The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research (IMSI), University of Belgrade
Institute of Physics, University of Belgrade

Center of Excellence for the Synthesis, Processing and Characterization of Materials for use in Extreme Conditions "CEXTREME LAB" - Institute of Nuclear Sciences "Vinča", University of Belgrade

Faculty of Mechanical Engineering, University of Belgrade

Center for Green Technologies, Institute for Multidisciplinary Research, University of Belgrade

Faculty of Technology and Metallurgy, University of Belgrade Faculty of Technology, University of Novi Sad

PROGRAMME and the BOOK of ABSTRACTS

5CSCS-2019

5th Conference of the Serbian Society for Ceramic Materials June 11-13,2019. Belgrade Serbia

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SPECIAL THANKS TO



Република Србија МИНИСТАРСТВО ПРОСВЕТЕ, НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА







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WELCOME MESSAGE

The 5th Conference of the Serbian Society for Ceramic Materials: 5CSCS-2019 aims to review the knowledge, experience and share new ideas among the professionals, industrialists and students from research areas of ceramic materials and by taking an active part in discussions and technical sessions at the conference. The conference provides exhibitor booths for the companies and the institutions to showcase their services, products, innovations, innovative ideas and research work & results.

The conference includes all aspects of ceramics: modelling, synthesis, properties, processing and applications of bulk, films, powders, nanomaterials, composites providing a platform for academic exchange among participants from universities, institutes, companies around the region in the field of ceramics research as well as to explore a new direction for future development. The conference has an elemental feature to the distinguished motive speakers, plenary speeches, young investigators, poster presentations, oral presentations, technical workshop, and scientific sessions.

The conference is hosted and organized by the Serbian Society for Ceramic Materials, and co-organized by the Institute for Multidisciplinary Research - University of Belgrade, Center of Excellence for the Synthesis, Processing and Characterization of Materials for use in Extreme Conditions "CEXTREME LAB" - Institute of Nuclear Sciences "Vinča" - University of Belgrade, Institute of Physics - University of Belgrade, Faculty of Mechanical Engineering - University of Belgrade, Center for Green Technologies of the Institute for Multidisciplinary Research - University of Belgrade, Faculty of Technology and Metallurgy - University of Belgrade, Faculty of Technology - University of Novi Sad.

We are grateful for the support of the Ministry for education, science and technological development of the Republic of Serbia. We would also like to express our sincere thanks to the conference organizers, session chairs, presenters, exhibitors and all the conference attenders for their efforts and enthusiastic support in this exciting time in Belgrade. I look forward to meeting you and interacting with you at Conference.

Branko Matovic, President of the Serbian Society for Ceramic Materials

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TRADITIONAL CERAMICS: PAST, PRESENT AND FUTURE

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In this paper review of the tradtional ceramics will be given. Different types of ceramics will be discussed, in correlation with histrocical time and use, as well the present time and future perspecives of tradiotional ceramics. Processing of the tradiotional ceramics, as well as diffrences in procesing during time will be also discussed. Past of the traditional ceramic will be focused on pottery, glass and construction and optic materials. Present time will include traditional engineering ceramic. Traditional ceramics in future will be related to the possible application and synthesis of modern ceramic materials.

- 1. P. Boch, J.C. Nielpce, *Ceramic Materials, Processes, Properties and Application*, Wilwy, 2010
- 2. https://www.sciencedirect.com/topics/materials-science/traditional-ceramics
- 3. https://science.jrank.org/pages/1343/Ceramics-Traditional-ceramics.html
- 4. https://www.betase.nl/traditional-and-advanced-ceramics/?lang=en
- 5. https://www.annualreviews.org/doi/pdf/10.1146/annurev.matsci.31.1.373
- 6. https://archaeology.uiowa.edu/prehistoric-pottery-0
- 7. http://science.sciencemag.org/content/240/4853/818
- 8. http://www.materials.unsw.edu.au