



**Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION IX
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, 20-21. September 2021.**

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Prof.dr Vojislav Mitić

Dr Lidija Mančić

Dr Nina Obradović

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Ivana Dinić

Marina Vuković

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- Basic Ceramic Science & Sintering
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INV

Influence of the water flow lens system on performances of the different laboratory made Sb_2S_3 -based and commercial solar cells

Vesna Lojpur and Ivana Validžić

Department of Atomic Physics, Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, P.O. Box 522, 11001 Belgrade, University of Belgrade, Serbia

Here, the behavior of different types of solar cells at a low light intensity, measured with and without using the water flow lens (WFL) system is investigated. This system enables the cooling of the surface of the solar cell/modules/panels, indirectly cooling the surrounding, and allows investigating of the influence of higher or lower intensities of the light with the inevitable change in the spectrum. All of these effects are very important and can greatly contribute to the better photovoltaic performance of the observed cells. In this study, laboratory-made and commercial solar cells were studied at 5 % sun and (or) 35 % sun using a tungsten and halogen lamp, respectively. Comparing the obtained results performed when the WFL system is used and left out, it was confirmed that the WFL system facilitates obtaining better photovoltaic properties for all investigated solar cells.

INV

Cobalt-based catalysts in catalytic oxidation of tartrazine activated by Oxone®

Sanja Marinović, Tatjana Novaković, Tihana Mudrinić, Nataša Jović-Jovičić, Marija Ajduković, Aleksandra Milutinović-Nikolić, Predrag Banković

University of Belgrade – Institute of Chemistry, Technology and Metallurgy, Department of Catalysis and Chemical Engineering, Njegoševa 12, 11000 Belgrade, Republic of Serbia

Two different types of cobalt-based catalysts were synthesized and tested as Oxone® activators in catalytic oxidation of model dye, tartrazine. First type of catalyst was cobalt impregnated aluminum pillared montmorillonite, and the second one was cobalt-doped alumina. Aluminum pillared montmorillonite was synthesized from Na-exchanged Wyoming clay and impregnated with cobalt using incipient wetness impregnation method. Cobalt-doped alumina catalysts were synthesized using the sol-gel method. Three calcination temperatures were employed: 500 °C, 1000 °C and 1100 °C. The degradation of tartrazine was monitored using Thermo Scientific Evolution 220 UV-Visible Spectrophotometer in the wavelength range from 200–600 nm. In this wavelength range the monitoring of decolorization, along with registering the emergence, followed by degradation, of detectable degradation products was achieved. The effect of the different reaction parameters on decolorization and degradation efficiency was tested, including the influence of the mass of catalyst, reaction temperature and initial pH. It was found that the increase of temperature and the mass of

catalysts were beneficial for the reaction. All investigated catalysts were found to be very efficient in the Oxone® initiated tartrazine decolorization and degradation.

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INV

Preparation and Characterization Of Active Carbon Microspheres Obtained From Fructose And Adsorption Application

Sanja S. Krstić, Vladimir M. Dodevski, Đuro Čokeša, Aleksandar B. Devečerski, Radojka T. Vujasin, Ksenija V. Kumrić, Branka V. Kaluđerović

Institut za nuklearnu nauku „Vinča“ - Institut od nacionalnog značaja za Republiku Srbiju,
Univerzitet u Beogradu, Beograd, Srbija

Carbon material with active surface properties have been synthesized by hydrothermal method from fructose using 40% and 80% phosphoric acid (H_3PO_4) solution, at temperature of 260°C and fructose concentration of 2M. The aim of this investigation was active carbon material synthesis which is completed by one step reaction, which was not the case in our previous works. Thus, compared with other samples from our works, this way is more economic and faster since both reaction of carbonization and activation was finished in one step. The hydrothermal process, in general, includes heat treatment of carbohydrate solutions under autogenous pressure at low temperatures (150–260 °C). Obtained solid carbon material has uniform morphology, amorphous structure and high content of oxygen functional groups. Prepared active carbon material is made up of spherical microsphere particles with the diameter in the range of 0.6-2.7 μm . The morphology and surface properties of obtained material were characterized by scanning electron microscopy (SEM), Fourier-transform infrared (FTIR) spectra. Adsorption and desorption isotherms of N_2 were measured on carbon containing material at -196 °C using the gravimetric McBain method. Adsorption from aqueous solutions of Methylene Blue (MB) onto prepared carbon material was conducted by changing concentration of MB from 200-500 mg/dm^3 . The best fit of the kinetic results was achieved by a pseudo second-order equation. Also, this nature of material is applicable in other systems regarding environmental protection and dye pollution prevention.