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 of Excellence for Green Technologies, Institute for Multidisciplinary Research, University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade

PROGRAMME and the BOOK of ABSTRACTS

6CSCS-2022

6th Conference of the Serbian Society for Ceramic Materials
June 28-29. 2022. Belgrade Serbia

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Branko Matović
Aleksandra Dapčević
Vladimir V. Srdić

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IMPROVED PHOTOCATALYTIC DEGRADATION OF RO16 DYE USING HYDROTHERMALLY SYNTHESIZED CeO_2@ZnO NANOCOMPOSITE

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The structural, microstructural, optical and photocatalytic properties of hydrothermally obtained single-phase ZnO and CeO_2@ZnO nanocomposites have been investigated by the XRPD, FESEM, HRTEM/SAED and UV-vis techniques. In order to improve the photocatalytic efficiency of ZnO, the optimal CeO_2 content in ZnO powders was determined by varying the quantity of CeO_2 from 0 to 10 mol%. The results showed that CeO_2 with spherical crystallites of about 5 nm was distributed onto the ZnO surface, whose crystallites displayed a bimodal distribution, from nano- to microcrystallites. The morphology of ZnO particles varied from elongated nanograins to microrods that further formed a 3-D tie-like morphology which was disrupted by CeO_2 adding. By degrading 90% of RO16 dye in 180 minutes, the composite containing 5 mol% of CeO_2 showed approximately for 30% better photocatalytic efficiency comparing to other samples, although all the obtained powders have similar structural, microstructural and optical characteristics. This is obviously the optimal ratio of these two phases, in which synergy of CeO_2 adsorption and ZnO photocatalytic effect reaches its maximum due to reduced recombination rate and improved adsorption. The kinetic of RO16 degradation could be described by a pseudo-first order model.