Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION III
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute of Chemistry Technology and Metallurgy
Institute of Physics
Institute for Technology of Nuclear and Other Raw Mineral Materials
Institute for Testing of Materials
Archeological Institute of SASA

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Sep 29th - Oct 1st, 2014, Belgrade, Serbia

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

Publisher:
Serbian Ceramic Society

Editors:
Prof.dr Vojislav Mitić
Prof. dr Olivera Milošević
Dr Nina Obradovic
Dr Lidija Mančić

Technical Editor:
Prof. dr Olivera Milošević

Printing:
Serbian Academy of Sciences and Arts,
Knez Mihailova 35, Belgrade
Format
Pop Lukina 15, Belgrade

Edition:
150 copies

Sculptural Concretes: Rajko D. Blažić, High School-Academy for Arts and Conservation, Serbian Ortodox Church, Belgrade, Serbia

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

666.3/.7(048)
66.017/.018(048)

SERBIAN Ceramic Society (Belgrade). Conference (3rd ; 2014 ; Beograd) Advanced Ceramics and Application : new frontiers in multifunctional material science and processing : program and the book of abstracts / III Serbian Ceramic Society Conference, 29th September - 1st October, Belgrade, 2014 ; [organized by] Serbian Ceramic Society ... [et al.] ; [editors Vojislav Mitić ... et al.]. - Belgrade : Serbian Ceramic Society, 2014 (Belgrade : Serbian Academy of Sciences and Arts). – 139 str. ; 30 cm

Tiraž 150.

ISBN 978-86-915627-2-4

1. Serbian Ceramic Society (Belgrade)
a) Керамика - Апстракти b) Наука о материјалима - Апстракти c) Наноматеријали - Апстракти

COBISS.SR-ID 209985036

PS2-19

The Ho_2O_3 Concentration Influence on $BaTiO_3$ – ceramics Fractal Structures

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An influence of dopant concentration on microstructure and dielectric properties of doped $BaTiO_3$-ceramics is developed based on fractal geometry. Using different technological parameters and different additives the structure of $BaTiO_3$ based ceramics materials can be controlled.

In this research, $BaTiO_3$ samples with different concentration of Ho_2O_3 are used. The ratio of dopant concentration ranges from 0.05% to 1%. The sintering temperature of 1350°C is chosen. Selected specimens of $BaTiO_3$ were documented using SEM (Scanning Electron Microscope) equipped with EDS analysis. As it is expected, the influence of impurities on intergranular capacity and other electrical properties is significant which is demonstrated and confirmed in this paper. Using the method of fractal modeling, a reconstruction of microstructure configurations, like grains shapes or intergranular contacts is performed.

Such interdisciplinary research is important for opening new frontiers in electronics, and give us a fine perspective in dielectric materials. A merit of such perspective is definition of a bond between microelectronics and materials and components made for sensors and actuators.

Keywords: BaTiO3-ceramics, doped ceramics, fractal structure.