



**Serbian Ceramic Society Conference**  
**ADVANCED CERAMICS AND APPLICATION VI**  
**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 2017.**

**Serbian Ceramic Society Conference**  
**ADVANCED CERAMICS AND APPLICATION VI**  
**New Frontiers in Multifunctional Material Science and Processing**

**Serbian Ceramic Society**  
**Institute of Technical Science 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 2017**

**Book title:** Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION VI 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

Ivana Dinić

**Printing:**

Serbian Ceramic Society

**Edition:**

200 copies

CIP - Каталогизacija 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 (6 ; 2017 ; Beograd)

Program ; and the Book of Abstracts / Serbian Ceramic Society Conference Advanced Ceramics and Application VI : New Frontiers in Multifunctional Material Science and Processing, Serbia, Belgrade, 18-20. September 2017. ; [organized by] Serbian Ceramic Society ... [et al.] ; [editors Vojislav Mitić, Lidija Mančić, Nina Obradović]. - Belgrade : Serbian Ceramic Society, 2017 (Belgrade : Serbian Ceramic Society). - 86 str. : ilustr. ; 30 cm

Tiraž 200.

ISBN 978-86-915627-5-5

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

Наноматеријали - Апстракти

COBISS.SR-ID 244577036

Dear Colleagues,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference VI organized by the Serbian Ceramic Society in cooperation with the Institute for Testing of Materials, Institute of Technical Sciences of SASA, Institute of Chemistry Technology and Metallurgy and Institute for Technology of Nuclear and Other Raw Mineral Materials.

Advanced Ceramics today include many old-known ceramic materials produced through newly available processing techniques as well as broad range of the innovative compounds and composites, particularly with plastics and metals. Such developed new materials with improved performances already bring a new quality in the everyday life. The chosen Conference topics cover contributions from a fundamental theoretical research in advanced ceramics, computer-aided design and modeling of a new ceramics products, manufacturing of nanoceramic devices, developing of multifunctional ceramic processing routes, etc. Traditionally, ACA Conferences gather leading researchers, engineers, specialist, professors and PhD students trying to emphasizes the key achievements which will enable the wide speared use of the advanced ceramics products in High-Tech industry, renewable energy utilization, environmental efficiency, security, space technology, cultural heritage, prosthesis, etc.

Serbian Ceramic Society has been initiated in 1995/1996 and fully registered in 1997 as Yugoslav Ceramic Society, being strongly supported by American Ceramic Society. Since 2009, it has continued as Serbian Ceramic Society in accordance to the Serbian law procedure. Serbian Ceramic Society is almost the only one Ceramic Society in the South-East Europe, with members from more than 20 Institutes and Universities, active in 16 sessions, by program and the frames which are defined by the American Ceramic Society activities.

For the first time Advanced Ceramic and Application Conference hosting delegations from Republics of Ghana, Nigeria, Niger and Cameroon with the idea to connect, share and provide positive influence to the scientific and industrial communities all around world.



Prof. Dr Vojislav Mitić  
*President of the Serbian Ceramic Society*  
*World Academy Ceramics Member*  
*European Academy of Sciences&Arts Member*



Prof. Dr Olivera Milošević,  
*President of the General Assembly of the*  
*Serbian Ceramic Society*  
*Academy of Engineering Sciences of Serbia Member*

### Conference Topics

- Basic Science & Sintering of Ceramics
- Nano, Bio- & Opto Ceramic
- Electro & Multifunctional Ceramics
- Magnetic, Catalytic & Composite Materials
- Renewable Energy, Heritage & Archeology
- Industrial Talks

### Conference Co-chairmens:

Prof. Dr. Vojislav Mitić SRB  
Prof. Dr. Olivera Milošević SRB  
Prof. Dr. Marcel Van de Voorde EU  
Prof. Dr. Rainer Gadow GER

### Conference Programme Chairs:

Dr. Lidija Mančić SRB  
Dr. Nina Obradović SRB

### **Scientific Committee**

Academician Zoran Đurić SRB  
Academician Ninoslav Stojadinović SRB  
Academician Zoran Popović SRB  
Academician Pantelija Nikolić SRB  
Academician Miroslav Gašić SRB  
Academician Laszlo Forro CHE  
Academician Dragoljub Mirjanić BiH(RS)  
Prof. Dr. Vojislav Mitić SRB  
Prof. Dr. Marcel Van de Voorde EEZ  
Prof. Dr. David Johnson GBR  
Prof. Dr. Slavcho Rakovsky BGR  
Prof. Dr. Jurgen G. Heinrich DEU  
Prof. Dr. Masohiro Yoshimura JPN  
Dr. Mrityunjay "Jay" Singh USA  
Prof. Dr. Rainer Gadow DEU  
Dr. Richard Todd GBR  
Dr. Moritz von Witzleben DEU  
Dr. Jon Binner, UK  
Dr. Fiqiri Hodaj FRA  
Prof. Dr. Hans Fecht DEU  
Dr. Dušan Jovanović SRB  
Prof. Dr. Olivera Milošević SRB  
Prof. Dr. Vladimir Pavlović SRB  
Dr. Nina Obradović SRB  
Dr. Lidija Mančić SRB  
Prof. Dr. Steven Tidrow USA  
Dr. Wilhelm Siemen DEU  
Dr. Jonjaua Ranogajec SRB  
Dr. Snežana Pašalić SRB  
Prof. Dr. Zoran Nikolić SRB  
Dr. Zagorka Radojević SRB  
Dr. Nebojša Romčević SRB  
Dr. Zorica Lazarević SRB

Prof. Dr. Ljubica Pavlović SRB  
Prof. Dr. Nebojša Mitrović SRB  
Prof. Dr. Ljubiša Kocić SRB  
Dr. Aleksandra Milutinović–Nikolić SRB  
Dr. Predrag Banković SRB  
Dr. Zorica Mojović SRB  
Dr. Dušan Milivojević SRB  
Dr. Miomir Korać SRB  
Prof. Dr. Branislav Vlahović SRB  
Dr. Radomir Žikić SRB  
Prof. Dr. Stevo Najman SRB  
Dr. Biljana Djordjević SRB  
Dr. Anja Terzić SRB

### **Organizing Committee**

Prof. Dr. Vojislav Mitić SRB  
Dr. Nina Obradović SRB  
Dr. Lidija Mančić SRB  
Prof. Dr. Vladimir Pavlović SRB  
Dr. Dušan Jovanović SRB  
Dr. Zorica Lazarević SRB  
Prof. Dr. Ljubica Pavlović SRB  
Dr. Vesna Paunović SRB  
Dr. Darko Kosanović SRB  
Dr. Anja Terzić SRB  
Dr. Suzana Filipović SRB  
Dr. Vladimir Blagojević SRB  
Prof. Zvonko Petković SRB  
Ivana Dinić SRB  
Zoran Gajić SRB  
Jelena Živojinović SRB

### **Sponsors & Endorsements:**

Analysis - Lab equipment, Belgrade (Serbia), Direktna Banka a.d. Kragujevac, Exchange office „Hulk“, LMB Soft, Niš (Serbia), SCAN doo. Preddvor (Slovenia), Voda Vrnjci (Serbia), Regular Authority of Electronic Media (Serbia), Turisticka organizacija Beograd, Štamparija "Format" and GRAND doo (Serbia).

### **Acknowledgements:**

The Conference Organizers are grateful to the Ministry of Education and Science of the Republic of Serbia for financial support, as well as to the Serbian Academy of Sciences and Arts, European Academy of Sciences and Arts, American Ceramics Society, Institute of Technical Sciences of SASA, Archeological Institute of SASA, Institute of Physics UB, Vinča Institute of Nuclear Sciences - Laboratory of Physics (010), Electrical Engineering Institute Nikola Tesla and High School-Academy for Arts and Conservation, Serbian Orthodox Church.

5% Ni (AlFe10Ni5-PILC), and c) 90 % Al, 5% Fe, 5% Ni (AlFe5Ni5-PILC). The XRD, chemical and FTIR analysis and nitrogen physisorption at -196°C were used for the characterization of the obtained samples. All results of the characterization confirmed successful pillaring. Degree of decolorization of dye containing aqueous solution was monitored using UV-Vis spectroscopy. The experiments were performed using solution with initial concentration of 50 mg dm<sup>-3</sup> at 60 °C with respect to the catalyst and H<sub>2</sub>O<sub>2</sub> amount. The catalytic degradation for all investigated catalysts followed the first order kinetics. Among the investigated materials AlFe10Ni5-PILC was found to be the most promising one for CWPO of AY99. These investigation are proof of concept that Al,Fe,Ni-pillared bentonite are applicable in CWPO.

## **P9**

### **Radioadaptive irradiation combined with radiosensitising effects of gold nanoparticles on the healthy and cancer human lung cell lines**

Vesna Kojić<sup>1</sup>, Dimitar Jakimov<sup>1</sup>, Natasa Vucinic<sup>2</sup>, Igor Djan<sup>1</sup>, Ivana Borišev<sup>3</sup>, Danica Jović<sup>3</sup>,  
Igor Medić<sup>3</sup>, Aleksandar Djordjević<sup>3</sup>

<sup>1</sup>*Oncology Institute of Vojvodina, Put doktora Goldmana 4, 21204 Sremska Kamenica, Serbia*

<sup>2</sup>*Faculty of Medicine, University of Novi Sad, Hajduk Veljkova 11, 21000 Novi Sad, Serbia*

<sup>3</sup>*Department of Chemistry, Biochemistry and Environmental Protection, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Serbia*

Many substances and materials have been reported to be radiosensitizers, some of which are gold nanoparticles GNP, too. Studies have shown that the presence of GNP increases the production of electrons and free radicals. Generally, radiosensitising with GNP depends on the nanoparticles' size, shape, ζ potential, and coating. The aim of this study was to investigate the optimal combination of radioadaptive irradiation with GNP on the healthy human lung fibroblast cell lines (MRC5) and human lung adenocarcinoma cells (A542). Also we examined potential synergistic effects between coating of GNP with β-cyclodextrine (βCD) and designed modality of irradiation. Gold nanoparticles and gold nanoparticles-βCD were measured in order to determine their size distribution and ζ-potential. The influence of different irradiation regimes on the survival of cells (viability) was determined using MTT assay.

## **P10**

### **Hybrid macroporous polymer/clay nanocomposites**

Bojana M. Marković<sup>1</sup>, Ivan S. Stefanović<sup>1</sup>, Zorica Vuković<sup>1</sup>, Aleksandra Nastasović<sup>1</sup>

<sup>1</sup>*University of Belgrade, Institute of Chemistry, Technology and Metallurgy, Njegoševa 12, Belgrade, Serbia*

Hybrid polymer/nanocomposites are a new class of materials that consist of polymer matrix and clay nanoparticles as the dispersed phase. The aim of this work was to obtain macroporous poly(glycidyl methacrylate-co-ethylene glycol dimethacrylate)/clay nanocomposites *p*(GEM-NC) with different porosity and morphology.

Macroporous  $p(\text{GEM})$  copolymer and two nanocomposite  $p(\text{GEM-NC})$  samples with different clay content (2 and 5 wt.%) were synthesized by *in situ* suspension copolymerization. Nanocomposite samples were reinforced with organomodified montmorillonite clay Cloisite 30B<sup>®</sup> (C30B). Structure, porosity and surface chemistry of the  $p(\text{GEM})$  and  $p(\text{GEM-NC})$  samples were evaluated by Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM/EDS) and mercury porosity.

The results show the synthesized  $p(\text{GEM-NC})$  have improved textural, structural and morphological properties in comparison with pure macroporous  $p(\text{GEM})$  copolymer. The incorporation of C30B in  $p(\text{GEM})$  was confirmed by FTIR and SEM/EDS analysis. Also, it was shown that the higher clay content significantly influences the  $p(\text{GEM-NC})$  porosity parameters (i.e. specific surface area, specific volume and pore diameter).

## P11

### Surface properties of Ni/BCY15 cermet anodes obtained by deposition wet-reduction

D. Nikolova<sup>1</sup>, M. Gabrovska<sup>1</sup>, A. Tsanev<sup>3</sup>, E. Mladenova<sup>2</sup>, D. Vladikova<sup>2</sup>, S. Rakovsky<sup>1</sup>,  
Z. Stoynov<sup>2</sup>

<sup>1</sup>*Institute of Catalysis, Bulgarian Academy of Sciences, Acad. G. Bonchev Str., Bldg. 11, 1113 Sofia, Bulgaria*

<sup>2</sup>*Acad. Evgeni Budevski Institute of Electrochemistry and Energy Systems, Bulgarian Academy of Sciences, Acad. G. Bonchev Str. Bldg. 10, 1113 Sofia, Bulgaria*

<sup>3</sup>*Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Acad. G. Bonchev str., bl. 11, 1113 Sofia, Bulgaria*

ABO<sub>3</sub> perovskite structured materials as Y-doped barium cerate ( $\text{BaCe}_{1-x}\text{Y}_x\text{O}_{3-\delta}$ ), are of particular interest because of their high proton conductivity and excellent chemical stability under reduced fuel cell environment in conducting solid oxide fuel cells (pSOFC). Metallic Ni has been extensively used to improve the electrocatalytic properties of pSOFC cermet anode and to ensure the necessary electronic conductivity.

Metallic Ni nanoparticles are added to  $\text{BaCe}_{0.85}\text{Y}_{0.15}\text{O}_{2.925}$  (BCY15) ceramic matrix by deposition wet-reduction approach in aqueous and non-aqueous medium. Strong interaction between support (BCY15 electrolyte) and metallic Ni is expected. The surface properties are examined applying N<sub>2</sub> sorption and X-ray photoelectron spectroscopy (XPS) techniques.

N<sub>2</sub>-physisorption analysis unveils preservation of the ceramic BCY15 matrix after incorporation of nickel and filling of the support pores by creation of the new mesopore system. The transition-metal Ni in the Ni/BCY15 cermet is doped on the Ce-sites confirmed by XPS data.