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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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