



**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*



### INV-AC3

#### **Processing and characterization of polymer nanocomposites with embedded ceramic quantum dots**

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This paper introduces processing and characterization of polymer nanocomposites based on poly(methyl methacrylate) (PMMA) matrix with embedded core-shell CdSe/ZnS quantum dots. Incorporation of quantum dots in the polymer is an attractive way of reducing the cost of optical devices, while retaining optical properties of the dots. Core-shell quantum dots were incorporated in the polymer via solvent casting, in order to investigate the influence of the nanocomposite's processing on the activity of their core. Surface modification of particles was performed to establish better compatibility between the dots and the polymer. FESEM analysis was used to investigate the morphology of the obtained nanocomposites. Time-resolved fluorescence measurements have given insight in the luminescence of unmodified and modified quantum dots in the polymer matrix, and it was confirmed that the chemical modification did not disrupt luminescence of the dots. Oxidation effects in quantum dots were removed with the use of PMMA as a host, and the core remained active. These findings showed that solvent casting is a suitable method for the processing of CdSe/ZnS-PMMA nanocomposites that could broaden the application field for the quantum dots.

### ORL-BCS 1

#### **Pressure-less rapid sintering of nanoparticle yttria stabilized zirconia**

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Pressure-less rapid sintering of yttria-stabilized zirconia was performed in a specially designed resistive furnace with a vertically moving sample holder. Four commercially available powder grades (tetragonal and cubic zirconia) with similar particle size were used in the study. As received powders were compacted in a steel die, followed by cold isostatic pressing and low temperature annealing. The green bodies, prepared in two sizes – thick ( $\varnothing$  14 x 10 mm) and thin ( $\varnothing$  14 x 2 mm), were rapidly sintered with a heating rate of 100 °C/min up to 1500 °C. The thin samples attained densities > 95 % of theoretical density (TD) as soon as the sintering temperature of 1500 °C was reached with no dwell time needed. However, in case of thick samples, only