Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VII
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, 17-19. September 2018.

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Book title:
Serbian Ceramic Society Conference -
ADVANCED CERAMICS AND APPLICATION VII
Program and the Book of Abstracts

Publisher:
Serbian Ceramic Society, Belgrade, 2018.

Editors:
Prof. dr Vojislav Mitić
Dr Lidija Mančić
Dr Nina Obradović

Technical Editors:
Ivana Dinić
Marina Vuković

Printing:
Serbian Ceramic Society, Belgrade, 2018.

Edition:
130 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 (7 ; 2018; Beograd)
Program ; and the Book of Abstracts / Serbian Ceramic Society
Conference Advanced Ceramics and Application VII : New Frontiers in Multifunctional Material Science and Processing, Serbia, Belgrade, 17-19. September 2018 ; [organized by] Serbian Ceramic Society ... [et al.] ; [editors Vojislav Mitić, Lidija Mančić, Nina Obradović]. - Belgrade : Serbian Ceramic Society, 2018 (Belgrade : Serbian Ceramic Society). - 106 str. : ilustr. ; 30 cm
Tiraž 130.
ISBN 978-86-915627-6-2
a) Керамика - Апстракти b) Наука о материјалима - Апстракти c) Наноматеријали - Апстракти

COBISS.SR-ID 267569676

Dear Colleagues,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference VII 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 emphasizes the key achievements which will enable the wide speared use of the advanced ceramics products in High-Tech industry, renewable energy utilization, environmental efficiency, security, space technology, cultural heritage, 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.

This year, the conference is dedicated to the memory of Academician Momčilo M. Ristić (1929-2018), Honorary President of the Serbian Ceramic Society and founder of Material Science in our country.

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 Ceramic Science & Sintering – *in memoriam Momčilo M.Ristić, academician*
Optical, Glass & Electro Ceramics
Nano & Bio Ceramics
Modeling & Simulation
Advanced Ceramics
Heritage, Arts & Design
Guide on Science Writing

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Exchange office „Hulk", LMB Soft, Niš (Serbia), SCAN doo. Preddvor (Slovenia),
Voda Vrnjci (Serbia) and Turistička organizacija Beograd

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
High School-Academy for Arts and Conservation.

μm - 40 μm. An increase in dopant concentration and sintering temperature causes a decrease in the average grain size in the investigated samples. So it is for samples doped with 1.0 at% Er/Yb, grain size range between 5 μm - 30 μm. The electrical resistivity were measured in temperature range from 25°C to 180°C at different frequencies. The value of the electrical resistivity decreases with increasing concentration of dopant, to a concentration of 0.5 at% Er/Yb, and then resistivity increases with dopant content in high doping level. Also, the electrical resistivity decreasing with increasing frequency, and for high frequencies it is lower by few order of magnitude.

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Microstructure and EDS Characterization of Doped $BaTiO_3$ Ceramics

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The purpose of this paper is an investigation of the effects of various dopants (La, Nb, Sb) on the microstructure properties, phase composition and contact surface of $BaTiO_3$ based ceramics. The doped $BaTiO_3$-ceramics were prepared by conventional solid state procedure and sintered up to 1350°C for four hours. The concentration of additive were range from 0.1 to 5.0 at% of La, Nb or Sb.

The grain size and microstructure characteristics for various samples and their phase composition was carried out using a scanning electron microscope SEM (JEOL-JSM 5300) equipped with EDS (QX 2000S) system.

The homogeneous and completely fine-grained was observed in samples doped with low concentration of dopant (0.1 and 0.5 at %). EDS analysis of this samples did not reveal any dopant-rich regions, which indicated a uniform incorporation of dopants within the samples. In high doped samples, apart from the fine grained matrix, the appearance of local area with secondary abnormal grains was observed. The increase of dopant concentration leads to the appearance of dopant-rich regions between grains.

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The Alternative energy sources review

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Renewable energy sources are energy sources that are derived from nature and can be renewed. Today, they are increasingly being used because of their harmlessness to the environment. Most renewable energy technologies are powered directly or indirectly from the Sun. The composition of the Earth's atmosphere is balanced, so that the radiation into space is equal to the

incoming solar radiation, which results in a certain energy degree within the Earth's atmospheric composition, and we can roughly describe it as the Earth's climate.

Renewable energy is obtained from natural processes that are constantly renewed. In its various forms, it derives directly from the sun, or from heat generated deep within the Earth. It also includes electricity and heat generated from sources such as sunlight, wind, oceans, hydropower, biomass and geothermal energy, biofuels and hydrogen from renewable sources. Each of these sources has unique characteristics that influence how and where they can be used. Renewable energy sources include: solar energy, wind energy, biomass, biofuel, biogas, geothermal sources, energy of small watercourses, tidal energy, energy of the waves, internal energy of the sea and the ocean.

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Structural characterization of Kalsilite

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Thermally induced phase transformation of K-exchange LTA zeolite is followed in the range from room temperature to 1500 ºC. The frameworks collapse into amorphous intermediate products after heating between 600 and 650 °C. Prolonged heating of the intermediate product over 1100 °C results directly in formation a kalsilite [$\boldsymbol{a}$= 8.1095 (4) Å, $\boldsymbol{b}$ =12.824 (4) Å, $\boldsymbol{c}$ =7.0674 (4) Å, $\boldsymbol{\beta}$ =115.89 °(3)]. The crystale phases of kalsilite in temperature range between 700 and 1500 °C was investigated by X-ray powder analyses.

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Fractal nature Heywang model contribution and $BaTiO_3$-ceramics semiconducting phenomena

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Well known material with ferroelectric properties, $BaTiO_3$-ceramics, have many advanced applications. Fractal approach in analyzing of these structures can be one of the solution for investigation of morphology. It is known that a wide range of disordered systems can be characterized by the fractal nature over a microscopic correlation length, and on a small scale the energy transformations are permitted. Due to the lack of energy, priorities of the future frontiers in ce-