Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION XI
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 2023.

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Dear colleagues and friends,

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

It is nice to host you here in Belgrade in person. We are very proud that we succeeded in bringing the scientific community together again and fostering the networking and social interactions around an interesting program on emerging advanced ceramic topics. The chosen topics cover contributions from fundamental theoretical research in advanced ceramics, computer-aided design and modeling of new ceramics products, manufacturing of nano-ceramic devices, developing of multifunctional ceramic processing routes, etc.

Traditionally, ACA Conferences gather leading researchers, engineers, specialists, professors and PhD students trying to emphasize the key achievements which will enable the widespread use of the advanced ceramics products in the High-Tech industry, renewable energy utilization, environmental efficiency, security, space technology, cultural heritage, etc.

Serbian Ceramic Society was 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 the Serbian Ceramic Society in accordance with Serbian law procedure. Serbian Ceramic Society is almost the only one Ceramic Society in South-East Europe, with members from more than 20 Institutes and Universities, active in 9 sessions..

Dr. Nina Obradović
President of the Serbian Ceramic Society

Dr. Suzana Filipović
President of the General Assembly of the Serbian Ceramic Society

Conference Topics

- Basic Ceramic Science & Sintering
- Nano-, Opto- & Bio-ceramics
- Modeling & Simulation
- Glass and Electro Ceramics
- Electrochemistry & Catalysis
- Refractory, Cements & Clays
- Renewable Energy & Composites
- Amorphous & Magnetic Ceramics
- Heritage, Art & Design

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Institut za tehnologiju nuklearnih i drugih mineralnih sirovina

P16

One-Step Synthesis of Biocompatible $NaY_{0.65}Gd_{0.15}F_4$:Yb,Er Upconverting Nanoparticles for *In Vitro* Cell Imaging

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There is a great technological interest in synthesis of lanthanide doped upconverting nanoparticles (UCNPs) with controlled crystal phase, morphology and intense luminescence properties suitable for biomedical use. A conventional approach for synthesis of such particles comprises decomposition of organometallic compounds in an oxygen-free environment, followed either with a ligand exchange, or biocompatible layer coating. Biocompatible $NaY_{0.65}Gd_{0.15}F_4$:Yb,Er nanoparticles used in this study were synthesized through chitosan assisted one-pot hydrothermal synthesis and were characterized by X-ray powder diffraction (XRPD), Fourier-transform infrared (FTIR) spectroscopy, scanning electron microscopy coupled with energy dispersive X-ray spectroscopy (SEM/EDS) and photoluminescence measurement (PL). Due to the presence of the amino groups at their surface, excellent biocompatibility and notably low cytotoxicity against MRC-5 cells (line of normal human fibroblasts) and A549 cells (human lung cancer cells) were detected using MTT assay. Furthermore, upon 980 nm laser irradiation, particles were successfully used *in vitro* for labeling of both, MRC-5 and A549 cells.

P17

Characterization of NTC thick film thermistor paste $Cu_{0.2}Ni_{0.5}Zn_{1.0}Mn_{1.3}O_4$

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A powder of $Cu_{0.2}Ni_{0.5}Zn_{1.0}$ $Mn_{1.3}O_4$ composition for custom thermistor was prepared by using a certain mixture of metal oxides and solid state reaction at 1000 °C/4h in air. The obtained thermistor powder was milled in the planetary ball mill and agate mill for a prolonged time to achieve submicron powder. The prepared thermistor powder was further characterized by using XRD and SEM techniques. After that, the thermistor powder was pressed into small disc-shaped samples and sintered at 1150 °C/2h. The sintered samples were also characterized by using XRD and SEM. The main electrical properties such as nominal resistance R and thermistor exponential factor B were measured in the climatic test chamber. After that, the thick film paste was prepared using the same powder, an organic vehicle and a glass frit. The paste was printed on alumina substrate, dried at 150 °C / 30 min and sintered in

air at 850 °C / 10 min in the hybrid conveyor furnace. The planar electrodes were printed on the sintered NTC thermistor layer using the PdAg thick film paste. The electric properties of sintered thick film thermistor were also measured in the climatic test chamber. The obtained results were used for development of novel self-heating thermistor applications.

P18
Corrosion behavior of Ni-P-based amorphous and nanocrystalline alloys

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Powder alloys consisted of amorphous ultrafine powders have many favorable functional characteristics, and therefore find application in composite materials production, catalysis, ferrofluids, magnetic recording media and powder metallurgy. Amorphous alloys, as kinetically and thermodynamically metastable materials, are prone to structural transformations at elevated temperatures or pressures, or during prolonged application under mild conditions. Corrosion properties of such materials, being influenced by the microstructure, significantly affect their suitability for practical application.
Ni-P-based powder materials with different chemical composition and microstructure were prepared using chemical reduction method. For the as-prepared and thermally treated materials, detailed microstructure and morphology analyses were performed. By using electrochemical methods, corrosion properties of the as-prepared and thermally treated materials were studied in different environments, including neutral, acidic and alkaline media of different concentrations. Relatively good corrosion resistance of the studied Ni-P-based materials was observed. It is indicated that the microstructure and chemical composition of the studied materials affect the mechanism of formation and composition of the oxide/hydroxide layer nearby the electrode surface, thus influencing the corrosion behavior of the material.

P19
The effect of different particle sizes of bentonite from the Bogovina deposit on the Briggs-Rauscher oscillatory reaction

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The Briggs-Rauscher oscillatory reaction, which represents the oxidation of malonic acid in the presence of hydrogen peroxide and potassium iodate catalyzed by manganese ion in an acidic environment, proved to be extremely sensitive for testing insoluble materials, such as bronzes and clays. It was shown that origin of bentonite has high impact on the length of the