

**13th ISE Satellite Student Regional
Symposium on Electrochemistry
(13th ISE - SSRSE)**

CONFERENCE REPORT

June 28, 2024, Zagreb, Croatia



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SYMPOSIUM ON ELECTROCHEMISTRY

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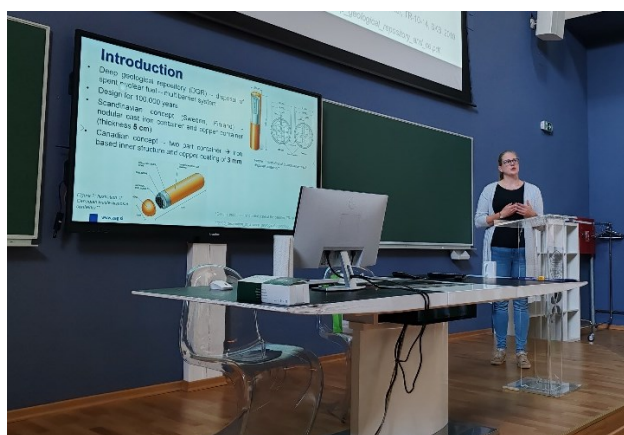
Friday June 28, 2024, Zagreb, Croatia

The meeting of undergraduate, graduate and postgraduate students, "13th ISE Satellite Regional Symposium on Electrochemistry" (13th ISE - SRSSE), took place on Friday, June 28, 2024, at the Faculty of Chemical Engineering and Technology in Zagreb, Croatia. It was supported by the International Society of Electrochemistry (ISE) and aimed to encourage young scientists to present their research results to their peers in the form of oral presentations. For the first time, it was also supported by the companies BioLogic, Emus and ReCorrTech. Another novelty was the creation of a conference website, which increased the recognition value of the conference and simplified the process of registering and submitting abstracts. The symposium was attended by 19 students from Croatia, Austria, Slovenia and Serbia, with a total of 17 presentations which covered broad aspects of electrochemical fields: electrochemistry of materials, corrosion, environmental, electroanalytical and electro-organic chemistry.

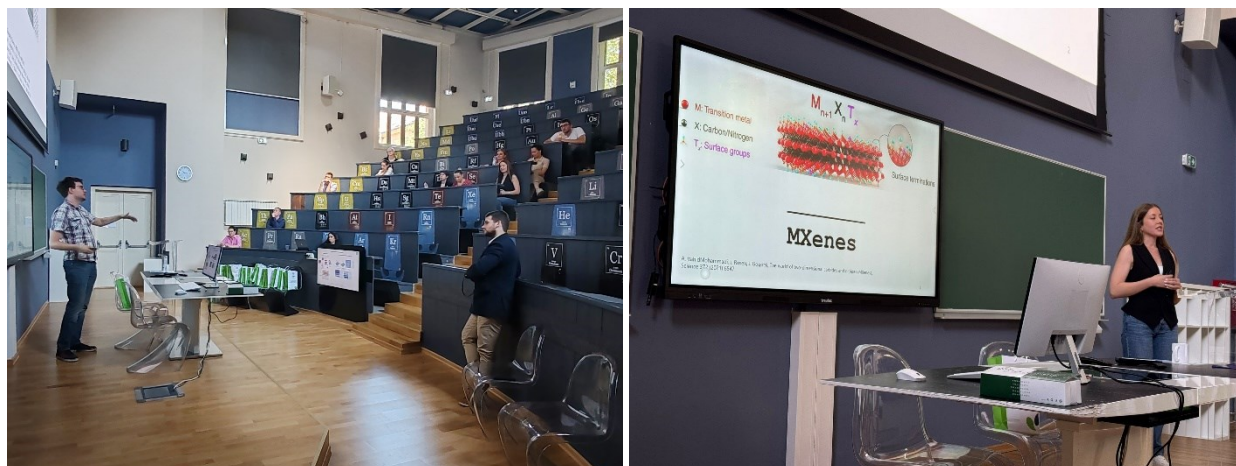


The conference began at 9:00 a.m. with a welcome by the organizers, postgraduate students Grgur Mihalinec from the Faculty of Chemical Engineering and Technology and Sara Šariri from the Ruđer Bošković Institute iz Zagreb. Chairman Grgur Mihalinec held a speech about the International Society of Electrochemistry (ISE) in which he briefly described history of ISE and Symposium origins. At the end of the speech, he gave a brief overview of the symposium program.

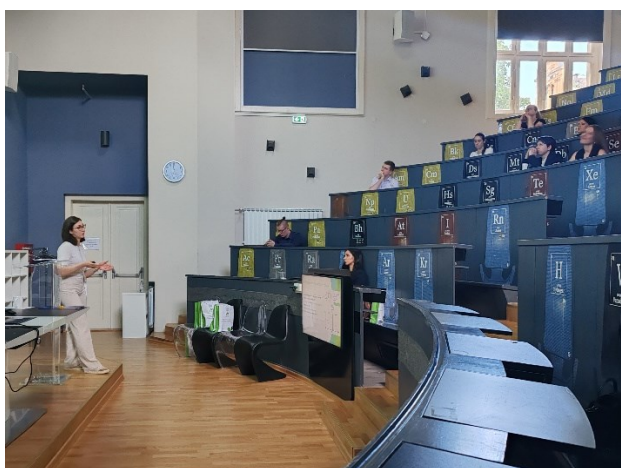
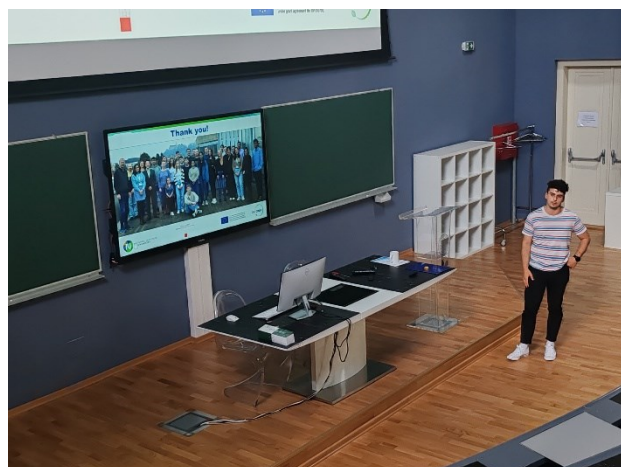
First section, dedicated to corrosion science comprised four oral presentations. Klara Prijatelj from the Slovenian National Building and Civil Engineering Institute in Ljubljana opened the session presenting her research on the use of coupled multi-electrode array (CMEA) for long-term monitoring of corrosion currents of copper-steel coupling. The second, third and fourth presentations were given by students from the Faculty of Chemical Engineering and Technology in Zagreb. Barbara Markulić presented her study on the application of cross-linked self-assembled molecular layers of behenic acid to protect bronze and its patina from corrosion caused by acid rain. Ines Bera showed that, based on the results of her laboratory and in-situ tests, the paste electrolyte cell also has a potential for application in assessment of bronzes, patinas and coatings in the conservation of metallic cultural heritage. Margareta Postonjski presented her work on the cross-linking of multilayer polymer nanocoatings of fatty acids with ionizing gamma radiation and the investigation of their protective properties on copper.



After the block of presentations on corrosion, the symposium continued with the section on new energy materials. The section included two presentations, both on MXenes. Ervin Rems from the National Institute of Chemistry and University of Ljubljana gave a talk on the implications of MXene surface chemistry for the synthesis of new MXenes and their applications in devices for electrochemical energy storage and conversion. Kaltrina Stajku from the Faculty of Chemical Engineering and Technology in Zagreb presented her results of surface characterization of MXenes synthesized fluoride-free using mechanochemistry.

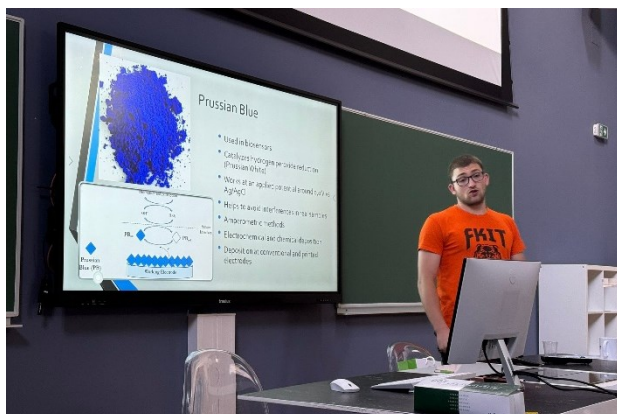


The next section, covering energy storage and production, began after the coffee break, during which gift bags were distributed to all participants. The first two presentations were given by students from the National Institute of Chemistry and the University of Ljubljana. Hafiz Ahmad Ishfaq gave a talk on the determination and importance of Li^+ transport number in lithium metal batteries with electrolytes based on fluorinated ethers. Urban Košir presented the transport and interfacial properties of a polymer-based coating that his research group has developed to be compatible with both Li metal and polymer-based electrolyte in solid-state lithium metal batteries. This was followed by Hrvoje Tašner who presented a work from collaboration of the Ruđer Bošković Institute and the Faculty of Chemical Engineering and Technology in Zagreb on the influence of V_2O_5 addition on the structure and conductivity of $Li_2O-Fe_2O_3-P_2O_5$ glasses, which are being investigated as a new material with potential application in solid-state ion batteries. The fourth presentation in this section was given by Leona Komparić from the Faculty of Chemical Engineering and Technology in Zagreb. She examined how the use of platinum and nickel as electrocatalyst materials can improve the efficiency and cost-effectiveness of green hydrogen production.



After the lunch break started the fourth section dedicated to the material science with the presentation by Magdalena Eškinja from the Montanuniversität Leoben. She carried out electrochemical measurements to test the effects of Mo carbides and surface modification on the hydrogen embrittlement susceptibility of two tempered martensitic steels to be used for hydrogen transport and storage facilities.

The symposium continued with the section on electroanalytical chemistry. Two students from the Faculty of Chemical Engineering and Technology in Zagreb presented their work on the use of Prussian Blue as an electrochemical mediator in biosensors. Andrej Molnar investigated the optimal conditions for the chemical deposition of Prussian Blue layers on graphene electrodes produced by inkjet printing, while Željka Boček adapted these electrodes and developed a functional biosensor for lactate.



Ana Rapljenović from the Ruđer Bošković Institute in Zagreb was the only student to present a work from the field of environmental electrochemistry. She investigated the interaction of trace metals and (micro)plastics from marine environments, which can serve as a vector for the transport of these ecotoxigants through aquatic ecosystems.

Kristian Koštan from the Faculty of Chemical Engineering and Technology in Zagreb presented his results on optimizing the electrochemical, more environmentally friendly, synthesis of 1-(4-hydroxy-3-methoxyphenyl)propan-2-one, an intermediate of guaiacylalkylamine important for the production of many medications.

Livia Grgurić from the Faculty of Chemical Engineering and Technology in Zagreb presented her study on the influence of $\text{Ca}(\text{TFSI})_2$ salt in two different solvents on the electrochemical behaviour of calcium electrodes, important for potential use in calcium batteries.

The last presentation of the symposium was held online, by Milica Zdravković from the Technical Faculty in Bor, who presented the possibility of combining non-destructive

and destructive electrochemical methods in one cycle, which enables simple and fast analysis of metal corrosion.



After the last presentation, the participating students and the organizing committee voted on the best student presentation. This year, for the first time, the cash prizes were awarded at the ISE Satellite Student Regional Symposium on Electrochemistry. The voting was to nominate three presenters who, in the opinion of the voters, stood out from the rest. The top three prizes went to: Kaltrina Stajku, who took first place and received prize money of 200 euros, Magdalena Eškinja in second place, who won 100 euros, and Andrej Molnar in third place with prize money of 50 euros.



The organizing committee would like to sincerely thank all participants for their contributions and gratefully acknowledge all sponsors, but especially the International Society of Electrochemistry for the given support and giving young researchers the opportunity to share their work experiences in different areas of electrochemistry and to establish contacts that may lead to future collaboration. We hope that this was an enjoyable and rewarding experience for them.



Book of abstracts:

https://www.hdki.hr/images/50013054/13th_ISE-SSRSE_2024_Book_of_Abstracts.pdf

<https://isesrs.fkit.unizg.hr/#book-of-abstracts>

