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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P1

Laser-induced graphene on PEO/PDMS composites

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Laser-induced graphene (LIG) has emerged as one of the most promising materials for flexible functional devices. One-step fabrication of LIG offers advantages such as low cost, patterning of desired geometries, and high sensitivity. However, previous attempts to obtain LIG on elastomeric substrates have been unsuccessful, limiting its potential for use in stretchable electronics. In this study, we propose using a substrate composed of polydimethylsiloxane (PDMS) and poly(ethylene oxide) (PEO) with a low molecular weight as a platform for manufacturing LIG. A series of PDMS/PEO materials with varying concentrations of PEO (1, 5, 10, 20, 30, 40 and 50 wt.%) were prepared using a cast-based approach, starting from divinyl-terminated-PDMS and poly(methyl-hydrogensiloxane). The prepared PDMS/PEO/graphene composites were characterized using Raman spectroscopy, Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM) analysis. FTIR analysis confirmed the structure of the prepared PDMS/PEO and PDMS/PEO/graphene materials. The results demonstrated that the prepared PDMS/PEO composites exhibited a higher degree of graphenization compared to pure PDMS networks. SEM analysis revealed the formation of a porous graphene structure. Based on these findings, the PDMS/PEO/graphene composites show promise for further investigation as electronic device applications.

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P2

Structural and thermal properties of PDMS/Triton/laser-induced graphene composites

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Laser-induced graphene (LIG) has recently been proposed as a viable option for fabricating various types of flexible electronic devices due to its excellent mechanical stability and electrical properties. During laser induction of graphene on polymers, the high temperature generated with the laser breaks C-O, C=O, and N-C bonds in polymers, leading to the recombination of C and N atoms. Additionally, the rapid release of carbonaceous and nitric