Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION IX
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, 20-21. September 2021.

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Enhanced dielectric properties of PVDF-based composites with $BaTiO_3$ ceramic decorated with Fe_2O_3

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The increase in the utilization of ceramic/polymer composites as components for electric devices is mainly based on their high chemical stability, mechanical strength, and flexibility. The polymers usually have poor dielectric performances. In order to increase the dielectric permittivity, ceramic fillers with high dielectric constant have been used as active fillers, and usually in large amounts, which have a detrimental effect on the mechanical properties of the composite. With the aim to enhance the dielectric properties of the composite without loss of polymer's flexibility, 5 wt.% of $BaTiO_3/Fe_2O_3$ core/shell powders, prepared by different synthesis conditions, was added into the PVDF matrix. The effect of the phase composition and morphology of the starting $BaTiO_3/Fe_2O_3$ core/shell filler on the crystal structure and lattice dynamics was investigated. Based on the results of the thermal analysis, TG/DSC, various parameters of ceramic/polymer composites were determined. We were able to corroborate that differences in the phase composition and morphology of $BaTiO_3/Fe_2O_3$ core/shell filler have an influence on the formation of various PVDF allomorph modifications, as well as the level of crystallinity. The dielectric performances of the pure PVDF and polymer/ceramic composites were measured. An enhancement in the dielectric permittivity and decrease in the loss tangent were revealed.