



**Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION**

Serbian Ceramic Society
Institute of Technical Sciences of SASA

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
May 10-11th, 2012, Belgrade, Serbia

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ADVANCED CERAMICS AND APPLICATION**

Organized by
Serbian Ceramic Society
&
Institute of Technical Sciences of SASA

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

Publisher:

Serbian Ceramic Society

Editors:

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Technical Editor:

Aleksandra Stojičić

Printing:

Serbian Academy of Sciences and Arts,
Knez Mihailova 35, Belgrade, Serbia

Format

Pop Lukina 15, Belgrade, Serbia

Edition:

70 copies

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

666.3/.7(048)

66.017/.018(048)

SERBIAN Ceramic Society. Conference (1 ; 2012 ; Beograd)

Advanced Ceramics and Application : program and the book of abstracts / #[1st]
#Serbian Ceramic Society Conference, May 10-11th, 2012, Belgrade, Serbia ; organized
by Serbian Ceramic Society & Institute of Technical Science of SASA ; [editors Vojislav
Mitić, Nina Obradović, Lidija Mančić]. - Belgrade : Serbian Ceramic Society, 2012
(Belgrade : Serbian Academy of Sciences and Arts). - XII, 37 str. ; 29 cm

Tiraž 70.

ISBN 978-86-915627-0-0

1. Srpsko keramičko društvo (Beograd)

a) Керамика - Апстракти b) Наука о материјалима - Апстракти c) Наноматеријали
- Апстракти

COBISS.SR-ID 190546188

Dear Colleagues and friends,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference organized by the Serbian Ceramic Society in cooperation with the Institute of Technical Sciences of SASA.

This conference brings together researchers from academia and industry to present the latest advances in synthesis and characterization in the field on new ceramic structures. Chosen conference topics open the new frontiers in designing of advanced ceramic materials, since they cover fundamental theoretical research, modeling and simulation, controlled nanostructured materials synthesis and optimization of the consolidation process, which all together should provide device miniaturization and better perspective in energy-materials-information integration process.

General conference topics include:

- Basic Ceramic Science
- Multifunctional Ceramics
- Nanostructural Ceramics
- Bio- and Opto- Ceramics
- Constructive and Eco- Ceramics
- Magnetic and Amorphous Materials
- Composite Materials, Catalysis and Electrocatalysis
- Artistic Ceramic and Design

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Acknowledgement

The Conference Organizers are grateful to the Ministry of Education and Science of the Republic of Serbia for the financial support, and to the Institute of Technical Sciences of SASA, Serbian Academy of Sciences and Arts, PTT Communications "Srbija", "Dunav" Insurance Co. and Nissal Co. for the conference support.



Prof. Dr. Vojislav Mitić, President
Serbian Ceramic Society
World Academy Ceramics' Member

S4.3

Surface Modification of High Density Polyethylene by Au⁺ ion Implantation Observed by Phase Imaging Atomic Force Microscopy

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High density polyethylene (HDPE) has been modified by Au⁺ ions implantation with the energy of 200 keV. The doses of implanted gold ions were: 1×10^{15} , 5×10^{15} and 1×10^{16} ions/cm². Surface topography was observed by atomic force microscopy (AFM), while surface composition changes were detected by phase imaging AFM. Phase analysis of AFM images has shown that both physical and chemical changes occurred on the surface of HDPE and that those changes depended on the implantation dose. The implantation of gold ions caused a high degree of physical changes. Breakpoints were observed for the implantation dose of 4.4×10^{15} ions/cm². Physical changes are confirmed by the analysis of mean square roughness and power spectral density (PSD) slopes as functions of the implantation dose. The position and half-width of peaks in histograms of phase AFM images confirmed the changes in surface composition.

S4.4

Organo-composite Ceramics: Synthesis and Application

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The synthesis of organo-bentonites (OBs) obtained by modification with quaternary alkyl ammonium cations (QAACs), their characterization and evaluation of their efficiency as adsorbents for organic and inorganic aqueous pollutants was investigated. In this work starting material was bentonite clay from Bogovina, Serbia, with particle diameters of up to 74 μm. The amount of incorporated QAACs corresponded to 0.0, 0.2, 0.5, 1.0 and 2.0 CEC value of the clay. The phase composition, textural and morphological properties of starting material and OB samples were determined by XRD and IR analyses, N₂ physisorption and SEM microscopy. It was found that the applied modification procedures resulted in the exclusive exchange of cations from the smectite interlamellar region, with no impact on the accompanying minerals present in bentonite (quartz, calcite, feldspar). The modification of clay surface with QAACs is a method to obtain organoclays by transforming clay surface from organophobic to strongly organophilic and therefore increasing the adsorption capacity for the adsorption of organic pollutants. In addition, this kind of modification greatly increases anionic adsorption capacity especially when surfactant loading exceeds the CEC of clay. This kind of QAAC-containing organobentonite has been extensively used for a wide variety of environmental applications.

Acknowledgements: This work was supported by the Ministry of Education and Science of the Republic of Serbia (Project III 45001).