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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Република Србија
МИНИСТАРСТВО НАУКЕ,
ТЕХНОЛОШКОГ РАЗВОЈА И
ИНОВАЦИЈА

INV1

$BaTiO_3/Ni_xZn_{1-x}Fe_2O_4$ (x =0, 0.5, 1) composites synthesized by thermal decomposition: The influence of phase composition on their magnetic and electrical properties

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To examine the influence of phase composition on the magnetic, dielectric, and ferroelectric properties of perovskite/spinel composites, $NiFe_2O_4$, $ZnFe_2O_4$, and $Ni_{0.5}Zn_{0.5}Fe_2O_4$ were *in situ* prepared by thermal decomposition onto $BaTiO_3$ surface. Acetylacetonate complexes were used as the precursors. The synthesized powders were compressed to pellets and additionally sintered at 1150 °C and 1300 °C. X-ray powder diffraction (XRPD) and scanning electron microscopy (SEM) coupled with electron dispersive spectroscopy (EDS) were used for the comprehensive study of phase composition and morphology. The magnetic and electrical properties were performed in detail. The optimal phase composition was found in the $BaTiO_3/NiFe_2O_4$ composite sintered at 1150 °C. This resulted in wide frequency range stability of relative dielectric constant. Furthermore, optimal phase composition in $BaTiO_3/NiFe_2O_4$ led to suitable properties such as low conductivity and ideal-like hysteresis loop behavior. These functional properties of $BaTiO_3/NiFe_2O_4$ make this composite a promising candidate for further studies on multiferroic properties.

INV2

Processing and testing of UHTCMCs for aerospace applications

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Materials used for thermal protection systems of space vehicles need to withstand extreme temperatures and intense mechanical vibrations during launch and re-entry into the Earth's atmosphere. The conditions they are exposed to, including extremely high temperatures, chemically aggressive environments, and rapid heating and cooling, surpass the capabilities of current materials. Ultra-high-temperature ceramics, such as borides and carbides of early transition metals, belong to a class of materials that possess melting points exceeding 3000°C, high thermal and electrical conductivities, and excellent ablation resistance. However, their low fracture toughness and poor thermal shock resistance pose major obstacles to their implementation. In the past few years, a new class of materials labelled UHTCMCs (ultra-high temperature ceramic matrix composites) has been developed combining a UHTC rich matrix with carbon fibres. In this presentation, we will showcase the recent advancements in the manufacturing of UHTCMCs and discuss their mechanical and environmental testing. By optimizing the compositions and textures, we have achieved outstanding resistance to ablation