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Posters

Denis Mihaela Panaitescu, Res. Rev. J Mat. Sci. 2018, Volume 6
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Porous structures from nanocellulose and biopolymers for biomedical application

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Bacterial cellulose has attracted a lot of interest in the last years due to its extraordinary properties for biomedical applications, high purity, water-uptake capability, good biocompatibility, cell adhesion, proliferation, good mechanical properties and non-toxicity of itself and its degradation products. A key element in tissue engineering is the 3D biomaterial scaffold which mimics the architecture of the Extra Cellular Matrix (ECM). ECM provides structural support for cell attachment, proliferation and differentiation. For this purpose, the 3D scaffolds should possess a network of interconnected pores ensuring cell migration, diffusion of nutrients and clearance of wastes and promoting cell adhesion and cell growth. More than 80% porosity is requested for porous scaffolds to mimic native ECM. Many tissues like heart, cartilages or bones have a fiber-sponge complex architecture and the nanofibrillated network of bacterial cellulose is similar to native ECM as respects biocompatibility, fibers size and assembling. However, the pore size of the cellulose network is much too low than the recommended minimum pore size of 100 microns, which limits cell penetration and migration. Hear we propose new methods to obtain porous biocomposite scaffolds using bacterial cellulose and eco-friendly additives and processes. Bacterial cellulose was modified with different agents and crosslinkers and the properties of the new porous structures were investigated by thermogravimetric analysis, atomic force microscopy, scanning electron microscopy, Fourier transform infrared spectroscopy and dynamic mechanical analysis. This study has shown that highly porous cellulose structures that combine lightweight and stiffness may be obtained by using simple and eco-friendly methods.

Biography

Denis Mihaela Panaitescu has completed her PhD from University Politehnica of Bucharest, Romania. She is a Senior Researcher at ICECHIM. She has published more than 70 papers in reputed journals and has managed several national projects.

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Ioana Chiulan, Res. Rev. J Mat. Sci. 2018, Volume 6
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Influence of nanosilica content on the thermal and mechanical properties of liquid silicone elastomers

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Silicone rubbers are one of the most important polymers, because they possess important properties, such as biocompatibility, large degree of flexibility, hydrophobicity, high gas permeability, high thermal stability, good UV and oxidative resistance. However, pure silicone rubber has poor tensile strength, which limits its practical applications. To overcome this drawback, different inorganic fillers were incorporated such as nano-SiO_2, carbon nanotube, nano-Al_2O_3, clay and so on. The aim of this work was to obtain composites based on liquid silicone rubber and hydrophilic nanosilica (HDK N_20), with good flexibility and tensile strength, as potential biomaterials for pelvic prosthesis. Nanosilica particles were selected as reinforcing filler due its extraordinary properties, such as a very high specific surface area, biocompatibility, high elastic modulus, low density and low material cost. This paper reports the impact of the filler content and sample thickness on the morphology, rheological properties, thermal behavior and tensile strengths before and after flexing tests of the silicone-nanosilica composites. The addition of the nanosilica content up to 3% conducted to a significant increase of the young modulus and the tensile strength.

Biography

Ioana Chiulan has completed his PhD in 2011, from University Politehnica of Bucharest, in the field of thermoresponsive hydrogels. He has an experience of more than 10 years as researcher and her work is focused on different materials for biomedical or packaging applications. He is co-author in more than 19 papers and one book chapter. Raluca Gabor, Cristian Nicolae, Denis Panaitescu and Adriana Frone are highly skilled researchers, specialized in thermal, mechanical and morphological characterization. Elena Radu and Sergiu Stoian are recently graduated students from University Politehnica of Bucharest.

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