Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION X
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 26-27. September 2022.

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Polyurethane/nanoferrite composite materials: antifungal and nanomechanical properties

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Crosslinked polyurethanes (PUs) based on hyperbranched polyester and poly(dimethylsiloxane) (PDMS), which are thermosetting polymers, are one of the most representative products in the coating applications. To enhance the biomedical properties of PUs, we have attempted to incorporate PDMS as soft segments and silver-ferrite as nanoparticles in order to prepared PU nanocomposites (PU NCs). Silver ferrite nanoparticles were incorporated into crosslinked polyurethanes (PU NCs) with different soft poly(dimethylsiloxane) segments, via *in situ* polymerization. Herein, we report the nanomechanical properties, hydrophobicity and antifungal activities of PU NCs based on poly(dimethylsiloxane), 4,4'-methylenediphenyl diisocyanate and hyperbranched polyester of the second pseudogeneration, with different soft (PDMS) segment content. The nanomechanical properties of PU NCs were investigated by nanoindentation measurements, while the hydrophobicity of PU NCs was measured by water absorption properties. The fungicidal activities of PU NCs were evaluated against *Candida albicans* and *Candida parapsilosis*. PU NCs with lower soft segment content exhibited selective and good antifungal activity toward the tested fungi due to higher hydrophilicity and higher amount of Ag+ ion released. The selective fungicidal activity and low cytotoxicity of PU NCs with good nanomechanical properties ensure it is a candidate as coatings for medical devices.
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