Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION XI
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, 18-20. September 2023.

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Dear colleagues and friends,

We have great pleasure to welcome you to the Advanced Ceramic and Application XI Conference organized by the Serbian Ceramic Society in cooperation with the Institute of Technical Sciences of SASA, Institute of Chemistry Technology and Metallurgy, Institute for Technology of Nuclear and Other Raw Mineral Materials and Institute for Testing of Materials.

It is nice to host you here in Belgrade in person. We are very proud that we succeeded in bringing the scientific community together again and fostering the networking and social interactions around an interesting program on emerging advanced ceramic topics. The chosen topics cover contributions from fundamental theoretical research in advanced ceramics, computer-aided design and modeling of new ceramics products, manufacturing of nano-ceramic devices, developing of multifunctional ceramic processing routes, etc.

Traditionally, ACA Conferences gather leading researchers, engineers, specialists, professors and PhD students trying to emphasize the key achievements which will enable the widespread use of the advanced ceramics products in the High-Tech industry, renewable energy utilization, environmental efficiency, security, space technology, cultural heritage, etc.

Serbian Ceramic Society was initiated in 1995/1996 and fully registered in 1997 as Yugoslav Ceramic Society, being strongly supported by American Ceramic Society. Since 2009, it has continued as the Serbian Ceramic Society in accordance with Serbian law procedure. Serbian Ceramic Society is almost the only one Ceramic Society in South-East Europe, with members from more than 20 Institutes and Universities, active in 9 sessions..

Dr. Nina Obradović
President of the Serbian Ceramic Society

Dr. Suzana Filipović
President of the General Assembly of the Serbian Ceramic Society

Conference Topics

- Basic Ceramic Science & Sintering
- Nano-, Opto- & Bio-ceramics
- Modeling & Simulation
- Glass and Electro Ceramics
- Electrochemistry & Catalysis
- Refractory, Cements & Clays
- Renewable Energy & Composites
- Amorphous & Magnetic Ceramics
- Heritage, Art & Design

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Република Србија
МИНИСТАРСТВО НАУКЕ,
ТЕХНОЛОШКОГ РАЗВОЈА И
ИНОВАЦИЈА

P11

Impact of synthesis parameters on the properties of polymer/MXene nanocomposites

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MXenes are a relatively new class of 2D nanomaterials with promising properties. The functional groups on the surface of the nanosheets play a vital role in interacting with other materials, especially in nanocomposites. Biocompatibility, admirable mechanical properties, and thermal stability are the most significant properties of poly(dimethylsiloxane)-based polyurethanes (PU). They are highly convenient for applications in electronic devices and implants. In this study, the MXene content was 1 wt. % for two series and 0.5 wt. % for the other two series, while the soft segment content was 50 wt. % for all the series. The nanocomposites were obtained using an *in-situ* polymerization method. The timing of adding the MXene nanoparticles to the reaction mixture was also varied to examine the changes in the physico-mechanical properties of the nanocomposites. Differential scanning calorimetry (DSC), scanning electron microscopy (SEM), and tensile tests were conducted to analyze the properties of the resulting materials. The glass transition temperature is highest for the series in which MXenes are added in the first phase of polyaddition after the solvation of MDI, while the series with 0.5 wt.% MXene added later into the reaction exhibit two transitions. SEM images revealed uneven distribution and agglomeration of MXene nanoflakes when added into the siloxane prepolymer. The tensile test indicated that the series with 0.5 wt. % nanoflakes have significantly lower Young's modulus and tensile strength. The distribution of nanoparticles and surface morphology are strongly influenced by the timing of adding the MXene dispersion into the reaction mixture, as well as the nanoparticle content.

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