

FIFTEENTH YOUNG RESEARCHERS' CONFERENCE MATERIALS SCIENCE AND ENGINEERING

**December 7-9, 2016, Belgrade, Serbia
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Program and the Book of Abstracts

**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 materials
Materials for high-technology applications
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 journals “Tehnika – Novi Materijali” and “Processing and Application of Ceramics“. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony.

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2-4

Comparison of the release of selenium nanoparticles from poly (ϵ -caprolactone) microparticles in four different degradation mediums

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One of the most prominent properties of poly (ϵ -caprolactone) (PCL) as a biodegradable polymer is slow degradation rate. Due to this advantage the PCL is often used in versatile systems for drug delivery or tissue engineering. When it comes to drug delivery systems, this property of PCL provides the slow release of encapsulated medicaments in order to avoid acute toxicity i.e. to enhance therapeutic efficiency, or protects medicaments from "aggressive" environment and ensures prolonged effect. Selenium nanoparticles (SeNp) recently gained attention as a potential candidate for cancer therapy and prevention with antibacterial properties as well. The major drawback of SeNp is substantial risk of toxicity. Degradation itself is a function of several material properties as well as the nature of surrounding medium. In this work it is examined the release of SeNp from PCL microparticles during the degradation in four different mediums: phosphate buffered saline (PBS), solution of lipase isolated from porcine pancreas in PBS, 0.1 M hydrochloric acid (HCL) and *Pseudomonas aeruginosa* cell free extract in PBS. The main idea was to compare the release of the selenium nanoparticles in physiological conditions (the first three medium) and in the pathological conditions (the fourth medium), respectively. Firstly, the PCL/SeNp were suspended in adequate medium and placed in water bath at 37 °C. At exact times, samples were collected and examined by different techniques: X-ray diffraction (XRD), inductively coupled plasma-atomic emission spectroscopy (ICP-AES), scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS), differential scanning calorimetry (DSC). The release of selenium nanoparticles in physiological conditions occurred in a very slow manner without burst release while in the presence of bacterial extract the release was much more pronounced, even after 24 h.