

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 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 «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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Development of a physiologically relevant osteosarcoma model based on alginate scaffolds and perfusion bioreactor

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Finding a cure for cancer is one of the greatest challenges today and professionals from different areas are working together to overcome it. The lack of adequate model systems is one of the problems since experiments regarding cancer biology and drug testing are mainly conducted on cells in monolayers, followed by animal studies. There is a huge gap between the characteristics of these two model systems, and both systems fail to mimic diseased human tissue completely. A proper model system should mimic *in vivo* diseased tissue, having a tridimensional structure and proper physiologically relevant mechanical and biochemical stimulation. In this work, the first steps were done to establish a model system for osteosarcoma, a tumor that is occurring in bone tissue. Regarding the bone nature, the model is based on a tridimensional porous scaffold composed of 1 wt% alginate and 1 wt% mineral powder β -TCP/hydroxyapatite in conjunction with a perfusion bioreactor. Murine osteosarcoma cells K7M2-wt were seeded onto the scaffolds and cultivated in the perfusion bioreactor for 7 days under the medium superficial flow velocity of 15 $\mu\text{m/s}$, while static cultures served as a control. After the cultivation period cells were metabolically active and retained their proliferation ability, yet the scaffolds started to degrade under cultivation conditions. Porosity of scaffolds was analyzed in order to estimate hydrodynamic conditions which were affecting the cells. Calculated shear stress values were in the range 0.1 – 1 mPa, corresponding to those *in vivo*. The obtained results show the potential of the model system and indicate directions for system optimization in terms of cell seeding procedure and scaffold composition.