doped BaSnO₃ symmetric quantum wells

Novak Stanojević¹, Jelena Radovanović^{1,2}, Nikola Vuković^{1,2}

¹University of Belgrade, School of Electrical Engineering, Bulevar kralja Aleksandra 73, 11120 Belgrade, Serbia, ²Centre for light-based research and technologies COHERENCE, Belgrade, Serbia

16.30 – 16.45 Role of halogen substituents in the design of halogen-containing high-energy materials

Aleksandra B. Đunović¹, Ivana S. Veljković², Vanja Šajatović³, Dušan Ž. Veljković³

¹Innovation Center of the Faculty of Chemistry, Belgrade, Serbia, ²Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Belgrade, Serbia, ³University of Belgrade - Faculty of Chemistry, Belgrade, Serbia

16.45 – 17.00 Tris-(nitroacetylacetonato) complexes as new high-energy materials

Danijela S. Kretić¹, Ivana S. Veljković², Nikola Marković¹, Dušan Ž. Veljković¹

¹University of Belgrade-Faculty of Chemistry, Studentski trg 12-16, 11000 Belgrade, Serbia; ²University of Belgrade-Institute of Chemistry, Technology and Metallurgy, Department of Chemistry, Njegoševa 12, 11000 Belgrade, Serbia

17.00 – 17.15 Molecular modeling of selected methylimidazolium ionic liquids using GROMACS simulation software

Ivona Đorđević¹, Milana Zarić², Ivona Radović¹

¹University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11120 Belgrade, Serbia, ²University of Belgrade, Institute of Chemistry, Technology, and Metallurgy-National Institute of Republic of Serbia, Njegoševa 12, 11000 Belgrade, Serbia

17.15 – 17.30 The Effects of Alloying Elements on Mechanical Properties of NIOMOL 490K steel

Ana Maksimovic¹, Ljubica Milovic², Bojana Zecevic¹, Branislav Djordjevic³, Vujadin Aleksic⁴

¹*Innovation Centre, Faculty of Technology and Metallurgy, 4 Karnegijeva St, 11120 Belgrade, Serbia,* ²*University of Belgrade, Faculty of Technology and Metallurgy, 4 Karnegijeva St, 11120 Belgrade, Serbia,* ³*Innovation Centre, Faculty of Mechanical Engineering, 16 Kraljice Marije St. 11120 Belgrade, Serbia,* ⁴*Institute for Testing of Materials-IMS Institute, 43 Bulevar Vojvode Mišića St.11040 Belgrade, Serbia*

17.30 – 17.45 Characterization of fracture behavior of a low carbon microalloyed steel for elevated temperature application

Bojana Zečević¹, Ana Maksimović¹, Ljubica Milović², Vujadin Aleksić³, Srđan Bulatović³

¹*Innovation Centre of the Faculty of Technology and Metallurgy, 4 Karnegijeva St, 11120 Belgrade, Serbia,* ²*University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia,* ³*Institute for Testing of Materials-IMS Institute, Belgrade, Serbia*

17.45 – 18.00 Calibration of Discrete Element Method Parameters to Simulate a Planetary Ball Mill

Mohsen Mhadhbi

Laboratory of Useful Materials, National Institute of Research and Physicochemical Analysis, Technopole Sidi Thabet 2020 Ariana, Tunisia

Thursday, December 1, 2022

09.00 – 10.45 5th Session – Nanostructured Materials I
Chairpersons: Dr. Vuk Radmilović and Jelena Rmuš

09.00 – 09.15 High-temperature tribological testing of magnetron sputtered nanolayered TiAlN/TiSiN coating deposited on tool steel

Vladimir Terek¹, Lazar Kovačević¹, Peter Panjan², Zoran Bobić¹, Aljaž Drnovšek², Branko Škorić¹, Pal Terek¹

¹*University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia,* ²*Jožef Stefan Institute, Ljubljana, Slovenia*

09.15 – 09.30 The role of copper doping on physicochemical properties of bismuth vanadate

Marko Jelić¹, Igor Pašti², Bojana Nedić Vasiljević², Jelena Erčić¹, Danica Bajuk-Bogdanović², Zoran Jovanović¹, Sonja Jovanović¹

¹*Vinča Institute of Nuclear Sciences – National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia,* ²*Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia*

09.30 – 09.45 Mechanochemically modified composites of molybdenum disulfide and graphene oxide for hydrogen evolution reaction

Jelena Rmuš¹, Blaž Belec², Željko Mravik¹, Sara Mijaković¹, Zoran Jovanović¹, Ivana Stojković Simatović³, Sandra Kurko¹

¹Department of physics, Center of excellence for hydrogen and renewable energy (CONVINCE), Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade, P.O. Box 522, 11001 Belgrade, Serbia, ²Materials Research Laboratory, University of Nova Gorica, Vipavska cesta 13, 5000 Nova Gorica, Slovenia, ³Faculty of Physical Chemistry, University of Belgrade, P.O. Box 47, 11158 Belgrade, Serbia

09.45 – 10.00 Investigation of Dissolution and Redeposition Mechanisms of High Surface Area Carbon Supported Pt alloys for Oxygen Reduction Reaction in Low Temperature Proton Exchange Membrane Fuel Cells

Armin Hrnjić^{1,2}, Ana-Rebeka Kamšek¹, Andraž Pavlišič³, Francisco Ruiz-Zapeda¹, Matija Gatalo¹, Leonard Moriau¹, Primož Jovanović¹, Nejc Hodnik^{1,2}

¹Department for Materials Chemistry, National Institute of Chemistry, Hajdrihova 19, SI-1000 Ljubljana, Slovenia, ²University of Nova Gorica, Vipavska 13, 5000 Nova Gorica, Slovenia, ³Department of Catalysis and Chemical Reaction Engineering, National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia

10.00 – 10.15 Electrochemically-grown chloride-free Cu₂O nanocubes favorably electroreduce CO₂ to methane: The interplay of appropriate electrochemical protocol
Stefan Popović^{1,2}, Mohammed Azeezulla Nazrulla¹, Primož Šket³, Khaja Mohaideen Kamal⁴, Blaž Likozar⁴, Luka Suhadolnik⁵, Luka Pavko¹, Angelija Kjara Surca¹, Marjan Bele¹, Nejc Hodnik^{1,2}

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10.15 – 10.30 Lithium-ion insertion into anatase TiO₂ nanotube arrays at room temperature

Nemanja Latas^{1,2}, Nikola Cvjetičanin¹, Vladimir Rajić²

¹University of Belgrade - Faculty of Physical Chemistry, Studentski Trg 12-16, 11158 Belgrade, Serbia, ²University of Belgrade - Department of Atomic Physics, INS Vinča – National Institute of the Republic of Serbia, Mike Alasa 12-14, 11001 Belgrade, Serbia

10.30 – 10.45 Tuning the Stability of Graphene Derived Carbon Support in Polymer Electrolyte Membrane Fuel Cell Electrocatalysts

Luka Pavko¹, Matija Gatalo¹, Francisco Ruiz-Zepeda¹, Matjaž Finšgar², Nejc Hodnik¹, Boštjan Genorio³, Miran Gaberšček¹

¹National Institute of Chemistry, Hajdrihova 19, 1001 Ljubljana, Slovenia, ²Faculty of Chemistry and Chemical Engineering, University of Maribor, Smetanova 17, 2000 Maribor, Slovenia, ³Faculty of Chemistry and Chemical Technology, University of Ljubljana, Večna pot 113, 1001 Ljubljana, Slovenia

10.45 – 11.00 Break

11.00 – 12.45 6th Session – Nanostructured Materials II Chairpersons: Dr. Nadica Abazović and Željko Mravik

11.00 – 11.15 Galvanostatic charge/discharge of thermally treated and ion-beam irradiated graphene oxide/12-tungstophosphoric acid nanocomposites

Željko Mravik¹, Jelena Rmuš¹, Blaž Belec², Andrzej Olejniczak^{3,4}, Nikita Kirilkin³, Nemanja Gavrilov⁵, Vladimir Skuratov³, Zoran Jovanović¹

¹Center of Excellence for Hydrogen and Renewable Energy (CONVINCE), Laboratory of Physics, Vinča Institute of Nuclear Sciences, University of Belgrade, P.O. Box 522, 11001 Belgrade, Serbia, ²Materials Research Laboratory, University of Nova Gorica, Vipavska 11c, 5270 Ajdovščina, Slovenia, ³Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, 141980 Dubna, Moscow region, Russia, ⁴Faculty of Chemistry, Nicolaus Copernicus University, Gagarina 7, 87-100 Toruń, Poland, ⁵Faculty of Physical Chemistry, University of Belgrade, P.O. Box 47, 11158, Belgrade, Serbia

11.15 – 11.30 Determination of electrochemically active surface area of Ir-based catalysts for oxygen evolution reaction

Anja Lončar^{1,2}, Primož Jovanović¹, Nejc Hodnik^{1,2}, Miran Gaberšček^{1,3}

¹Department of Materials Chemistry, National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia, ²University of Nova Gorica, Vipavska 13, SI-5000 Nova Gorica, Slovenia, ³Faculty of Chemistry and Chemical Technology, University of Ljubljana, Večna pot 113, SI-1000 Ljubljana, Ljubljana

11.30 – 11.45 Atomically resolved structural changes of TiON-supported Ir oxygen evolution reaction catalyst

Ana Rebeka Kamšek^{1,2}, Anja Lončar^{1,3}, Gorazd Koderman Podboršek^{1,4}, Marjan Bele¹, Luka Suhadolnik⁵, Primož Jovanović¹, Nejc Hodnik^{1,3,4}

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11.45 – 12.00 The biocorrosion activity of ZnO-based materials as biosensors

Katarina Aleksić¹, Ana Stanković¹, Ljiljana Veselinović¹, Ivana Stojković Simatović², Smilja Marković¹

¹*Institute of Technical Sciences of SASA, Belgrade, Serbia*, ²*University of Belgrade, Faculty of Physical Chemistry, Belgrade, Serbia*

12.00 – 12.15 Taming the morphology of ZnO nanomaterials with chemistry

Zorica Novakovic¹, Snežana, Papović¹, Marko Radović², Branimir Bajac²

¹*University of Novi Sad, Faculty of Sciences, Novi Sad, Republic of Serbia*, ²*University of Novi Sad, BioSense Institute, Novi Sad, Republic of Serbia*

12.15 – 12.30 Mechanical Properties of Jute/nano-ZrO₂ Composite Laminates

Jelena D. Gržetić, Slavko Mijatov, Marica Bogosavljević, Tihomir Kovačević, Saša Brzić, Danica M. Bajić

Military Technical Institute, Ratka Resanovića 1, Belgrade, Serbia

12.30 – 12.45 Effect of disorder and electron-phonon interaction on 2H-TaSe_{2-x}S_x lattice dynamics probed by Raman spectroscopy

Jovan Blagojević¹, Sanja Đurđić Mijin¹, Jonas Bekaert², Milorad Milošević², Čedomir Petrović³, Yu Liu³, Marko Opačić¹, Zoran Popović^{1,4} and Nenad Lazarević¹

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12.45 – 13.45 Lunch break

13.45 – 15.30 7th Session – Nanostructured Materials III

Chairpersons: Dr. Sonja Jovanović and Tea Belojica

13.45 – 14.00 Crystal structure of InSiTe₃ studied by Raman spectroscopy

Ana Milosavljević¹, Sanja Đurđić¹, Tea Belojica¹, Andrijana Šolajić¹, Jelena Pešić¹, Bojana Višić¹, Yu Liu², Čedomir Petrović², Zoran V. Popović^{1,3}, Nenad Lazarević¹

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14.00 – 14.15 Optical properties of nanostructured multi-stoichiometric tungsten suboxides

Bojana Višić^{1,2,3}, Luka Pirker^{1,3}, Marko Opačić², Ana Milosavljević², Nenad Lazarević², Boris Majaron^{3,4}, Maja Remškar¹

¹Department of Condensed Matter Physics, Jozef Stefan Institute, Jamova Cesta 39, 1000 Ljubljana, Slovenia, ²Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia, ³Department of Complex Matter, Jozef Stefan Institute, Jamova 39, 1000 Ljubljana, Slovenia, ⁴Faculty of Physics and Mathematics, University of Ljubljana, Jadranska 19, Slovenia

14.15 – 14.30 Development of Self-assembling Bioactive Hydroxyapatite Nanorods

Federico Pupilli^{1,2}, Andrea Ruffini¹, Anna Tampieri¹, Simone Sprio¹

¹Institute of Science, Technology and Sustainability for Ceramic Materials, Development – National Research Council of Italy (ISSMC-CNR), Faenza, Italy, ²University of Padua, Italy

14.30 – 14.45 Chitosan-stabilized magnetic nanoparticles for application in medicine

I. Khmara¹, O. Strbak², M. Molcan¹, A. Antosova¹, Z. Gazova¹, M. Kubovcikova¹, I. Antal¹, V. Zavisova¹, M. Koneracka¹

¹Institute of Experimental Physics, SAS, Watsonova 47, Kosice, Slovakia, ²Biomedical Center Martin, JFM CU, Mala Hora 4, 03601 Martin, Slovakia

14.45 – 15.00 Nanostructured TiO₂@SiO₂@FeO_x: Application in photocatalysis

Filip Koldžić, Aleksandra Dapčević

University of Belgrade – Faculty of Technology and Metallurgy, Serbia

15.00 – 15.15 Thermo-physical properties of epoxy resin reinforced by single-walled and multi-walled carbon nanotubes

Illia Zhydenko^{1,2}, Dmytro Chalyy¹, Halyna Klym^{2,3}, Ivan Karbovnyk^{2,3}

¹Lviv State University of Life Safety, Lviv, Ukraine, ²Lviv Polytechnic National University, Lviv, Ukraine, ³Ivan Franko National University of Lviv, Lviv, Ukraine

15.15 – 15.30 Free-volume transformation in the BaGa₂O₄ ceramics caused by Eu³⁺ Ions

Halyna Klym^{1,2}, Yuriy Kostiv¹

¹Lviv Polytechnic National University, Lviv, Ukraine, ²Ivan Franko National University of Lviv, Lviv, Ukraine

15.30 – 16.00 Break

16.00 – 17.45 8th Session – Materials for New Generation Solar Cells and New Synthesis and Processing Methods

Chairpersons: Dr. Smilja Marković and Jovan N. Lukić

16.00 – 16.15 Thin Film Polyaniline/Silver Nanowires Nanocomposites for Optoelectronic Applications

Jovan N. Lukić, Vuk V. Radmilovic

Faculty of Technology and Metallurgy, University of Belgrade, Serbia

16.15 – 16.30 Solar cells for window applications

Branislav Milenković¹, Đorđe Jovanović², Mladen Krstić³

¹Faculty of Applied Science, Dušana Popovića 22a, 18000, Niš, Department of Mechanical Engineering, ²Mathematical institute of SASA, Kneza Mihaila 36, 11000, Belgrade, Department of Computer Science, ³Faculty of Mechanical and Civil Engineering, Dositejeva 19, 36000, Kraljevo, Department of Mechanical Engineering

16.30 – 16.45 Innovative nondestructive optical method for plant overall health evaluation

Katarina M. Miletić¹, Miloš S. Mošić¹, Marijana Milutinović², Nikola Šušić³, Vidoje B. Kasalica⁴

Faculty of Physics¹, Faculty of Forestry², Institute for Multidisciplinary Research³, Faculty of Mechanical Engineering⁴, University of Belgrade, Belgrade, Serbia

16.45 – 17.00 ³²Si Geochronometer: Radiochemical separation and purification of ³²Si for half-life redetermination

Đorđe Cvjetinović^{1,2}, Mario Veicht^{1,3}, Ionut Mihalcea¹, Dorothea Schumann¹

¹Laboratory of Radiochemistry, Paul Scherrer Institut Villigen, Switzerland, ²Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia, ³École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

17.00 – 17.15 Early and non-invasive diagnosis of malignant and premalignant lesions of the mucosa of the oral cavity through imagistic methods

Daria Negrut^{1,2}, Pricop Marius^{1,2}, Emanuela-Lidia Craciunescu^{1,2}, Sergiu Chebici^{1,2}, Ioana Moldovan^{1,2}, Meda Lavinia Negrutiu^{1,2}, Mihai Rominu^{1,2}, Virgil-Florin Duma^{3,4}, Cosmin Sinescu^{1,2}

¹Universitatea de Medicina si Farmacie “Victor Babes”, Facultatea de Medicina Dentara, Timisoara, Romania, ²Research Center in Dental Medicine Using Conventional and Alternative Technologies, School of Dental Medicine, “Victor Babes” University of Medicine and Pharmacy of Timisoara, 9 Revolutiei 1989 Ave., 300070 Timisoara, Romania, ³Doctoral School, Polytechnic University of Timisoara, 1 Mihai Viteazu Ave., 300222 Timisoara, Romania, ⁴3OM Optomechatronics Group, Aurel Vlaicu University of Arad, 77 Revolutiei Ave., 310130 Arad, Romania

17.15 – 17.30 Photography in dentistry- a new approach

Ioana Moldovan^{1,2}, Emanuela-Lidia Craciunescu^{1,2}, Sergiu Chebici^{1,2}, Daria Negrut^{1,2}, Meda Lavinia Negrutiu^{1,2}, Virgil-Florin Duma^{3,4}, Mihai Rominu^{1,2}, Pricop Marius^{1,2}, Cosmin Sinescu^{1,2}

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17.30 – 17.45 New Concept in Luting Zirconia Crowns

Chete Sofia^{1,2}, Novac Andreea Codruta^{1,2}, Neagu Carina Sonia^{1,2}, Pop Daniela Maria^{1,2}, Craciunescu Emanuela^{1,2}, Rominu Mihai^{1,2}, Negrutiu Meda Lavinia^{1,2}, Moldovan Ioana^{1,2}, Negrut Daria^{1,2}, Serban Christa^{1,2}, Duma Virgil Florin^{2,3,4}, Sinescu Cosmin^{1,2}

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Friday, December 2, 2022

09.00 – 11.00 9th Session – Materials for High-technology Application I
Chairpersons: Dr. Dragana Jugović and Sina Kavak

09.00 – 09.15 Electrodeposition of Ni-Sn alloys on porous Ni substrates as Hydrogen evolution catalysts

J. Gojic¹, A. Petricevic¹, M. Krstajic Pajic¹, T. Rauscher², C.I. Bernaecker², V. Jovic³

¹University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11000 Belgrade, Serbia, ²Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Branch Lab Dresden, Winterbergstraße 28, 01277 Dresden, Germany, ³University of Belgrade, Institute for Multidisciplinary Research, Kneza Višeslava 1, 11030 Belgrade, Serbia

09.15 – 09.30 Satellite Structured Boride Reinforced In718 Based Composite Powder Preparation for Additive Manufacturing

Sina Kavak^{1,2}, Emre Tekoğlu³, M. Lütfi Öveçoğlu¹, Duygu Ağaoğulları^{1,2}

¹*Istanbul Technical University, Faculty of Chemical and Metallurgical Engineering, Department of Metallurgical and Materials Engineering, Particulate Materials Laboratories (PML), Graphene & 2D Materials Laboratory, 34469 Maslak, Istanbul, Türkiye,* ²*Istanbul Technical University, Prof. Dr. Adnan Tekin Materials Science and Production Technologies Applied Research Center (ATARC), 34469 Maslak, Istanbul, Türkiye,* ³*Department of Nuclear Science and Engineering, Massachusetts Institute of Technology, Cambridge, 02139, USA*

09.30 – 09.45 Composite coatings based on Zn-Co alloy and yttrium/samarium with the self-healing effect of substrate

Aleksandra Mijatović, Jelena Bajat

Department of Physical Chemistry and Electrochemistry, Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

09.45 – 10.00 Influence of cold deformation on the hardness and electrical conductivity of the EN AW-7075 aluminum alloy

Avram S. Kovačević, Uroš S. Stamenković

University of Belgrade, Technical faculty Bor

10.00 – 10.15 Hybrid polymer composites epoxy/PVB reinforced with sub-micron and nano-sized BN

Marijana Stalević¹, Milan Vučković¹, Bojana Fidanovski¹, Danica M. Bajić¹

Military Technical Institute, Ratka Resanovića 1, Belgrade, Serbia

10.15 – 10.30 Optimization Studies on Powder Preparation of SiC nanowire and SiC/ZrB₂ particulate reinforced In718 powders for additive manufacturing

Siddika Mertdinç-Ülküseven^{1,2}, Sina Kavak^{1,2}, Emre Tekoğlu³, İlayda Süzer^{1,2},

M. Lütfi Öveçoğlu², Duygu Ağaoğulları^{1,2}

¹*Istanbul Technical University, Faculty of Chemical and Metallurgical Engineering, Department of Metallurgical and Materials Engineering, Particulate Materials Laboratories (PML), Graphene & 2D Materials Laboratory, 34469 Maslak, Istanbul, Türkiye,* ²*Istanbul Technical University, Prof. Dr. Adnan Tekin Materials Science and Production Technologies Applied Research Center (ATARC), 34469 Maslak, Istanbul, Türkiye,* ³*Massachusetts Institute of Technology, Department of Materials Science and Engineering, Cambridge, 02139, MA, USA*

10.30 – 10.45 Infrared and Raman study of narrow-gap semiconductor FeGa₃

C. Martin¹, V. A. Martinez², M. Opačić³, S. Djurdjić-Mijin³, P. Mitrić³, A. Umićević⁴, V. N. Ivanovski⁴, A. Poudel¹, I. Sydoryk¹, Weijun Ren⁵, R. M. Martin⁶, D. B. Tanner², N. Lazarević³, C. Petrović⁵, and D. Tanasković³

¹Ramapo College of New Jersey, Mahwah, NJ 07430, USA, ²Department of Physics, University of Florida, Gainesville, Florida 32611, USA, ³Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia, ⁴Vinca Institute of Nuclear Sciences – National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia, ⁵Brookhaven National Laboratory, NY 11973, USA, ⁶Montclair State University, Montclair, NJ 07043, USA

10.45 – 11.00 Applying electrically conductive hot melt copolyamide in the additive manufacturing process

Michał Misiak¹, Kamil Majchrowicz¹, Karol Szlązak¹, Paulina Latko-Duralek^{1,2}

¹Warsaw University of Technology, Faculty of Materials Science and Engineering, Woloska 141 Street, 02-507 Warsaw, Poland, ²Technology Partners Foundation, Adolfa Pawinskiego 5A Street, 02-106 Warsaw, Poland

11.00 – 11.15 Break

11.15 – 13.15 10th Session – Materials for High-technology Application II
Chairpersons: Dr. Zoran Jovanović and Tamara Petrović

11.15 – 11.30 Evaporation of polonium from LBE-cooled reactors

Ivan Zivadinovic^{1,2}, Liu Lu², Patrick Steinegger^{1,2}, Jörg Neuhausen²

¹Laboratory of Radiochemistry, Nuclear Energy and Safety Division, Paul Scherrer Institute, Villigen PSI, Switzerland, ²Laboratory of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Zürich, Switzerland

11.30 – 11.45 3D Electrodes for Industrial Alkaline Flow Electrolysers

A. Petricevic¹, J. Gojgic¹, M. Krstajic Pajic¹, T. Rauscher², C.I. Bernaecker², V. Jovic³

¹University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11000 Belgrade, Serbia, ²Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Branch Lab Dresden, Winterbergstraße 28, 01277 Dresden, Germany, ³University of Belgrade, Institute for Multidisciplinary Research, Kneza Višeslava 1, 11030 Belgrade, Serbia

11.45 – 12.00 Hybrid aqueous Ca-ion battery: Design and Performance

Tamara Petrović¹, Miloš Milović², Aleksandra Gezović³, Jana Mišurović³, Veselinka Grudić³, Milica Vujković¹

¹University of Belgrade - Faculty of Physical Chemistry, Belgrade, Serbia, ²Institute of Technical Sciences of SASA, Belgrade, Serbia, ³Faculty of Metallurgy and Technology, University of Montenegro, Podgorica, Montenegro

12.00 – 12.15 Epitaxial growth of metal oxide thin films on semiconductors

Darija Petković, Zoran Jovanović

Laboratory of Physics, Vinča Institute of Nuclear Sciences – National Institute of the Republic of Serbia, Belgrade, Serbia

12.15 – 12.30 PbSe targets for nuclear physics studies

Nadine M. Chiera¹, Emilio Andrea Maugeri¹, Ivan Danilov¹, Javier Balibrea-Correa², Cesar Domingo-Pardo², Ulli Köster³, Jorge Lerendegui-Marco², Mario Veicht¹, Ivan Zivadinovic¹, Dorothea Schumann¹

¹Paul Scherrer Institute, Villigen PSI, Switzerland, ²Instituto de Fisica Corpuscolar, Valencia, Spain, ³Institut Laue-Langevin, Grenoble, France

12.30 – 12.45 Carbon felt/PPy-functionalized/AgCl composite as cathode material for rechargeable Mg cell

Aleksandra S. Popović, Branimir N. Grgur

University of Belgrade Faculty of Technology and Metallurgy Department of Physical chemistry and electrochemistry Karnegijeva 4, 11020 Belgrade, Serbia

12.45 – 13.00 Synthesis and Characterization of Al-x(Hf_{0.2}Ti_{0.2}Zr_{0.2}V_{0.2}Nb_{0.2})B₂ (x = 1, 2, 5, 10, 15 wt.%) Composites

İlayda Süzer^{1,2}, A. Saruhan Tekinşen¹, Yunus Emre Özçakıcı¹, Sıddıka Mertdin³-Ülküseven^{1,2}, Kübra Gürcan Bayrak³, Erhan Ayas³, M. Lütfi Öveçoğlu¹, Duygu Ağaoğulları^{1,2}

¹Istanbul Technical University, Faculty of Chemical and Metallurgical Engineering, Department of Metallurgical and Materials Engineering, Particulate Materials Laboratories (PML), 34469 Maslak, Istanbul, Türkiye, ²Istanbul Technical University, Prof. Dr. Adnan Tekin Materials Science and Production Technologies Applied Research Center (ATARC), 34469 Maslak, Istanbul, Türkiye, ³Eskişehir Technical University, Faculty of Engineering, Department of Materials Science and Engineering, İki Eylül Campus, 26555, Eskişehir, Türkiye

13.00 – 13.15 Screening for novel bioconverters of animal husbandry wastes into valuable substances

Anna Shestakova^{1,2}, Elizaveta Popova¹, Alexander Osmolovskiy¹

¹Department of Microbiology, Faculty of Biology, Lomonosov Moscow State University; Russia, 119234, Moscow, Leninskie gory, 1, building 12, ²Faculty of Biology and Biotechnology, HSE University; Russia 101000, Moscow, st. Myasnitskaya, 20.

13.15 – 14.15 Lunch break

14.15 – 16.15 11th Session – Environmental Materials I

Chairpersons: Dr. Ljiljana Damjanović-Vasilčić and Jana Petrović

14.15 – 14.30 Heterojunctions based on g-C₃N₄ for the photocatalytic reduction of Cr(VI)

Jana Petrović¹, Željko Radovanović², Slavica Lazarević¹, Đorđe Janačković¹, Rada Petrović¹
¹University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia,
²Innovation Center of Faculty of Technology and Metallurgy, Ltd, Belgrade, Serbia

14.30 – 14.45 TiO₂ nanoparticles supported on natural zeolite clinoptilolite from Serbia for removal of bisphenol A from aqueous solution

Srna Stojanović¹, Vladislav Rac², Kristina Mojsilović³, Rastko Vasilčić³, Smilja Marković⁴, Ljiljana Damjanović-Vasilčić¹
¹University of Belgrade-Faculty of Physical Chemistry, Studentski trg 12-16, P.O. Box 47, 11158 Belgrade 118, Serbia, ²University of Belgrade-Faculty of Agriculture, Nemanjina 6, 11080 Belgrade, Serbia, ³University of Belgrade-Faculty of Physics, Studentski trg 12-16, 11000 Belgrade, Serbia, ⁴Institute of Technical Sciences of SASA, Knez Mihailova 35/IV, 11000 Belgrade, Serbia

14.45 – 15.00 Synthesis of biomorphic TiO₂ and its photocatalytic activity in the removal of amitriptyline and ciprofloxacin from the aqueous medium

Dušica Jovanović¹, Marko Radović², Daniela Šojić Merkulov¹, Szabolcs Bognár¹, Nina Finčur¹
¹University of Novi Sad Faculty of Sciences, Department of Chemistry, Biochemistry and Environmental Protection, Trg D. Obradovića 3, 21000 Novi Sad, Serbia, ²BioSense Institute, Dr Zorana Đinđića 1, 21000 Novi Sad, Serbia

15.00 – 15.15 Modified food wastes as potential sorbents for phosphate removal

Anja Antanasković¹, Zorica Lopičić¹, Tatjana Šoštarić¹, Jelena Milojković¹, Vladimir Adamović¹, Danijela Smiljanić², Milan Milivojević²
¹Institute for Technology of Nuclear and Other Mineral Raw Materials, Belgrade, Serbia, ²Faculty of Technology and Metallurgy, University of Belgrade, Serbia

15.15 – 15.30 Sustainable removal of 17 α -ethynilestradiol from aqueous environment, using newly synthesized ZnO-based nanocomposites

Szabolcs Bognár¹, Tamara Ivetić², Nina Finčur¹, Dušica Jovanović¹, Daniela Šojić Merkulov¹
¹University of Novi Sad Faculty of Sciences, Department of Chemistry, Biochemistry and Environmental Protection, Trg Dositeja Obradovića 3, 21 000 Novi Sad, Serbia, ²University of Novi Sad Faculty of Sciences, Department of Physics, Trg Dositeja Obradovića 4, 21 000 Novi Sad, Serbia

15.30 – 15.45 Onion peels as an adsorbent for copper ions biosorption – Kinetic and thermodynamic studies

Miljan Marković, Milan Gorgievski, Nada Štrbac, Vesna Grekulović, Kristina Božinović, Milica Zdravković, Marina Marković

University of Belgrade, Technical Faculty in Bor, Bor, Serbia

15.45 – 16.00 Ultra-high performance fiber reinforced concrete for applications in complex building structures

Bojana Grujić, Žarko Grujić

University of Banja Luka, Faculty of Architecture, Civil Engineering and Geodesy, Banja Luka /Department of Civil Engineering

16.00 – 16.15 Decolorization of azo dye Methyl Orange with crude fungal laccase obtained by growing *Ganoderma spp.* on cereal mix

Nevena Ilić¹, Marija Milić², Slađana Davidović², Anđela Kostić², Katarina Mihajlovski², Suzana Dimitrijević-Branković²

¹*University of Belgrade, Innovation Center of Faculty of Technology and Metallurgy, Belgrade, Serbia,* ²*University of Belgrade, Faculty of Technology and Metallurgy, Department for Biochemical Engineering and Biotechnology, Belgrade, Serbia*

16.15 – 16.30 Break

16.30 – 18.00 12th Session – Environmental Materials II
Chairpersons: Dr. Ana Stanković and Aleksandra Medić

16.30 – 16.45 Pyrimethanil cytotoxic activity on human testicular teratocarcinoma NT2/D1 cells

Aleksandra Medić¹, Danijela Stanisavljević Ninković¹, Andrijana Lazić¹, Milena Aleksić², Marija Schwirtlich¹, Perica Vasiljević², Isidora Petrović¹, Milena Stevanović^{1,3,4}

¹*Institute of Molecular Genetics and Genetic Engineering, University of Belgrade, Vojvode Stepe 444a, PO Box 23, 11010 Belgrade, Serbia,* ²*Department of Biology and Ecology, Faculty of Science and Mathematics, University of Niš, Višegradska 33, 18000 Niš, Serbia,* ³*University of Belgrade, Faculty of Biology, Studentski trg 16, PO box 43, Belgrade, 11000, Serbia,* ⁴*Serbian Academy of Sciences and Arts, Knez Mihailova 35, 11001 Belgrade, Serbia*

16.45 – 17.00 An assessment of tritium deposition on the earth's surface

Emina Tursunović¹, Marija Janković², Marko Daković¹, Nataša Sarap², Jelena Krneta Nikolić², Milica Rajačić², Ivana Vukanac²

¹*University of Belgrade, Faculty of Physical Chemistry, Studentski trg 12-16, 11000 Belgrade,* ²*University of Belgrade, Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, Radiation and Environmental Protection Department, Mike Petrovića Alasa 12-14, 11001 Belgrade*

17.00 – 17.15 Ultrasound procedures for improved protein extraction from pumpkin leaves Cucurbita pepo

Gavrilo Mihajlović¹, Zorica Knežević-Jugović¹

University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11120 Belgrade, Serbia

17.15 – 17.30 Characterization of the historical glass samples

Marija Kovač, Bojan Miljević, Mihajlo Valuh, Snežana Vučetić

University of Novi Sad – Faculty of Technology, Laboratory for Materials in Cultural Heritage (HERITAGELAB), Bulevar cara Lazara 1, 21000, Novi Sad, Serbia

17.30 – 17.45 Quality control of HPGe detectors for gamma spectrometry of environmental samples

Jelena Krneta Nikolić, Milica Rajačić, Ivana Vukanac, Nataša Sarap, Marija Janković

Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, University of Belgrade, Mike Petrovića Alasa 12-14, Belgrade

17.45 – 18.00 Employing EFM as a nondestructive method for studying green corrosion inhibition of copper in chloride environment

Milica Zdravković¹, Vesna Grekulović¹, Nada Štrbac¹, Milan Gorgievski¹, Edina Huseinović², Miljan Marković¹, Kristina Božinović¹

¹University of Belgrade, Technical Faculty in Bor, Bor, Serbia, ²University of Tuzla, Faculty of Natural Sciences and Mathematics, Tuzla, Bosnia and Herzegovina

18.10 Closing Ceremony

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Glucosomes: Magnetically induced controlled release of glucose modified liposomes

Đorđe Cvjetinović^{1,2}, Zorana Milanović³, Marija Mirković³, Jelena Petrović³, Ana Vesković²,
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Novel methods of cancer therapy are constantly being investigated since the current approach heavily relies on the use of non-specific and toxic chemotherapy agents. Ideally, a drug used for cancer therapy would specifically target tumor sites or rather bind specifically with cancer cells. The way to achieve this is by targeting cancer cell specific receptors or receptors present in abnormally high counts at the surface. Rapid proliferation of cancer cells is fueled by large amounts of energy that is in turn produced by abnormal glucose uptake. Because of this high energy/glucose demand, cancer cells exhibit an abnormally high glucose receptor (GLUTs) count on their surface, compared to normal, healthy cells. We have utilized this glucose dependency to create glucose modified liposomes (Glucosomes) that are specifically bound by cancer cells. Glucosomes can be used to transport different substances, either hydrophilic or hydrophobic, and can therefore deliver any type of drug to cancer cells, increasing its efficiency. Another important aspect to consider is the controlled release of the drug being transported in order to maximize therapeutic efficiency. Controlled release can be achieved by utilizing different internal or external influences. In our study, we have used standard Fe₃O₄ magnetic nanoparticles to load glucosomes and induce their controlled opening via an external magnetic field. By applying an external magnetic field, the magnetic nanoparticles start heating up and transferring this thermal energy to the surrounding lipid bilayer, causing its perturbation and opening of the glucosome. Our study has found that controlled release can be achieved with high efficiency while the chemical stability of the Fe₃O₄ nanoparticles stays practically intact. Using EPR spectroscopy, we have shown that Fe₃O₄ nanoparticles remain trapped within the lipid bilayer and are essentially protected from oxidation that would diminish their magnetic properties. Since magnetic Fe₃O₄ nanoparticles are lodged well within the lipid bilayer no thermal damage can be caused to the drug being transported within the glucosome bilayer, making this a viable controlled release cancer targeting drug delivery system.