

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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The study of mechanical properties of polymers depending on the fillers

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Feasibility of obtaining chemically and mechanically resistant polymer materials is determined by the prospect of their use in a wide range of industries. But the limiting factor of application polymer coatings is the lack of mechanical strength of the products. The solution of this problem is in several directions, one of which is in the introduction of new types of fillers. In present time as fillers use a variety of materials both natural and synthetic origin, from the most common well known carbonate compounds to the most exotic, for example, chitin nanofibers. The promising raw materials for fillers are various technological and household wastes, which are represented by a variety of groups of substances.

This report presents the results of a study on the use as fillers for plastics the cenospheres from coal fly ash of thermal power station and of calcium carbonate from eggshells. As a polymer matrix was used the polyester - polyethylene terephthalate. We are special used diametrically different materials and showed how the mechanical activation influence on the end product.

Using the cenospheres and eggshell as fillers for polymer material is also ambiguous effect on the characteristics of the resulting composite materials. However, it found that the polymeric materials with fly ash and eggs shell as fillers with thin dispersion show better performance of mechanical, water repellency and acid resistance properties than their counterparts on the basis of traditional raw materials.

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pH-sensitive membranes with crosslinked poly(acrylic acid) hydrogel for controlled delivery

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Polymeric pH-sensitive membranes and hydrogels are interesting materials for the controlled delivery of chemical agents triggered by external stimuli. In this contribution, we present a novel membrane design consisting of a polyethersulfone polymeric base and a crosslinked poly(acrylic acid) hydrogel containing pH-responsive carboxyl groups. Membranes were prepared using the modified traditional liquid phase inversion process. Solutions containing all membrane precursors were cast on a glass plate and cured by UV irradiation. UV curing was followed by immersion into the water bath to achieve phase separation and solidification. Obtained membranes exhibited high ion-exchange capacity and a moderate swelling degree dependent on the crosslinker properties. Studies of membrane loading with methylene blue and subsequent release of methylene blue from the membrane into the alkaline and acidic buffered solutions demonstrated pH-dependent delivery kinetics.