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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P28
Radiation and pulsed NBTS induced threshold voltage shift in p-channel power VDMOSFETs

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Negative bias temperature instability (NBTI) is one of the critical issues for reliability of metal-oxide-semiconductor field effect transistors (MOSFETs). These instabilities present itself mostly in p-channel MOSFET devices that function under negative gate oxide fields in the range 2-6 MV/cm and at elevated temperatures (100-250°C). Our previous researches were focused on power vertical double diffused MOS (VDMOS) transistors that are part of switching power supply systems. Since these devices are parts of the switching power supply systems, they are exposed to pulsed signals. Power VDMOSFET are also noticed as very sensitive to ionizing irradiation.
Research presented in this paper investigates the effects of pulsed NBT stressing of the commercial power VDMOS device IRF9520 which were previously irradiated with different doses. Parts of the experiment concerning irradiation were performed with the aid of the Metrological Laboratory at the Institute for Nuclear Sciences, Vinča, Serbia, while other parts of the experiments were conducted at the Faculty of Electronic engineering, Niš, Serbia, where special methods for measuring of these effects were developed. Investigation was mostly focused on the threshold voltage shift (ΔV_T) of the VDMOS, since it was shown that this parameter directly affects the device lifetime.

P29
Structural properties of graphene-oxide and its capacity for the elimination of dimethoate from water

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Organophosphate pesticides are known to be some of the most toxic substances synthesized by a man today. Extensive use of this group of compounds in contemporary agriculture results in a critical need for their efficient removal from the environment, especially water. Adsorption of pesticides on different materials is one of the most frequently used strategies for this purpose. In the past decade, the use of graphene-oxide escalated due to its interesting properties.

In this contribution, the adsorption of organophosphate pesticide dimethoate on two commercially available graphene-oxides has been investigated. The materials were characterized by different physico-chemical methods. Careful structural characterization of adsorbents was combined with batch adsorption experiments. It was shown that 1 g of both graphene-oxides is capable of adsorbing 9×10^{-3} mol dm^{-3} of dimethoate at 25 °C. A satisfactory agreement of both sets of experimental results with the Langmuir isotherm model suggests the monolayer adsorption on the homogenous surface. The adsorption was also investigated at 30 and 35 °C. The results showed that the concentration of adsorbed dimethoate increases with temperature for both studied adsorbents. Investigated graphene-oxides were successfully used for the removal of dimethoate from water.

P30
Correlation of the total induced amorphization in SiC crystal with the ion implantation fluence

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During the ion implantation process, regardless if it was attentional or not, amorphization will be introduced into the crystal structure. Depending on the chosen ions, different quantities of the amorphization will be introduced for the same applied fluences. In order to estimate the total amorphization of the SiC crystal for different ions and fluences combination, an assessment model was proposed. For this purpose, 4 MeV carbon and silicon ions with multiple fluences were implanted in the [0001] axial direction of a 6H-SiC single crystal. The amorphization depth distributions were obtained by Elastic Backscattering Spectroscopy/channeling spectra analysis via Channeling SIMulation (CSIM) phenomenological computer code. As a result, relation of the total induced amorphization and implantation fluences for carbon and silicon ions were obtained. Based on these experimental results, a total amorphization assessment model for different ions (energy of 4 MeV) and fluences combination was established.