Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VIII
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, 23-25. September 2019.

Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VIII
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Science 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, 23-25. September 2019

Book title: Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION VIII Program and the Book of Abstracts

Publisher:
Serbian Ceramic Society

Editors:
Prof.dr Vojislav Mitić
Dr Lidija Mančić
Dr Nina Obradović

Technical Editors:
Dr Ivana Dinić
Dr Marina Vuković

Printing:
Serbian Ceramic Society, Belgrade, 2019

Edition:
100 copies

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

666.3/.7(048)
66.017/.018(048)

SRPSKO keramičko društvo. Conference Advanced Ceramics and Application : New Frontiers in Multifunctional Material Science and Processing (8 ; 2019 ; Beograd)
Program ; and the Book of abstracts / Serbian Ceramic Society Conference Advanced Ceramics and Application VIII : New Frontiers in Multifunctional Material Science and Processing, Serbia, Belgrade, 23-25. September 2019. ; [organized by] Serbian Ceramic Society ... [etc.] ; [editors Vojislav Mitić, Lidija Mančić, Nina Obradović]. - Belgrade : Serbian Ceramic Society, 2019 (Belgrade : Serbian Ceramic Society). - 98 str. : ilustr. ; 30 cm

Tiraž 100.

ISBN 978-86-915627-7-9

а) Керамика -- Апстракти б) Наука о материјалима -- Апстракти в) Наноматеријали -- Апстракти

COBISS.SR-ID 279041804

Dear Colleagues,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference VIII organized by the Serbian Ceramic Society in cooperation with the Institute of Technical Sciences of SASA, Institute of Chemistry Technology and Metallurgy, Institute for Technology of Nuclear and Other Raw Mineral Materials and Institute for Testing of 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, 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 supported by the Serbian Chapter of American Ceramic Society and European Academy of Sciences and Arts.

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
- Nano-, Opto- & Bio-ceramics
- Modeling & Simulation
- Glass & Electro Ceramics
- Electrochemistry & Catalysis
- Magnetic & Refractory Ceramic
- Renewable Energy, Composites & Amorphous Ceramics
- Heritage, Art & Design

Conference Programme Chairs:

Dr. Lidija Mančić SRB
Dr. Nina Obradović SRB

Conference Co-chairs:

Prof. Dr. Vojislav Mitić SRB
Prof. Dr. Olivera Milošević SRB
Prof. Dr. Rainer Gadow GER
Prof. Dr. Marcel Van de Voorde EU

Scientific Committee

Academician Zoran Đurić SRB
Academician Ninoslav Stojadinović SRB
Academician Zoran Popović SRB
Prof. Dr. Vojislav Mitić SRB
Prof. Dr. Rainer Gadow DEU
Prof. Dr. Marcel Van de Voorde EEZ
Prof. Dr. David Johnson GBR
Prof. Dr. Masohiro Yoshimura JPN
Dr. Mrityunjay "Jay" Singh USA
Prof. Dr. Pavol Šajgalik SVN
Dr. Richard Todd GBR
Prof. Dr. Hans Fecht DEU
Dr. Dušan Jovanović SRB
Prof.Dr. Olivera Milošević SRB
Prof. Dr. Vladimir Pavlović SRB
Dr. Nina Obradović SRB
Dr. Lidija Mančić SRB
Dr. Takashi Goto, Japan
Dr. Snežana Pašalić SRB
Prof. Dr. Zoran Nikolić SRB
Dr. Zagorka Radojević SRB
Dr. Nebojša Romčević SRB
Dr. Zorica Lazarević SRB
Prof. Dr. Ljubica Pavlović SRB
Prof. Dr. Nebojša Mitrović SRB
Dr. Aleksandra Milutinović–Nikolić SRB
Dr. Predrag Banković SRB
Dr. Zorica Mojović SRB
Dr. Dušan Milivojević SRB
Dr. Miomir Korać SRB
Prof. Dr. Branislav Vlahović USA
Dr. Radomir Žikić SRB
Prof. Dr. Stevo Najman SRB
Dr. Biljana Djordjević SRB

Organizing Committee

Prof. Dr. Vojislav Mitić SRB
Dr. Lidija Mančić SRB
Dr. Nina Obradović SRB
Dr. Ivana Dinić SRB
Dr. Marina Vuković SRB
Prof. Dr. Vladimir Pavlović SRB
Dr. Dušan Jovanović SRB
Dr. Nataša Jović Jovičević SRB
Dr. Vesna Paunović SRB
Dr. Suzana Filipović SRB
Dr. Vladimir Blagojević SRB
Sandra Veljković, B.Sc.Eng

Sponsors & Endorsements:

Analysis - Lab equipment, Belgrade (Serbia), HARDER digital SOVA d.o.o. Niš
PTT Communication (Serbia), SCAN doo. Preddvor (Slovenia), Exchange office „Hulk“, LMB Soft, Niš (Serbia), Voda Vrnjci (Serbia) & Turistička organizacija Beograd

Acknowledgements:

Ministry of Education and Science of the Republic of Serbia
Serbian Academy of Sciences and Arts, European Academy of Sciences and Arts, American Ceramics Society – Serbian Chapter, Institute of Technical Sciences of SASA, Archeological Institute of SASA, Institute of Physics UB, Vinča Institute of Nuclear Sciences UB - Laboratory of Physics (010), Electrical Engineering Institute Nikola Tesla and High School-Academy for Arts and Conservation.

The complex dielectric permittivity reaches the lowest of 176.9 pF/m in the sample activated for 90 minutes and the highest of 918.07 pF/m in the sample activated for 180 min. This sample also shows the highest dissipation factor over the entire frequency band up to 500 MHz, reaching a maximum of 50% at a frequency of 431 MHz.

After the heating to 300 ^{0}C and subsequent cooling to room temperature, the most prominent increase in mass magnetization value of 95% shows the sample activated for 300 min.

P21
Cavitation demage morphology of glass-ceramics based on basalt

Marko Pavlović[1], Marina Dojčinović[1], Ljubiša Andrić[2],
Dragan Radulović[2], Zoran Čeganjac[3]

[1] University of Belgrade, Faculty of Technology and Metallurgy,
Karnegijeva 4, 11 000 Belgrade, Serbia
[2] Institute for Technology of Nuclear and Other Mineral Raw Materials,
Franchet d'Esperey 86, 11 000 Belgrade, Serbia
[3]High Technical School of Professional Studies,
34300 Arandelovac, Serbia

Cavitation is a kind of wear and represents formation, growth and collaps of steam or vapor gas bubbles in a flowing fluid. Collaps of the bubble creates shock waves and micro–jet that are damaging materials in contact with the fluid that flows. It has been shown that the impact formed by collapsing cavitation bubbles cause damage and mass loss of the material, i.e., cavitation erosion. Basalt–based glass ceramics obtained by processes of melting, casting and thermal treatment of the basalt aggregate proved to be suitable for use in conditions of high cavitation loads. The experiment was conducted using an ultrasonic vibration method with stationary sample (ASTM G32 standard). A change in the sample mass in function of the cavitation time was monitored for the evaluation of cavitation resistance. The level of degradation of the sample surface was quantified using the image analysis. The change in the morphology of the sample surface with the test time was followed by scanning electron microscopy. Analyzing the progression of erosion samples of glass-ceramics, it can be concluded that the mass loss is small, for 120 min exposure is 3.53 mg, with a cavitation rate of 0.03 mg/min and total surface damage of the sample of 12%. This technical ceramics shows high resistance to the effect of the cavitation.

P22
The influence of DBD plasma treatment on the dielectric loss tangent and surface morphology of fibrous polymeric materials

Aleksandra M. Ivanovska[1], Mirjana M. Kostic[1], Slavica B. Maletic[2]
Andrijana A. Zekic[2], Koviljka A. Asanovic[1], Dragana D. Cerovic[2,3]

[1]Faculty of Technology and Metallurgy, University of Belgrade, Karnegijeva 4, Belgrade 11000, Serbia
[2]Faculty of Physics, University of Belgrade, Studentski trg 12, 11000 Belgrade, Serbia
[3]The College of Textile Design, Technology and Management, Starine Novaka 24, 11000 Belgrade, Serbia

The aim of this work was to investigate the influence of dielectric barrier discharge (DBD) plasma treatment during 30 and 60 seconds on the fibrous polymeric materials made of cotton, polyethylene terephthalate and polypropylene by recording the frequency dependence of the dielectric loss tangent. Furthermore, the changes in the sample surface morphology were observed using scanning electron microscopy (SEM). By comparing the frequency dependence of the dielectric loss tangent, the same trend

with increasing the frequency was noticed for both untreated and treated samples, after 0.5 h as well as 2 and 7 days after plasma treatment. The changes in the value of dielectric loss tangent are small, but it can be noticed that the plasma effect on the cotton sample was maintained after 7 days, which is less noticeable for the samples made of polyethylene terephthalate and polypropylene. The SEM analysis of the cotton sample showed micro cracks on its surface as a result of plasma etching, while the polyethylene terephthalate fibers appeared darker and rough after the plasma treatment. The changes were more obvious on the samples treated 60 seconds compared to samples treated 30 seconds. There are no significant changes in the polypropylene sample surface morphology.

Acknowledgment: Authors are grateful to the Ministry of Education, Science and Technological Development of the Government of the Republic of Serbia for funding the study under the Projects (OI 172029 and OI 171029).

P23
Characterization of diatomsceous earth from Kolubara mining basin, Serbia

Aleksandra Šaponjić[1], Zvezdana Baščarević[2], Svetlana Ilić[1], Đorđe Šaponjić[1],
Adela Egelja[1], Ljiljana Janković Mandić[1], Maja Kokunešoski[1]
[1] University of Belgrade -Vinča Institute of Nuclear Sciences, Belgrade, Serbia
[2] University of Belgrade - Institute for Multidisciplinary Research, Belgrade, Serbia

Diatomaceous earth is of sedimentary origin consists mainly of accumulated skeletons formed as a protective covering of the diatoms. Usually, high absorption capacity of diatomaceous earth provides its wide use as heat insulation, filter, and absorbent material. Starting raw material, diatomaceous earth from surface coal mine Kolubara, Serbia, was characterized using X-ray fluoroscence (XRF), X-ray diffraction (XRD), scanning electron microscopy (SEM) were employed to the phases and microstructure of the diatomaceous earth. In addition, concentrations of activity of natural radionuclides ^{40}K, ^{226}Ra and ^{232}Th and anthropogenic radionuclide ^{137}Cs in diatomaceous earth were determined by gamma spectrometry with HPGe detector. It was found that the activity concentrations were in the range of 150-190 Bq / kg for ^{40}K, 5-12 Bq / kg for ^{226}Ra and 22-33 Bk / kg for ^{232}Th. In all samples, the concentration of anthropogenic radionuclide ^{137}Cs was below the detection limit. This research shows that this material is environmentally safe for further use.

P24
Characterisation of clay from Kolubara mining basin, Serbia

Maja Kokunešoski[1], Ljiljana Janković Mandić[1], Zvezdana Baščarević[2],
Đorđe Šaponjić[1], Svetlana Ilić[1], Adela Egelja[1], Aleksandra Šaponjić[1]
[1] University of Belgrade - Institute of Nuclear Sciences, Belgrade, Serbia
[2] University of Belgrade - Institute for Multidisciplinary Research, Belgrade, Serbia

During coal exploitation in the Kolubara mining basin, Serbia, clay is deposited as accompanying mineral. The aim of the present study is to analyze the activity concentrations of terrestrial (^{226}Ra, ^{232}Th and ^{40}K) and anthropogenic (^{137}Cs) radionuclides in clay collected from Kolubara mining using the high-resolution gamma spectrometer with HPGe detector and evaluate external ionizing radiation exposure in outdoor air. The total absorbed gamma dose was in the range of 39-44 nGy/h. In addition, inductively coupled plasma spectroscopy (ICP), X-ray diffraction (XRD), X-ray fluoroscence (XRF), Scanning electron microscopy (SEM) clay from Kolubara mining basin, Serbia, were used. Also, this study is indicative that clay from Kolubara mining is not a significant source of radiation and is suitable for potential use clay in advanced environmental protection area.