



**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*  
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## 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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## INV-NB 4

### Effects of micelles on surfactant self-assembly

Jelena Manojlovic

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The aim of our research was to produce homogeneous monolayers of surfactants on muscovite mica, using quaternary ammonium surfactants (cetyltrimethylammonium bromide). According to some earlier studies described in the literature, well-ordered monolayers or bilayers on mica can be produced. Self-assembled monolayers were prepared using different methods already proposed in the literature as well as using newer protocols that we have established. Homogeneous hydrophobic monolayers on mica were difficult to realize. Clear seasonal variations between winter and summer called for a systematic variation of many experimental parameters. The specific conductivity of aqueous surfactant solutions as a function of temperature was measured, below and above the critical micelle concentration (cmc). At the Krafft temperature and above the cmc a significant increase of conductivity was observed, commonly ascribed to the micelle formation. In heating-cooling cycles below and above the Krafft temperature a significant and reproducible conductivity hysteresis is found. A procedure that allows the “erasure” of such structural memory effects has been identified. These significant solution structural changes as a function of the experimental conditions have a great influence to surfactant self-assembly on mica.

## INV-MS1

### Thermal and electrical conductivity relation phenomena within fractal nature synthesized diamonds frontiers

Vojislav V. Mitic<sup>1,2</sup>, Sandra Veljkovic<sup>1</sup>, Goran Lazovic<sup>3</sup>, Markus Mohr<sup>4</sup>, Peter Gluche<sup>5</sup>, Vesna Paunovic<sup>1</sup>, Hans Fecht<sup>6</sup>

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Many areas, like the most known jewelry, medical-surgery, in high professional industry, as well as producing micro components, there are many possibilities for application of synthesized diamonds. These and others specific application of polycrystal diamonds, require permanently research and improvement of their properties. Such exploring could be much better with understanding fundamentals of microstructures. In such investigation, fractal nature analysis could significantly contribute to the revealing of possibilities for improvements. By the experimental procedure, it is noticed that the influence of grain size on thermal and electrical conductivity have notable impact. Considering that, these conductivities affect the possibility of application in many areas, explaining on microstructural nature is of high importance. The influence

of relation between the structures and final properties of synthesized diamonds can be achieved by explaining these phenomena based on fractal nature. The aim of the investigation is the establishing thermal and electrical conductivity relation phenomena within fractal nature synthesized diamonds frontiers.

## INV-MS2

### **Separation process of granular materials – mathematical modeling and numerical simulations**

Milada Pezo

*University of Belgrade, Institute of Nuclear Sciences Vinča,  
Laboratory for Thermal Engineering and Energy*

Separations of granular materials of different mass, size and other characteristics are frequently used in process, chemical, building construction, energy and food industry. Zigzag air classifier is cascade classifier that consists of vertical zigzag channel where several pipes with rectangular cross section are connected at a fixed angle to each other. The optimization of devices used for separation and classification can be performed with numerical simulations. The main focus in this numerical simulation is the discovery of the particle trajectory and the evaluation of the separation efficiency of the zigzag apparatus. The mathematical modeling based on CFD (Computational Fluid Dynamics) can easily obtain the satisfactory and reliable results of the separation characteristics and process parameters. The fluid phase is treated as a continuum by solving the Navier-Stokes equations, while the dispersed phase is solved by tracking a large number of particles through the calculated flow field. The dispersed phase can exchange momentum, mass, and energy with the fluid phase.

## INV-AC1

### **Hydro-/Solvothermal synthesis: The influence of synthesis parameters on physicochemical properties of ferrite nanoparticles**

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In the last few decades cobalt ferrite ( $\text{CoFe}_2\text{O}_4$ , CFO) has attracted considerable attention due to its potential application in data storage, catalysis, energy, environment, and in particular, biomedicine. However, for each application, the ferrite nanoparticles with specific size, shape and magnetic response are required. Therefore, fine-tuning of the particle size, shape, crystallinity and chemical composition is essential and for that purpose hydro-/solvothermal synthesis method was used.

In the present work, the CFO nanoparticles were prepared using hydrothermal and solvothermal methods in which the synthesis parameters such as pH, temperature and amount of capping agent were examined. The results show that pH influences the formation and growth of