FIRST INTERNATIONAL CONFERENCE ON ELECTRON MICROSCOPY OF NANOSTRUCTURES

ELMINA 2018

ПРВА МЕЂУНАРОДНА КОНФЕРЕНЦИЈА О ЕЛЕКТРОНСКОЈ МИКРОСКОПИЈИ НАНОСТРУКТУРА

August 27-29, 2018, Belgrade, Serbia
27–29. август 2018. Београд, Србија

FIRST INTERNATIONAL CONFERENCE

ELMINA 2018

PROGRAM

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BOOK OF ABSTRACTS

Rectorate of the University of Belgrade, Belgrade, Serbia
August 27-29, 2018
http://elmina.tmf.bg.ac.rs

Organized by:
Serbian Academy of Sciences and Arts and Faculty of Technology and Metallurgy, University of Belgrade

Endorsed by:
European Microscopy Society and Federation of European Materials Societies

FIRST INTERNATIONAL CONFERENCE
ELMINA 2018
Program and Book of Abstracts

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At the beginning we wish you all welcome to Belgrade and ELMINA2018 International Conference organized by the Serbian Academy of Sciences and Arts and the Faculty of Technology and Metallurgy, University of Belgrade. We are delighted to have such a distinguished lineup of plenary speakers who have agreed to accept an invitation from the Serbian Academy of Sciences and Arts to come to the first in a series of electron microscopy conferences: Electron Microscopy of Nanostructures, ELMINA2018. We will consider making it an annual event in Belgrade, due to this year's overwhelming response of invited speakers and young researchers. The scope of ELMINA2018 will be focused on electron microscopy, which provides structural, chemical and electronic information at atomic scale, applied to nanoscience and nanotechnology (physics, chemistry, materials science, earth and life sciences), as well as advances in experimental and theoretical approaches, essential for interpretation of experimental data and research guidance. It will highlight recent progress in instrumentation, imaging and data analysis, large data set handling, as well as time and environment dependent processes. The scientific program contains the following topics:

- Instrumentation and New Methods
- Diffraction and Crystallography
- HRTEM and Electron Holography
- Analytical Microscopy (EDS and EELS)
- Nanoscience and Nanotechnology
- Life Sciences

To put this Conference in proper prospective, we would like to remind you that everything related to nanoscience and nanotechnology started 30 to 40 years ago as a long term objective, and even then it was obvious that transmission electron microscopy (TEM) must play an important role, as it was the only method capable of analyzing objects at the nanometer scale. The reason was very simple - at that time, an electron microscope was the only instrument capable of detecting the location of atoms, making it today possible to control synthesis of objects at the nanoscale with atomic precision. Electron microscopy is also one of the most important drivers of development and innovation in the fields of nanoscience and nanotechnology relevant for many areas of research such as biology, medicine, physics, chemistry, etc. We are very proud that a large number of contributions came from young researchers and students which was one of the most important objectives of ELMINA2018, and which indicates the importance of electron microscopy in various research fields. We are happy to present this book, comprising of the Conference program and abstracts, which will be presented at ELMINA2018 International Conference. We wish you all a wonderful and enjoyable stay in Belgrade.

TABLE OF CONTENTS

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GENERAL INFORMATION

DATE AND VENUE: The conference will be held August 27-29, 2018 at the Rectorate of the University of Belgrade, Studentski Trg 1, 11000 Belgrade, Serbia with the beginning at 8:30 AM on August 27th, 2018, in the Solemn Hall.

REGISTRATION: At the registration desk, located and the ground floor hall of the conference venue. Registration desk working hours are: Sunday, August 26th, from 16:00 to 18:00, Monday, August 27th, from 08:00 to 18:30, Tuesday, August 28th, from 08:00 to 13:00, Wednesday, August 29th, from 08:00 to 11:00. Registered participants will receive a nametag and a conference bag.

INSTRUCTIONS FOR AUTHORS: The conference will feature plenary sessions and poster sessions as well as vendor presentations during lunch breaks. Presentations during plenary sessions will last 30 minutes each, including discussion. Standard and hands-free microphones will be on site. No A-V equipment will be provided for any poster presentations. Poster presenters must remain at their poster on their assigned day during the required poster session. Each poster will be allocated a 130 cm high and 95 cm wide (130X95) display area.

CONFERENCE AWARDS: Poster presentations will be reviewed according to the following criteria: (a) relevance to a specific symposium, (b) scientific content, quality and innovative proposals, (c) clarity of the text, and (d) compliance with the format. During the conference, the best three (3) posters, selected by a poster award committee, will receive awards.

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• **PO1.28**

Synthesis and Characterization of $Na_{0.4}MnO_2$ as a Positive Electrode Material for an Aqueous Electrolyte Sodium-ion Energy Storage Device

Lazar Rakočević[1], Mirjana Novaković[2], Jelena Potočnik[2], Dragana Jugović[3] and Ivana Stojković Simatović[1]

[1]University of Belgrade, Faculty of Physical Chemistry, Belgrade, Serbia, [2]University of Belgrade, Vinča Institute of Nuclear Sciences, Serbia, [3]Institute of Technical Sciences of SASA, Belgrade, Serbia

• **PO1.29**

Metal Nanoparticles-PANI Nanocomposites and their Applications

Una Stamenović[1], Vesna Vodnik[1] and Mojca Otoničar[2]

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• **PO1.30**

Morphology of Nanotubular Oxide Layer Formation on Titanium and Titanium Alloy Using Electrochemical Anodization

Dragana R. Barjaktarević[1], Ivana D. Dimić[1], Ivana Lj. Cvijović-Alagić[2], Veljko R. Đokić[1] and Marko P. Rakin[1]

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• **PO1.31**

Depth Analysis of Thin Films Using StrataGem Program

Jelena Potočnik, Maja Popović, Mirjana Novaković, Davor Peruško, Zlatko Rakočević

University of Belgrade, INN Vinča, Mike Petrovića Alasa 12-14, 11351 Belgrade, Serbia

• **PO1.32**

Improvement of Density and Influence of Sb Doping on Structural Properties of Perovskite $BaSnO_3$

Jelena Vukašinović[1], Milica Počuča-Nešić[1], Danijela Luković Golić[1], Slavica M. Savić[2], Zorica Branković[1], Nikola Tasić[1], Aleksandra Dapčević[3], Slavko Bernik[4], Matej Kocen[4] and Goran Branković[1]

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Perovskite-type materials are widely important class of materials due to their interesting physical properties, such as superconductivity, ferromagnetism, ferroelectricity, piezoelectricity, and many others [1]. Barium stannate ($BaSnO_3$) is crystalizing in an ideal cubic structure, and has good chemical and thermal stability at high temperatures up to 1200 °C. Undoped $BaSnO_3$ is an n-type semiconductor with a band gap of ~3.1 eV [1]. $BaSnO_3$ finds application as dielectric ceramic material, transparent conducting oxide (TCO), resistor, photocatalyst, photoanode material, gas sensor for many gases, protonic conductor. Doping with antimony (Sb) can improve the electrical conductivity and enhance density during sintering [1-4].

In this work samples of $BaSn_{1-x}Sb_xO_3$ (x = 0.04, 0.06, 0.08, 0.1) were prepared by mechanochemically assisted solid state method. Precursor powders $BaCO_3$, SnO_2 and Sb_2O_3 were mechanochemically activated in isopropanol for 8h. After drying prepared powders were calcined at 900 °C for 4h in air. Calcined powder were mounted into a carbon die and subsequently sintered by spark plasma sintering (SPS) at 1200 °C for 5 minutes. Structural properties of the obtained ceramic samples of ($BaSn_{1-x}Sb_xO_3$) were completely characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and atomic force microscopy (AFM). Electrical properties of the ceramic $BaSn_{1-x}Sb_xO_3$ samples were determined by measuring the current-voltage characteristics at room temperature and elevated temperatures in different mediums (air, silicon oil). The

XRD analysis showed the formation of the cubic perovskite $BaSnO_3$ as a major phase and Ba_2SnO_4 as a secondary phase. The content of tetragonal secondary phase of Ba_2SnO_4 was approximately the same in all samples. This confirmed that presence of Sb did not influence the forming of Ba_2SnO_4. Ionic radius of Sb^{3+} (0.076 nm) is larger than ionic radius of Sn^{4+} (0.069 nm), and it incorporation by lattice leads to the increase of lattice parameter [4]. The cubic lattice parameter *a* was estimated to be 0.41287(9), 0.41301(9), 0.41321(9) and 0.41302(4) nm for x =0.04, 0.06, 0.08 and 0.1, respectively. The relative densities were 95.2 %, 84.2 %, 85.9 % and 79.2 % for x =0.04, 0.06, 0.08 and 0.1, respectively The SEM images of the fractured surfaces of the obtained ceramics revealed that all samples were well-densified, with the trend of reducing a grain size with increasing of Sb concentration. The AFM images showed the existence of various particles shapes, with the particle size of around 36 nm.

References:

[1] M Hiroshi *et al*, Chemistry of Materials **25** (19) (2013), 3858.
[2] Y Masahiro *et al*, Materials Science and Engineering B **173** (2010), 29.
[3] L Wenzhong *et al*, Sensors and Actuators **80** (2000), 35.
[4] Y Daisuke *et al*, Materials Science and Engineering B **173** (2010), 33.
[5] The authors would like to acknowledge the financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia, project III 45007.

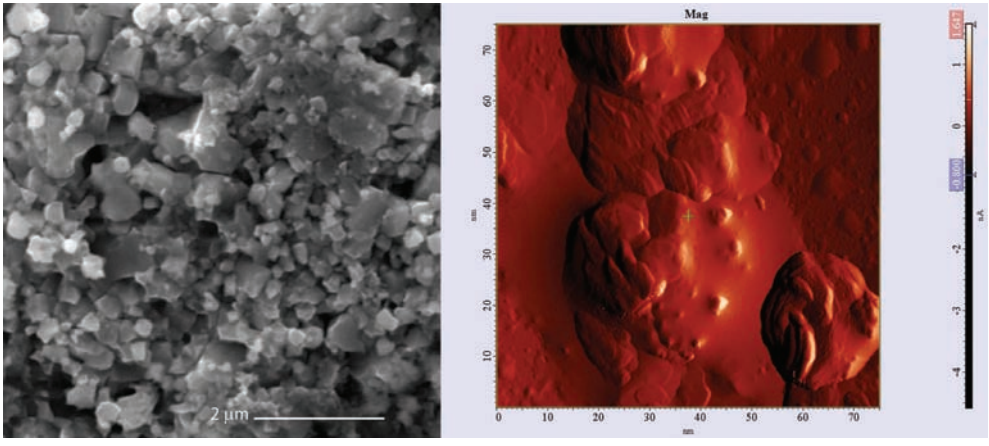

Figure 1. SEM image of fractured surface of $BaSn_{0.92}Sb_{0.08}O_3$ (left) and AMF image of crashed pellet of $BaSn_{0.92}Sb_{0.08}O_3$ (right).