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.

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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

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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

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The influence of mechanically activated fillers (ZnO, $BaTiO_3$ and $SrTiO_3$ 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, $BaTiO_3$ and $SrTiO_3$ 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

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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 advantage of these techniques over the usuallyused NRA in these situations arefollowing: EBS/RBS cross-sections are commonly several orders of magnitude higher than NRA ones, thus significantly reducing the experimental time and proton and alpha particles as probing beams avoid the hazardous neutron emission commonlyassociated with NRA.
CSIM assumes the phenomenological approach to the channeling process described by three parameters: 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 χ^2 minimization 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.