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 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, 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

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Different techniques have been used for characterization of the synthesized powders. X-ray diffraction pattern shows the formation of single phase wurtzite ZnO. No other phases were observed. The average particle size of undoped ZnO & Histidine incorporated ZnO was estimated to be in the range of 40-60nm. Selected area diffraction pattern of Histidine incorporated ZnO indicates the observation of two hexagons titled to each other indicating the presence of strain in the synthesized ZnO powders. This tilt varied with the increase concentration of Histidine. The UV-visible spectrograph shows variation in band gap energy the Histidine incorporated ZnO. The undoped and Histidine incorporated ZnO were used for the bacterial activity test. While undoped ZnO, as expected, shows antibacterial activity, the Histidine incorporated ZnO shows, interestingly, pro-bacterial activity. Scanning electron microscopy supports the pro-bacterial activity of Histidine incorporated ZnO.

OR-NOP1
Synthesis of ZnO:Ag core-shell nanoparticles with enhanced photocatalytic properties by single - and two-steps USP

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Synthesis of **ZnO:Ag** core-shell nanoparticles were performed by ultrasonic spray pyrolysis (USP) from the corresponding nitrate solutions. Varying relative concentrations of Ag and ZnO precursors and two different equipment installation, allowing either common (single-step) or separate precipitation (two-steps) of Ag and ZnO, were examined in terms of their effect on final microstructure and photocatalytic properties using X-ray powder diffraction (XRPD), scanning and transmission electron microscopy (SEM, TEM, HRTEM), UV-Vis spectroscopy and photocatalytic tests. Formation of phase-pure **ZnO:Ag** core- shell like particles where ZnO secondary submicron sized particles formed by primary crystals with the size of 5-20 nm were confirmed by TEM analyses. Structural analyses revealed variations in silver distribution and morphology within ZnO core depending on experimental conditions. Samples with fine and uniform silver distribution on ZnO surface display a strong silver-induced enhancement of photocatalytic performance and exhibits a significantly improved photocatalytic activity in the degradation of methyl blue (MB) than that of other noble metal free ZnO systems. Photocatalytic analyses (all samples reached > 45% MB degradation) confirm the all synthesized **ZnO:Ag** USP systems viability for environmental applications. The best result (93% of dye elimination) is obtained for sample exhibiting maximum available surface, which strongly depends on particle morphology, size and distribution. Moreover, all samples synthesized by single-step USP revealed higher dye elimination with respect to ones with two- steps USP due to favored distribution of silver in microstructure.