Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION V
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
School of Electrical Engineering and Computer Science of Applied Studies

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 21st-23rd September 2016.
Book title: Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION V: Program and the Book of Abstracts

Publisher:
Serbian Ceramic Society

Editors:
Prof.dr Vojislav Mitić
Dr Lidija Mančić
Dr Nina Obradović

Technical Editors:
Dr Lidija Mančić
Dr Nina Obradović
Adriana Peleš

Printing:
Serbian Ceramic Society

Circulation:
140 copies

CIP - Каталогизација у публикацији - Народна библиотека Србије, Београд

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

SERBIAN Ceramic Society Conference - Advanced Ceramics and Application (5 ; 2016 ; Beograd)

Tiraž 140.

ISBN 978-86-915627-4-8

1. Serbian Ceramic Society (Beograd)
a) Керамика - Апстракти b) Наука о материјалима - Апстракти c) Наноматеријали - Апстракти

COBISS.SR-ID 225924876
centrations of heavy metal ions were determined by using ion chromatography coupled with mass spectrometry (ICP-MS).

P20

Novel amino modified GMA-EGDMA-m-PMMA monolith for efficient cationic pollutant removal

Jelena Rusmistrović¹, Steva Lević², Vladimir Pavlović²,³, Aleksandar Marinković⁴

¹Innovation center, Faculty of Technology and Metallurgy, Belgrade, Serbia
²Faculty of Agriculture, University of Belgrade, Belgrade-Zemun, Serbia
³Institute of Technical Sciences of the SASA, Knez Mihailova 36, 11000 Belgrade, Serbia
⁴Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

Novel macro/micro-porous monolith material containing surface amino functional groups was developed for efficient cationic pollutant removal. The monolith was prepared by copolymerization process of monomers glycidyl methacrylate (GMA), ethylene glycol dimethacrylate (EGDMA) and modified low molar mass poly(methyl methacrylate) (PMMA). In order to improve mechanical stability of GMA-EGDMA monolith, surface of PMMA was modified with ethanol amine in first step, and introduction of methacryloyl chloride in a second step produced m-PMMA. Synthesized GMA-EGDMA-m-PMMA monolith was modified with poly(ethylene imine) (PEI). The effectiveness of copolymerization, as well as introduction of amino groups via PEI modification were confirmed by FTIR and Raman analyses. The morphological appearance of the synthesized monolith, examined by scanning electron microscopy (SEM), clearly indicates porous structure. The results of textural parameters, i.e. monolith porosity, determined by using liquid saturating method, indicate high degree of porosity. Cationic pollutant removal capacity, cadmium and lead, of 32.0 and 42.5 mg g⁻¹ at 25 °C indicates that this monolith is high efficient. This macro/micro-porous monolith could be a promising adsorbent because of its low-cost synthesis process and excellent performance.

P21

Influence of mechanical activation on mechanical properties of PVDF-nanoparticle composites

Jelena Živojinović, Adriana Peleš, Vladimir Blagojević, Darko Kosanović, Vladimir Pavlović

Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade, Serbia

The influence of mechanically activated fillers (ZnO, BaTiO₃, SrTiO₃, ultra-fine powders) on mechanical properties of poly(vinylidene) fluoride (PVDF) and oxide nanoparticle composite was investigated using molecular simulations. Mechanical activation leads to the creation of new surfaces and the comminution of the initial powder particles, which affects the crystallization of PVDF matrix. In addition, prolonged mechanical activation leads to agglomeration of
nanoparticles into “soft” and “hard” agglomerates of different sizes. All of this has a significant
effect on mechanical properties of PVDF-nanoparticle composites. Microstructural changes
due to mechanical activation in ZnO, BaTiO₃ and SrTiO₃ powders were investigated using SEM
and XRD, while dependence of mechanical properties on nanoparticle size was investigated
using molecular simulation. These show that smaller nanoparticles significantly enhance the
mechanical properties of PVDF-nanoparticle composite and allow use of mechanical activation
as a means of reducing the amount of nanoparticle filler in the composite, while achieving the
same of superior mechanical properties.

P22

Simulation of channeling EBS/RBS spectra – a new code

M. Erich¹, S. Petrović¹ and M. Kokkoris²
¹Laboratory of Physics, Vinča Institute of Nuclear Sciences, University of Belgrade,
PO Box 552, Belgrade, Serbia
²National Technical University of Athens, Department of Physics,
Zografou Campus, 15780 Athens, Greece

Newly developed C++ code – CSIM – allows for successful simulation and quantification of
channeling EBS/RBS spectra, which is a long standing problem in material analysis with ion
beams (IBA). It opens new possibilities for using these IBA techniques in determination of
light ions concentration profiles in heavier matrix, or for heavier ones located at the greater
depths whose backscattered yield overlaps with the matrix induced background. The advan-
tage of these techniques over the usually used NRA in these situations are following: EBS/RBS
cross-sections are commonly several orders of magnitude higher than NRA ones, thus signifi-
cantly reducing the experimental time and proton and alpha particles as probing beams avoid
the hazardous neutron emission commonly associated with NRA.

CSIM assumes the phenomenological approach to the channeling process described by three pa-
rameters: the dechanneling rate and range, and , being characteristic parameters of a Gompertz
type sigmoidal dechanneling function and the parameter, , being the channeling to random
energy loss ratio. These three parameters can either be manually set or obtained via the χ² mini-
imization routine. CSIM has been successfully tested in reproducing 1-2 MeV protons virgin
EBS/C spectra of a diamond crystal. More importantly, CSIM was used for determination of the
amorphization profile induced by 4 MeV carbon ions implanted in the diamond crystal. The
maxima of amorphization profile coincides with the carbon end of the range in the diamond.