



**Serbian Ceramic Society Conference  
ADVANCED CERAMICS AND APPLICATION VI  
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, 18-20. September 2017.**

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Dear Colleagues,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference VI 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, prosthesis, 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.

For the first time Advanced Ceramic and Application Conference hosting delegations from Republics of Ghana, Nigeria, Niger and Cameroon with the idea to connect, share and provide positive influence to the scientific and industrial communities all around world.



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 Science & Sintering of Ceramics
- Nano, Bio- & Opto Ceramic
- Electro & Multifunctional Ceramics
- Magnetic, Catalytic & Composite Materials
- Renewable Energy, Heritage & Archeology
- Industrial Talks

### Conference Co-chairmen:

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## OR-BMS1

### Zinc oxide-based materials with enhanced sunlight-driven photo- and photo-electro-catalytic activity

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Current trend in photocatalysis is to develop efficient semiconductors which can be activated by absorbing sunlight. Which wavelength of sunlight will be absorbed depends on the semiconductor band gap; semiconductors with a wide band gap ( $> 3$  eV) can absorb only UV light (5% of sunlight), while those with a narrow band gap ( $< 3$  eV) can be activated by visible light (45% of sunlight).

Zinc oxide (ZnO) is promising semiconductor with band gap of 3.37 eV. Various approaches have been applied to modify its optical properties, for example: incorporation of different metal and nonmetal ions or defects into the crystal structure, particles' surface sensitization or hydrogenation. In this study, we examined the influence of different defects present in ZnO particles on their photo- and photo-electro-catalytic properties. Processing of ZnO particles were carried out in order to introduce: (1) lattice defects, through microwave procedure, (2) surface defects, through mechanical activation, and (3) surface defects, through composite with polyethylene oxide. Synthesized particles were characterized by XRD, FE-SEM, laser diffraction particle size analyzer, Raman, UV-Vis diffuse reflectance and photoluminescence spectroscopy. The results of achieved photo- and photo-electro-catalytic tests indicate that both, structural and surface, defects enhanced sunlight-driven activity of ZnO particles.

## OR-BMS2

### Synthesis, characterization & bacterial activity of ZnO and Histidine incorporated ZnO

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Chemical route was adopted to synthesize both ZnO and amino acid (Histidine) incorporated ZnO. For synthesizing ZnO, which is used as reference, a solution (0.25M) Zn (NO<sub>3</sub>)<sub>2</sub> was prepared in distilled water. NH<sub>4</sub>OH was added drop wise till a white precipitate is observed. This solution was stirred continuously at 100°C for 1 hr. The precipitate was then centrifuged & washed several times using distilled water, which was subsequently dried. The same procedure was carried out in the presence of Histidine for the synthesis of Histidine incorporated ZnO. Four different concentrations of Histidine were used, ranging from 0.1 mg/ml to 1mg/ml during the synthesis of Histidine incorporated ZnO.