

Faculty of Technology
University of Novi Sad

Conference for Young Scientists in Ceramics

10th Students' Meeting
and
3rd ESR COST MP0904 Workshop

Book of Abstracts

Conference for Young Scientists in Ceramics

SM 2013
COST SIMUFER

Novi Sad, Serbia, November 6-9, 2013

CONFERENCE for YOUNG SCIENTISTS in CERAMICS

**The Tenth Students' Meeting, SM-2013
The Third ESR Workshop, COST MP0904**



PROGRAMME and BOOK OF ABSTRACTS

**November 6-9, 2013
Novi Sad, Serbia**

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Editors-in-Chief

Prof. Dr. Vladimir V. Srdić

Prof. Dr. Liliana Mitoseriu

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Preface

The Conference for Young Scientists in Ceramics is organized by the Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia (November 6-9, 2013). This year it consists of two events - The Tenth Students' Meeting, SM-2013, "Processing and Application of Ceramics" and The Third Early Stage Researchers Workshop of the COST Action MP0904 "Single- and multiphase ferroics and multiferroics with restricted geometries".

The first Students' Meeting was held in 1998 as a national meeting for Serbian PhD students and this year tenth meeting will be the seventh international in a row. For several years now, the Meeting 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 MP0904 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 122 presentations given by young researchers and 1 plenary lecture and 14 invited talks coming from 26 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 Meeting, and especially to thank our endorsers and sponsors for making this event possible.

Editors

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**The Third Early Stage Researchers Workshop
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oxide nanoparticles stands in the versatility of the brucite-like sheets composition which may allow the insertion of key cations, like Zn^{2+} and Ti^{4+} , within the LDH network. The LDHs materials can supply a good dispersion of the metal cations within the layers which may act as charge separation centers enhancing the efficiency in photocatalytic applications.

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M16

SYNTHESIS AND CHARACTERIZATION OF NICKEL ZINC FERRITES

A. Džunuzović¹, N. Ilić¹, J. Bobić¹, M. Vijatović Petrović¹,
L. Curecheriu², B. Stojanović¹

¹*Institute for multidisciplinary research, Belgrade University, Kneza Višeslava 1, Belgrade, Serbia*

²*Faculty of Physics, Alexandru Ioan Cuza University of Iasi, Romania*

In this study we have prepared nickel ferrite (NF) and nickel zinc ferrite (NZF) nanoparticles by auto-combustion method starting from nickel, zinc and iron nitrates. After the process of self-ignition, fine precursor powder was thermally treated at 1000 °C for 1 h, forming nickel zinc ferrite powders, with molar ratio of Zn 0, 0.3, 0.5, 0.7. XRD characterization showed the formation of well crystallized nickel ferrite and nickel zinc ferrite inverse spinel structure without presence of secondary phases. Ceramic materials were obtained by uniaxial pressing at 196 MPa and sintering at 1250 °C for 4 h in the tube furnace. SEM images at the free surface showed that substitution of Ni^{2+} ions with

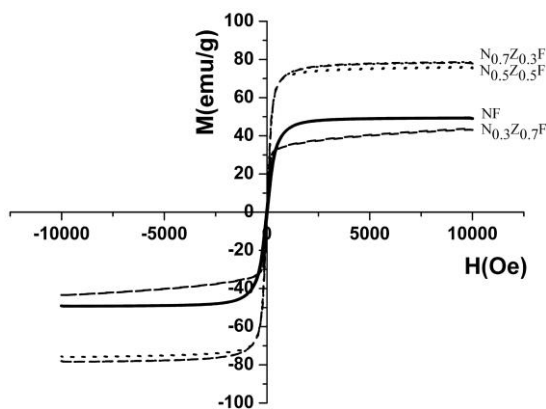


Figure 1. Magnetic measurements of $Ni_{1-x}Zn_xFe_2O_4$ ceramics

Zn^{2+} ions results in larger grains and lower porosity, confirmed by density measurements.

Magnetization results showed ferromagnetic behavior of the NF and NZF materials. Magnetic measurements of ferrites were carried out and presented in Fig. 1. Saturation magnetization moment of NF was lower than for $N_{0.7}Z_{0.3}F$ and $N_{0.5}Z_{0.5}F$, but slightly higher than for $N_{0.3}Z_{0.7}F$. With increasing the ratio of Zn to 0.3, magnetization increases, because the Fe^{3+} ions in the octahedral site interact with other Fe^{3+} ions. The fields at which saturation occur was almost the same for all materials.

M17

DIELECTRIC PROPERTIES OF NANOGRAIN BSPT CERAMICS

S. Balčiūnas¹, M. Ivanov¹, H. Amorín², A. Castro², M. Algueró², J. Banys¹

¹Faculty of Physics, Vilnius University, Sauletekio 9/3 817k., LT10222 Vilnius, Lithuania

²Instituto de Ciencia de Materiales de Madrid, CSIC, Cantoblanco,
28049 Madrid, Spain

Ferroelectric materials are of high interest for both researchers and engineers due to their remarkable properties. Their switchable electric polarization [1] is ideal for use in devices for memory storage and integrated microelectronics. Advanced devices tend to nanoscale, that raises necessity to research new cheaper and more durable materials.

BSPT ($xBiScO_3-(1-x)PbTiO_3$, $x = 0.36$ and 0.375) ceramics with micron, submicron and nanoscale grains were produced from nanocrystalline powders obtained by mechanosynthesis [2] in different milling media (WC and stainless steel). From Fig. 1

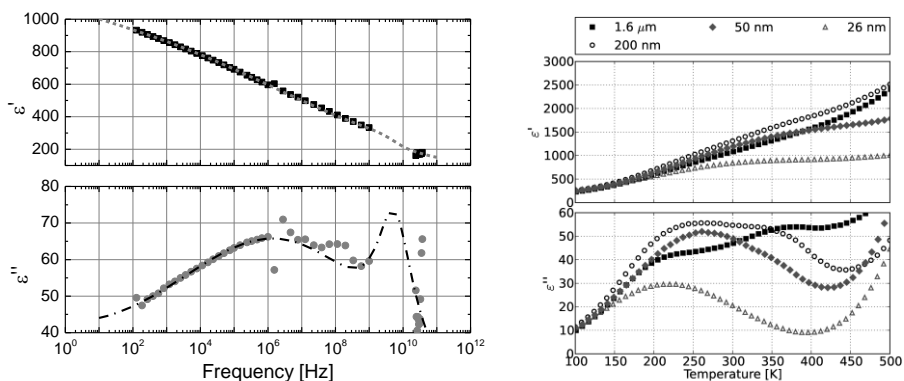


Figure 1. Frequency dependence and fit curves of real (top left) and imaginary (bottom left) part of dielectric permittivity at 225 K temperature for BSPT 200 nm grain size and temperature dependence at 1 kHz frequency of real (top right) and imaginary (bottom right) of different grain size BSPT ceramics produced in WC milling media