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

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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

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Synthesis, characterization and toxicity studies of gelatin modified zinc oxide nanoparticles

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Nanostructured zinc oxides are promising materials for numerous biomedical applications where they can serve as therapeutic agents or tools for sensing and imaging. Despite their favorable properties, wider use of zinc oxide nanoparticles in biomedicine is limited by toxicity issues. Therefore, new synthesis approaches should be devised to obtain zinc oxide nanoparticles which are safe-by-design. We present an innovative low-cost wet precipitation synthesis of gelatin modified zinc oxide nanoparticles at the gel/liquid interface. The diffusion of ammonia through the gelatin hydrogels of different porosities induces precipitation of the product in contact with the surface of the aqueous solution of zinc ions. After thermal treatment of the precipitate, adsorbed organic residues of decomposed gelatin act as modifiers of zinc oxide nanoparticles. We characterized the physicochemical properties of obtained gelatin modified zinc oxide nanoparticles by XRD, FTIR, DTA/TG, and SEM. The synthesized nanoparticles show hexagonal wurtzite structure and form flake-like aggregates. FTIR and DTA/TG analyses indicate that the thermal decomposition of adsorbed gelatin depends on the gelatin content of the hydrogel used in the synthesis. We also examined the viability of HepG2 cells, generation of intracellular reactive oxygen species, and genotoxicity using the MTS, DCFH-DA, and alkaline comet assay, respectively. Fabricated gelatin modified zinc oxide nanoparticles show very low toxicity potential at doses relevant for human exposure.