

MATERIALS RESEARCH SOCIETY OF SERBIA
INSTITUTE OF TECHNICAL SCIENCES OF SASA



Programme and the Book of Abstracts

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

Belgrade, December 4–6, 2019

<http://www.mrs-serbia.org.rs/index.php/young-researchers-conference>

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MATERIALS SCIENCE AND ENGINEERING**

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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 «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 2020.

Sponsors



ANALYSIS
LABORATORY EQUIPMENT

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**Surface modification of Ti implants by electrophoretic deposition
of hydroxyapatite/chitosan/graphene/gentamicin coating**

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Bone diseases and especially prevalent surgical procedures of total joint replacements in aging population, cause the need for swift development of new biomaterials for bone tissue implants. Nowadays, Ti implants are by far most commonly used in orthopedics, due to their excellent mechanical properties and biocompatibility. Having in mind that biomaterials should stimulate bone tissue regeneration while providing strong support, the Ti implant surface requires modifications to facilitate improved osteointegration. In this work, modification of the titanium surface was carried out by depositing novel composite hydroxyapatite/chitosan/graphene (HAP/CS/Gr) and hydroxyapatite/chitosan/graphene/gentamicin (HAP/CS/Gr/Gent) coatings. Deposition was performed by single-step electrophoretic deposition (EPD) technique from aqueous suspension at constant voltage on pure titanium plates. X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR) and field-emission scanning electron microscopy (FE-SEM) were used to characterize obtained composites and to explore the graphene influence on the composites properties. The results of all performed analyses confirmed the formation of new composite HAP/CS/Gr and HAP/CS/Gr/Gent coatings on Ti. Antibacterial activity kinetics against *Staphylococcus aureus* and *Escherichia coli* was performed in order to evaluate the antibacterial properties of obtained composites. HAP/CS/Gr/Gent coating exhibited excellent antibacterial properties, justifying the gentamicin addition to composites. Encouraging results for potential applications were obtained for cytotoxicity testing towards MRC-5 and L929 cell lines. Good biocompatibility of composites was proven towards both cell lines, with slightly more pronounced effect for human MRC-5 cell line. Summarizing the obtained results it could be safe to state that HAP/CS/Gr/Gent composite represents a prospective material for bone implant coating.

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