



**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*  
*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

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microscopy (FESEM) and Fourier transform infrared spectroscopy (FTIR). The analyses confirmed the presence of new, well developed HAp crystals on the surface of scaffolds after incubation in SBF as a proof of their excellent bioactivity. The mechanical properties of scaffolds and their antimicrobial activities against *Escherichia coli* and *Staphylococcus aureus* were also investigated. In spite of less satisfactory results of mechanical testing, the antimicrobial activity was significant, especially in the case of scaffold obtained from AgCuSi-HAp powder.

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### Synthesis of BaFe<sub>12</sub>O<sub>19</sub>-BaTiO<sub>3</sub> multiferroics by mechanical activation

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A mixture of polycrystalline powders of Fe (70 % wt.) and BaTiO<sub>3</sub> (30 % wt.) was ball-milled in a planetary mill under air atmosphere, for different time intervals: 60, 120, 180, 240, 300 and 360 min. During the mechanical activation, the powder was exposed to oxygen from the air, resulting in formation of iron oxides: FeO and then Fe<sub>2</sub>O<sub>3</sub> and Fe<sub>3</sub>O<sub>4</sub>.

XRD and SEM analyses of the activated powders revealed that the weight fraction of the iron oxides in the mixture and microcrystal size depend on the activation time. For the powders activated for different time intervals, average crystallite size ( $D_{hkl}$ ), dislocation density ( $\rho_n$ ) and average microcrystal size of BaTiO<sub>3</sub> and Fe were determined. In order to investigate the influence of thermally induced structural changes on magnetic properties, the change of magnetic properties of the pressed activated powders during multiple heating in a magnetic field of 10KA/m was measured. Maximum magnetization of the samples was reached after heating at 620 K.

Pressed powder samples were sintered at temperatures of 1100 °C and 1200 °C for 2h giving the different phase diagrams. The samples sintered at 1100 °C include BaTiO<sub>3</sub>, BaFe<sub>12</sub>O<sub>19</sub> and BaFeO<sub>2,67</sub> as the dominant components. The samples sintered at 1200 °C containing only two components, BaTiO<sub>3</sub> and BaFe<sub>12</sub>O<sub>19</sub>, exhibited pronounced ferromagnetic and ferroelectric properties.