



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.

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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 emphasize the key achievements which will enable the wide spread 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
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Conference Topics

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

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mathematically processed by integration of the peak area characteristic for nitrates and by measuring the ratio of intensity of the characteristic peaks.

The results from the fast FTIR technique and those obtained by a slow and demanding UV-Vis spectrophotometric technique were compared. This showed that the proposed mathematical analysis of the FTIR spectra gave the same trend of quantitative results as the UV-Vis results, promising to be a useful tool for preliminary investigation of nitrate content in powdered materials.

P23

Synthesis and Characterization of Multiferroics 16%(Fe₂O₃)4%(BaCO₃)80%(BaTiO₃)

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The initial powder (16 % Fe₂O₃, 4 % BaCO₃, 80 % BaTiO₃) was mechanically activated in a planetary mill for 20, 80, 120, 160, 200 and 220 minutes in air. Modified Faraday method was used to perform magnetization measurements of compressed activated powder. The value of magnetization of these samples increases with increase in time of activation from 0.77 Am²kg⁻¹ to 1.74 Am²kg⁻¹. Thermomagnetic measurements in 20-600 °C temperature interval was used to investigate the dependence of magnetization on temperature. Multiple heating cycles of the sample activated for 120 min shows that after heating to 540 °C and 600 °C the value of magnetization increases 17 % and 62 %, respectively. Compressed powder samples were sintered for 2 hours at 1200 °C, leading to an increase in magnetization of 81 to 123 %. Thermomagnetic measurements of sintered samples in 20-450 °C temperature interval shows that sintered samples possess both ferromagnetic and ferroelectric properties. The relative dielectric constant of sintered samples at room temperature is around 8x10⁴, depending on mechanical activation time.

P24

Tetramethylammonium-smectites as nicotine adsorbents

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Nicotine i.e. (S)-3-(1-methylpyrrolidin-2-yl) pyridine is an alkaloid present mostly in tobacco, used for cigarette production and consequently in wastewaters obtained during tobacco manufacturing. The adsorption, as wastewater purification method, is among widely

used methods. New class of hybrid nanomaterials based obtained of intercalation of tetramethylammonium (TMA) cations into clay minerals, i.e. smectite, potentially could be effective adsorbents due to their organic-inorganic interfaces. Therefore the influence of TMA loading on adsorption properties of nanocomposite toward nicotine was investigated. The series of nanocomposites with different TMA:smectite ratios was synthesized and characterized by XRD and low temperature nitrogen physisorption. The nanocomposites with intercalated TMA into smectite in pillared arrangements with highly developed porous structure were found to be the most efficient adsorbents. The adsorption isotherms of nicotine were fitted with different models and the Langmuir isotherm model showed the best agreement with experimental data.

P25

Synthesis and characterization of SrY₂O₄:Eu³⁺ nanoparticles for potential application in solar cells

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Here in this work, SrY₂O₄ with different concentration of Eu³⁺ nanoparticles (0.25, 0.5, 1, 2, 4 and 8 at%) were investigated for the purpose of application in solar cells. Nanoparticles were obtained with citrate sol-gel method using glycine as a fuel. The samples was burned in the furnace at 500 °C for 1.5h and then finally calcined for 2.5h at 1000 °C. Solar cell was made using ITO conductive glass; composite film that consisted of SrGd₂O₄:Eu³⁺ nanoparticles and hypericine as a natural dye, electrolyte (0.5M KI + 0.05M I₂) and aluminum as a counter electrode. Layer was deposited by spraying technique and had a thickness of 1µm. Characterization was performed by X-ray diffraction (XRD), Scanning electron microscopy (SEM), Photoluminescent measurements (PL) and Current-Voltage (I-V) measurements. The solar cell was investigated at very low light (5% of sun), low light (35% of sun) and at Standard test conditions (1 sun) with different light distribution. Whole cell surface was 7.5 cm² while illuminated part was 3 cm².

P26

Determination of pigments using the SEM-EDS method for the restoration and conservation of art painting

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The aim of this paper is to identify the pigments present in the samples of painting colors that were applied in the production of a certain artistic painting.

Characterization, control and analysis of various materials (metals, ceramics, semiconductors, polymers, etc.) can't be imagined without knowing their microstructure and microstructural constituents. Therefore, the techniques and methods for analyzing the