



**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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High School-Academy for Arts and Conservation.

fluoroapatite ($\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$) was investigated. Fluoroapatite powders were produced by co-precipitation method from solution of initial components. Samples were manufactured by sintering process on air condition during 6 hours at 1200°C and possessed maximal apparent density values (90-92 %). The increase of thermal treatment process up to 9 hours was resulted in the transfer of $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ sample material from crystal to glass-ceramic state. Any changes in phase and structure composition of crystal fluoroapatite samples were not observed by XRD and SEM methods after the electron irradiation process. On the contrary, a lot of gas bubbles of spherical form were detected in glass-ceramic material sample after the electron irradiation process. Results of leaching tests in water conditions demonstrated any principal changes of corrosion resistance of crystal fluoroapatite material after the electron irradiation. Stability of physical-chemical properties of synthesized crystal fluorapatite after electron irradiation is challenging for further application of materials based on fluorapatite structures as promising matrices for HLW immobilization.

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Polyvinyl alcohol PVA with poly ethylene Glycol PEG added as a binder for the powder compaction

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During the compaction of the powder mixture of ZnO and Mn_2O_3 (MnCO_3) and Fe_2O_3 compacts were found fragile for further handling. Poly vinyl alcohol PVA was used as a binder in an unusual 20% PVA content. We made as well 2% PVA with 0.6% Poly ethylene glycol PEG and 20% PVA with 6 % PEG. Binder was wrapped over the powder by suspension forming in the polymer water solution and drying afterwards until all water content evaporates. On these obtained powders employed characterization techniques were: Fourier transformed Infra red FTIR spectra with ATR attenuated total reflection technique as well as differential thermal analysis DTA on the device with low temperature sensitivity and TEM transmission electron microscopy. All binder concentrations gave compacts with good mechanical properties, that can be handled with ease but with adding, a PEG as plasticizer the operating of the anvil and piston were extremely difficult due to friction.