

11<sup>TH</sup> CONFERENCE FOR YOUNG SCIENTISTS IN CERAMICS



# **11<sup>TH</sup> CONFERENCE FOR YOUNG SCIENTISTS IN CERAMICS**

Satellite event:  
**ESR COST IC1208 Workshop**

## **BOOK OF ABSTRACTS**

October 21-24, 2105  
Faculty of Technology  
Novi Sad, Serbia



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## **PROGRAMME and BOOK OF ABSTRACTS**

**October 21-24, 2015  
Novi Sad, Serbia**

**Programme and Book of Abstracts of The 11<sup>th</sup> Conference for Young Scientists in Ceramics (SM-2015, and ESR Workshop, COST MP1208)** publishes abstracts from the field of ceramics, which are presented at traditional international Conference for Young Scientists in Ceramics.

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## **Preface**

*The 11<sup>th</sup> Conference for Young Scientists in Ceramics is organized by the Department of Materials Engineering, Faculty of Technology Novi Sad, University of Novi Sad, Serbia (October 21-24, 2015) and it is followed with one Satellite Event: Early Stage Researchers Workshop of the COST Action IC1208 "Integrating devices and materials: a challenge for new instrumentation in ICT".*

*This Conference first started as the Students' Meeting back in 1998 when it was just a national meeting for Serbian PhD students. After three national, this year is going to be the eighth consecutive international conference held every second year. For several years now, the Conference has a well-earned reputation as an excellent opportunity for the promotion of the work in the field of ceramics done by early stage researchers, being MSc and PhD students or young doctors. Additionally, the young scientists will be in the position to attend sessions covering major general topics of broad interest which will be presented by experienced scientists through the invited lectures. In that way, young researchers will have a chance to participate in the active discussions with their senior colleagues who are all well-known scientists in their area of expertise. We strongly hope that the overall activities during this event will create for the young researchers a fruitful platform for finding new topics, ideas and approaches for their scientific research and an excellent opportunity for establishing connections and finding proposals for collaborations*

*General idea behind the Conference was and will continue to be the building of the closely intertwined European scientific network by offering the platform for young scientists to meet, discuss and exchange ideas in the ever growing field of ceramics. It is our deepest belief that this approach will be beneficial for both young researchers and the European science as a whole. Therefore, we strongly appreciate that the European Ceramic Society identified the efforts and the enthusiasm we have put into this idea of creating the bridge between young researchers and we truly hope that the European Ceramic Society will support this initiative in the future. Special thanks to the JECS Trust Fund and COST IC1208 for strong financial support of the Meeting. The Conference was also recognized by the Serbian Ministry of education, science and technological development as well as by the Provincial Secretary of science and technological development and we would like to thank them for their endorsement too. A total number of 110 presentations given by young researchers and 13 invited talks coming from 25 countries with multidisciplinary profiles will be presented during the conference. It should be emphasised that presented topics cover research subjects of the highest scientific interest: experimental, theoretical and applicative aspects of synthesis, processing, advanced nano/microscale and functional characterisation of various types of structures and ceramic materials. We wish to express our thanks to the members of the local organizing committee in Novi Sad for their effort and time during preparation of the Conference, and especially to thank our endorsers and sponsors for making this event possible.*

*Editors*

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### **BiFeO<sub>3</sub> CERAMICS DENSIFICATION STUDY**

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Bismuth ferrite (BiFeO<sub>3</sub>) is one of the very few materials possessing ordered both electrical dipoles and magnetic moments in very wide range of temperatures. That gives it tremendous opportunities for research and application.

BiFeO<sub>3</sub> precursor powders were prepared by auto-combustion and soft chemical synthesis methods using different organic compounds as fuels and complexing agents. They were calcined at 600 °C for 2 h, grinded, pressed and sintered at 800 °C for 1 h with quenching. XRD and SEM confirmed formation of very pure BiFeO<sub>3</sub> perovskite phase, but problem with low density, which is characteristic for BiFeO<sub>3</sub> ceramics, still remained. It doesn't affect magnetic properties, but has strong influence on electrical and, through them, on multiferroic properties. To define actual, intrinsic properties of material, it is very important to obtain ceramics with densities close to theoretical. For this reason, many treatments were tried in order to raise samples' densities: powder milling and homogenization, ultrasound, different pressures, various thermal treatments. Powders and ceramic samples were then characterized (particle size analysis, XRD, SEM). The densities of sintered BiFeO<sub>3</sub> samples were measured. All the treatments had impact on ceramics density, but some also introduced secondary phases.

E5

### **CHARACTERIZATION OF 0.9Pb(Mg<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>-0.1PbTiO<sub>3</sub> ELECTROCALORIC MULTILAYERED STRUCTURES PREPARED BY TAPE CASTING**

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The electrocaloric (EC) effect is an adiabatic and reversible temperature change, due to reorientation of dipoles in a polar material induced by an electric field. Lead-based relaxor ferroelectrics, such as PbMg<sub>1/3</sub>Nb<sub>2/3</sub>O<sub>3</sub>-PbTiO<sub>3</sub> (PMN-PT), exhibit high dielectric permittivity and polarization, and a large change of polarization with temperature resulting in large EC temperature changes ( $\Delta T_{EC}$ ). The largest  $\Delta T_{EC}$  has been