



**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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P18

Photocatalytic degradation of substituted arylazo pyridone dyes

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Heterogeneous photocatalysis has gained increasing interest in the last four decades, especially in the field of solar water splitting and purification of air and water. TiO₂ as the most universal used photocatalyst has been widely studied owing to its nontoxicity, chemical stability, low cost and high photocatalytic activity. In this study, commercial TiO₂ (Degussa P25) has been applied in photodegradation of substituted arylazo pyridone dye, with orto-, meta- and para- substituents in benzene ring. The results showed that the type and the position of substituents influence photoreactivity of investigated dye in a profound manner. Reactivity of investigated dyes were correlated with Hammett substituent constants, in order to gain insights into the mechanism of photocatalytic dye degradation.

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Adsorption capacity of wollastonite based adsorbents with porous structure controlled with different progeny agents

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Porous wollastonite (WL) based adsorbents were fabricated by a pressureless sintering process by using low molecular weight poly(methyl methacrylate) (PMMA), nanocellulose (NC) and yeast as the pore forming agents. WL based adsorbents were synthesized in two step process. In the first step, calcium carbonate and methylhydrogen cyclosiloxane were mixed with isopropyl alcohol, dried and calcined at 250 °C. Second step included WL mixing with porogen, followed by controlled calcination and on that way the sintered materials with randomly distributed pores were obtained. The effectiveness of the synthesis steps as well as material properties, i.e., the pore morphology were determined by FTIR analysis and scanning electron microscopy (SEM), respectively. The pore morphology and adsorption capacity was changed dramatically by changing the pore forming agent. The highest adsorption capacity was obtained when NC was used as the pore forming agent. Obtained materials showed moderate adsorption capacities of 10.56, 8.42 and 11.33 mg/g with respect to As⁵⁺, Cr⁶⁺ and phosphate, respectively. The con-

centrations of heavy metal ions were determined by using Ion chromatography coupled with mass spectrometry (ICP-MS).

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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.

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

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The influence of mechanically activated fillers (ZnO, BaTiO₃ and 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