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.

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, 18-20th September 2023.

Book title: Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION XI Program and the Book of Abstracts

Publisher:
Serbian Ceramic Society

Editors:
Dr. Nina Obradović
Dr. Lidija Mančić

Technical Editors:
Dr. Adriana Peleš Tadić
Dr. Jelena Živojinović

Printing:
Serbian Ceramic Society, Belgrade, 2023.

Edition:
120 copies

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

666.3/.7(048)
66.017/.018(048)

SRPSKO keramičko društvo. Conference Advanced Ceramics and Application : New Frontiers in Multifunctional Material Science and Processing (11 ; 2023 ; Beograd)

Program ; and the Book of abstracts / Serbian Ceramic Society Conference Advanced Ceramics and Application XI New Frontiers in Multifunctional Material Science and Processing, Serbian Academy of Sciences and Art Serbia, Belgrade,18-20.September 2023. ; [editors Nina Obradović, Lidija Mančić]. - Belgrade : Serbian Ceramic Society, 2023 (Belgrade : Serbian Ceramic Society). - 90 str. : ilustr. ; 30 cm

Tiraž 120.

ISBN 978-86-905714-0-6

а) Керамика -- Апстракти б) Наука о материјалима -- Апстракти

COBISS.SR-ID 122849545

ORL3

Graphene oxide/12 tungstophosphoric acid nanocomposites – achieving favorable properties with ion beams for electrochemical supercapacitors

Željko Mravik[1], Milica Pejčić[1], Jelena Rmuš Mravik[1], Blaž Belec[2], Danica Bajuk-Bogdanovic[3], Sonja Jovanović[1], Smilja Marković[4], Nemanja Gavrilov[3], Vladimir Skuratov[5], Zoran Jovanović[1]

[1]Center of Excellence for Hydrogen and Renewable Energy (CONVINCE), Laboratory of Physics, Vinča Institute of Nuclear Sciences, University of Belgrade, Belgrade, Serbia
[2]Materials Research Laboratory, University of Nova Gorica, Ajdovščina, Slovenia
[3]Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia
[4]Institute of Technical Sciences of SASA, Belgrade, Serbia
[5]Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, Dubna, Moscow region, Russia

In recent years graphene oxide (GO)/12-tungstophosphoric acid (WPA) nanocomposites have demonstrated promising potential for electrochemical supercapacitors. However, to enhance their performance, it is necessary to modify the surface chemistry of GO to minimize the influence of basal plane oxygen groups, which hinder the material's conductivity. Additionally, some degree of structural modification of WPA is desired. In this regard, ion beam irradiation presents a promising method to simultaneously optimize surface chemistry of GO and structurally modify WPA. To accomplish this, ion beam irradiation is employed for modification of individual components as well as their nanocomposites with varying mass ratios. Different ion species, fluences and energies were utilized depending on the sample type, ranging from 10 keV C to 710 MeV Bi. Spectroscopy methods were employed to gain insight into the type and degree of structural modification in WPA. A direct correlation is observed between the parameters of the ion beams and the resulting structural changes. As the disordering increases, the structure transitions from partially modified to increased bond breaking, ultimately leading to reconnected bronze-like structures. By increasing the fluence, a gradual modification of the structure and surface chemistry of GO was possible. The effects of irradiation on GO and WPA are particularly pronounced in irradiated composites, where higher capacitance is measured.