



**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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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 emphasize the key achievements which will enable the wide spread 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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The synthesized diamonds microstructure consolidation review

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Excellent mechanical, optical and thermal properties of diamonds are the advantages for which they are used in many areas and thus in the industrial as well. Considering that natural diamonds are rare and expensive, in order to overcome that, production of synthesized diamonds is a good solution. Hence, investigation of alternative producing methods led to discovery of commercially available chemical vapor deposition – CVD method. Using this method led to creation of microcrystalline diamond (MCD) with grain size larger than 100 nm. Because of some disadvantages of this synthesized diamond, new nanocrystalline (NCD) and ultra-nanocrystalline (UNCD) diamond materials were developed, with average size of grains ranging 5-100 nm and 3-5 nm, respectively. Reactor geometry, filament setup and gas phase conditions are also very important parameters for diamonds growth on silicon wafers, in addition to the mixture composition and pressure of applied gases. The goal of the paper is to present the relation of microstructure and diverse consolidation methods.

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Electrical conductivity and fractal nature analysis synthesized diamonds phenomena

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Chemical Vapor Deposition – CVD can be used for creation of synthesized diamonds. The result of the process is the microstructure which is composed of numerous small grains. Such structure can be applied in various areas, like medicine, electronics, micromechanical systems, microelectromechanical systems – MEMS and many others. For these and many other applications, one of the most important feature is the electrical conductivity. Although the natural diamond is an excellent insulator, synthesized diamonds show different behavior. The exploring of this feature is a complex area with a strong convolution between grain size and sp² bond-

ing effect. The optimization of the synthesized diamond properties requires the revealing of the size and the shape of the created crystallites. Due to the size of grains being significantly reduced, the fractal theory can help in analysis of the grain morphology and especially of electrical conductivity.

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The synthesized diamonds thermal conductivity and fractal nature

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It is well known that diamonds are almost the best thermal conductors. This property as well as other convenient features, led to intensive research of synthesized diamonds production. Also, the investigation of the most valuable characteristics is the aim of permanently exploring. The thermal conductivity of synthesized diamonds research is very important, and because of that, the knowledge of the thermal conductivity properties is a basic point for completely understanding the synthesized diamonds phenomena. The experimental procedure confirmed interesting results regarding thermal conductivity. Investigation of the influence of different inputs on the synthesized diamonds process is of high importance. Due to the fact that the dimensions of the grain size have an impact on thermal conductivity, and that they are very small in deposited films of synthesized diamonds, the investigation of their fractal nature could lead to the further explanation of phenomena. The goal of this paper is basic analysis of what is the influence on thermal conductivity in the light of fractal nature materials properties.

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The influence of Sintering Temperature on Electrical Resistivity of Modified BaTiO₃ Ceramics

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In this paper, the influence of sintering temperature on electrical resistivity (ρ) of modified BaTiO₃ ceramics was investigated. The BaTiO₃ doped samples were sintered at 1350 ° for 4 hours. The concentration of the additives were from 0.01 to 1.0 at% Er or Yb. The density was ranged from 83% of theoretical density (TD) for samples doped with low content of dopant (0.01 at%) to 95% for samples doped with 1.0 at% of dopant. SEM analysis for samples doped with concentration of 0.01 at% shows abnormal grain growth with the average size range between 10