



**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 - Каталогизација 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 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

### Conference Co-chairmen:

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.

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.

## P17

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

O. Kosić<sup>1</sup>, D. Kosanović<sup>2</sup>, V. Randelović-Ćirić<sup>1</sup>, A. Maričić<sup>1</sup>, D. M. Minić<sup>3</sup>

<sup>1</sup>Faculty of Technical Sciences, University of Kragujevac, 32000 Čačak, Serbia

<sup>2</sup>Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, 11000  
Belgrade, Serbia

<sup>3</sup>Faculty of Physical Chemistry, University of Belgrade, 11000 Belgrade, Serbia

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.