



3rd YOUNG SCIENTISTS' DAY – Conference

OSIJEK, November 30th, 2021

FACULTY OF MEDICINE JOSIP JURAJ STROSSMAYER UNIVERSITY OF OSIJEK,
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BOOK OF ABSTRACTS

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| | |
|---------------|--|
| 12:10 – 12:20 | Utjecaj narušenja Lorentzove invarijancije na visokoenergetske gama spektre astrofizikalnih izvora / Influence of Lorentz invariance violation on very high energy gamma-ray spectra from astrophysical sources (J. Striško) – Department of Physics Osijek |
| 12:20 – 12:30 | Uporaba anorganskih oksida u fotokatalizi / Application of inorganic oxides in photocatalysis (M. Terzić, P. Živković, J. Kojčinović, D. Tatar, M. Korica, E. Kovač-Andrić) – Department of Chemistry Osijek |
| 12:30 – 12:40 | Taloženje kalcijeva oksalata monohidrata i dihidrata s galnom kiselinom / Precipitation of calcium oxalate monohydrate and dihydrate with gallic acid (S. Goman, S. Šafranko, D. Goman, S. Jokić, M. Medvidović-Kosanović, A. Stanković) – Department of Chemistry Osijek |
| 12:40 – 12:50 | Procjena toksičnosti aktivne tvari azoksistrobin i komercijalnog pripravka (Quadris®) na ne ciljani organizam tla Enchytraeus albidus / Toxicity evaluation of the active ingredient azoxystrobin and a commercial product (Quadris®) on the non-target soil organism Enchytraeus albidus (M. Kovačević, N. Stjepanović, D.K. Hackenberger, B.K. Hackenberger) – Department of Biology Osijek |
| 12:50 – 13:50 | Lunch Break |

Section IV.

Moderators: Martina Poje Sovilj, assistant professor; Martina Medvidović-Kosanović, associate professor; Davor Seifert, associate professor

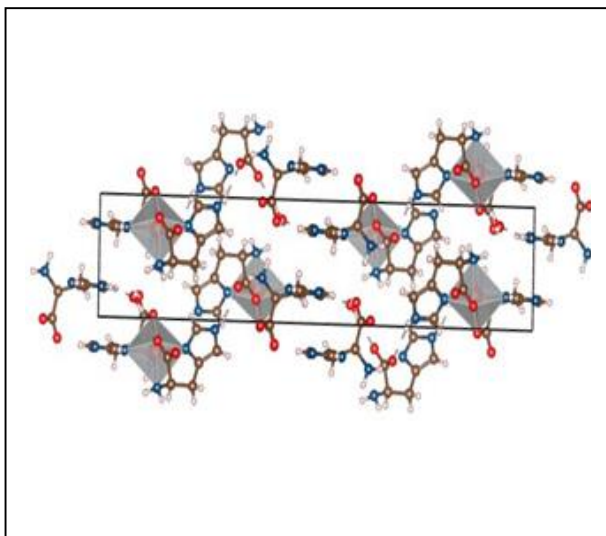
| | |
|---------------|---|
| 13:50 – 14:00 | Preliminarna histološka analiza dva biomaterijala nakon prezervacije alveole / Preliminary histological analysis of two biomaterials after socket preservation (M. Tomas, M. Čandrlić, M. Juzbašić, M. Matijević, Ž. Perić Kačarević) – Faculty of Dental Medicine and Health Osijek |
| 14:00 – 14:10 | Asocijativna analiza fenotipskih svojstava heksaploidne pšenice i molekularnih markera / Association analysis of phenotypic traits and molecular markers in hexaploid wheat (S. Kujundžić, S. Vila) – Faculty of Agrobiotechnical Sciences Osijek |
| 14:10 – 14:20 | Ekstrakcija bioaktivnih spojeva iz duhanskog otpada / Extraction of bioactive compounds from tobacco waste (M. Banožić, S. Jokić) – Faculty of Food Technology Osijek |
| 14:20 – 14:30 | Kemijski sastav organskog industrijskog otpada / Chemical composition of some industrial organic waste (M. Tkalec Kojić, T. Vinković, B. Popović, Z. Lončarić, N. Parađiković) – Faculty of Agrobiotechnical Sciences Osijek |

Uporaba anorganskih oksida u fotokatalizi Application of inorganic oxides in photocatalysis

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Nowadays, inorganic oxides have found various applications in industry and environmental protection. One of the most interesting classes of inorganic oxides is transition metal oxides. High interest is due to their interesting electrical and optical properties, as well as a suitable bandgap. As such, they have been found and applied in photocatalysis and decomposition of organic pollutants in wastewater. The aim of this study is to synthesize nanoparticles of inorganic oxides by ultrasonic synthesis and to examine their use in photocatalysis. Seven series of nanoparticles of copper(II) oxide and nickel(II) oxide were synthesized by the ultrasonic synthesis in an ultrasonic bath from copper(II) acetate monohydrate and nickel(II) acetate tetrahydrate - CuH, CuH1, CuH3, CuH5, CuE,

NiH and NiE. Characterization methods, PXRD, FT-IR, TGA, UV/VIS, UV/VIS NIR, TEM, SEM, and XPS were used. The similarity in crystal size within the series of samples, determined by the Sherrer and Williamson - Hall method, showed that the time of ultrasonic synthesis does not affect the size of the crystallite, bandgap, and photocatalytic activity as well. The smallest optical bandgap value of 1.5 eV has the CuH sample, while the largest bandgap value of 4.025 eV has the CuE sample. The photocatalytic activity of the samples was tested on the degradation of methylene blue. It was found that with an increase in the bandgap there is a decrease in the rate constant of the photocatalytic reaction. Depending on the changes in absorbances over time, the efficiency of the photocatalyst was calculated according to which the CuH sample with the reaction rate constant of $8.1 \cdot 10^{-3} \text{ min}^{-1}$ has the highest efficiency and photocatalytic activity. On the other hand, the CuE sample with a reaction rate constant of $3.73 \cdot 10^{-3} \text{ min}^{-1}$ has the lowest efficiency and photocatalytic activity.

Keywords: inorganic oxides, band gap, photocatalysis, photocatalytic activity



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