

**International Society of Electrochemistry  
Ministry of Education and Science of Ukraine  
Kyiv National University of Technologies and Design  
Igor Sikorsky Kyiv Polytechnic Institute**



## **PROGRAM**

**6<sup>th</sup> ISE Satellite Student Regional Symposium on  
Electrochemistry «Promising Materials and Processes in  
Applied Electrochemistry»**



**Kyiv 2024**

**We are very pleased to invite you to participate in the 6<sup>th</sup> ISE Satellite Student Regional Symposium on Electrochemistry in Ukraine «Promising Materials and Processes in Applied Electrochemistry», which will be held in Kyiv on May 22, 2024.**

**Its aim is to promote scientific contacts and discussions between scientists and students representing different areas of this versatile science.**

**We hope that the 6th ISE Satellite Student Regional Symposium on Electrochemistry in Ukraine will be equally interesting and useful for you!**



# INTERNATIONAL PROGRAM COMMITTEE

- Ivan Gryshchenko** Doctor of Science in Economics, Professor, Academician of the National Academy of Pedagogical Sciences of Ukraine, Rector of the Kyiv National University of Technologies and Design, Ukraine, Chairman of the Scientific Committee
- Liudmyla Hanushchak-Yefimenko** Doctor of Science in Economics, Professor, Vice-Rector for Research and Innovation of the Kyiv National University of Technologies and Design, Ukraine, Vice-Chairman of the Scientific Committee
- Volodymyr Khomenko** DScTech, Assoc. Prof. of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, National Secretary of Ukraine at the International Society of Electrochemistry (ISE), Ukraine
- Tatiana Derkach** Dr. habil. in Education, PhD in Chemistry, Professor, Dean of Faculty of Chemical and Biopharmaceutical Technologies of the Kyiv National University of Technologies and Design, Ukraine, Vice-Chairman of the Scientific Committee
- Olga Linyucheva** DScTech, Professor, Head of the Department of the Chemical and Technological Faculty of the National Technical University of Ukraine «Ihor Sikorskyi Kyiv Polytechnic Institute», Ukraine
- Viktoriia Plavan** DScTech, Professor, Head of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
- Olexei Kosogin** PhD, Head of a Chair Deputy of the Department of Electrochemical Productions Technolog of the National Technical University of Ukraine «Ihor Sikorskyi Kyiv Polytechnic Institute», Ukraine
- Oleksandra Buzharovska** Professor of the Faculty of Technology and Metallurgy at the University of Saints Cyril and Methodius in Skopje, Skopje, North Macedonia
- Chiara Gualandi** Professor of the Faculty of Chemistry at the University of Bologna, Bologna, Italy
- Nathalie Herlin** PhD, Head of the Nanomaterials Department Commissariat for Atomic Energy and Alternative Energy Technologies and the National Center for Scientific Research (CIA-CNRS) of the University of Paris- Saclay, France
- Iratxe de Meazza** PhD, Head of the Research Group for the Development of Lithium-ion Batteries of the Materials for Energy Department of the Materials for Energy Center (CIDETEC), San Sebastian, Spain

- Andrei Jitianu** Professor of Chemistry and Chair of the Inorganic Subdiscipline at CUNY Graduate School Lehman College City University of New York, New York, USA
- Grzegorz Lota** Professor Poznań Technical University, Director of the Poznań Branch of Łukasiewicz Research Network — Institute of Non-Ferrous Metals Poznań Division, Poznan, Poland
- Anatolii Belous** Professor, Academicians of NAS of Ukraine, Dr., Head of the Department of Solid-state Chemistry at the V.I.Vernadskii Institute of General and Inorganic Chemistry of the Ukrainian NAS, Ukraine
- Yuriy Maletin** Corresponding Members of NAS of Ukraine, Dr., Head of the Department of Nanoscale Carbon Materials for Energy Storage of Institute for Sorption and Problems of Endoecology of the Ukrainian NAS, Ukraine
- Mykola Sakhnenko** DScTech, Professor, Head of the Department of Physical Chemistry, National Technical University «Kharkiv Polytechnic Institute», Ukraine
- Volodymyr Kotsyubynskyi** Doctor of Physical and Mathematical Sciences, Professor, Head of the Department of Materials Science and New Technologies of Vasyl Stefanyk Precarpathian National University, Ukraine
- Olena Mokrousova** DScTech, Professor, Head of the Department of Biotechnology, Leather and Fur, Kyiv National University of Technologies and Design, Ukraine
- Volodymyr Bessarabov** DScTech, Professor of the Department of Industrial Pharmacy, Kyiv National University of Technologies and Design, Ukraine

## ORGANIZING COMMITTEE

- Tatiana Derkach** Dr. habil. in Education, PhD in Chemistry, Professor, Dean of Faculty of Chemical and Biopharmaceutical Technologies of the Kyiv National University of Technology and Design, Ukraine, Head of Organizational the Committee
- Viktoriia Plavan** DScTech, Professor, Head of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine, Deputy Head of Organizational the Committee
- Volodymyr Khomenko** DScTech, Assoc. Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine, Deputy Head of Organizational the Committee



<b>Oksana Butenko</b>	PhD, Senior Lecturer of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine, Secretary of the Organizing Committee
<b>Bohdan Savchenko</b>	DscTech, Prof., Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Nadiya Sova</b>	DscTech,, Prof., Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Iryna Makeeva</b>	PhD, Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Olha Kislova</b>	PhD, Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Olena Kryukova</b>	PhD, Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Olena Ishchenko</b>	PhD, Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Iryna Lyashok</b>	PhD, Senior Lecturer of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Dmytro Novak</b>	PhD, Associate Professor of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Dmytro Patlun</b>	PhD student of the Department of Chemical Technologies and Resource Saving, Kyiv National University of Technologies and Design, Ukraine
<b>Olena Yershova</b>	PhD, Head Department Informative Software And Technology Transfer Of Kyiv National University Technologies And Design, Ukraine

# SYMPOSIUM PROGRAM

May 22, 2024

9.30 – 10.00

## REGISTRATION OF PARTICIPANTS

10.00-10.30

### *Opening ceremony*

#### WELCOME SPEECH

**Ivan Gryshchenko** – Doctor of Science in Economics, Professor, Academician of the National Academy of Pedagogical Sciences of Ukraine, Rector of the Kyiv National University of Technologies and Design, Ukraine, Chairman of the Scientific Committee (Kyiv, Ukraine)

10.30-14.00

## ORAL PRESENTATIONS

10.30-10.45

### **Future Prospects of Natural Graphite as a High-Tech Material for Energy Applications**

Volodymyr Khomenko, Iryna Makeeva, Olga Kyslova, Dmytro Patlun, Dmytro Nikulin

*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

10.45-11.00

### **RINA Consulting Unveiled: Pioneering Energy Storage with the GR4FITE3 Project.**

Nora Ganzinelli

*Innovation for Energy Efficiency Project Manager, RINA Consulting S.p.A., Italy*

11.00-11.15

### **Advanced Techniques in Polymer and Materials Characterization**

Prof. Aleksandra Bužarovska

*Faculty of Technology and Metallurgy, Ss. Cyril and Methodius University, Skopje, North Macedonia*

11.15-11.30

### **Modified carbon materials for energy storage and conversion**

Łukasz Kolanowski, Piotr Krawczyk, Katarzyna Lota, Grzegorz Lota

*Research Group of New Technologies for Energy Storage, Łukasiewicz Research Network - Institute of Non-Ferrous Metals Poznań Division, Poznań, Poland*

11.30-12.00

## COFFEE BREAK

12.00-12.15

### **Empowering redox flow batteries using supercapacitors**

Monica Giovannucci

*Department of Chemistry “Giacomo Ciamician”, Alma Mater Studiorum University of Bologna, Bologna, Italy*

12.15-12.30

### **Lignin-Derived Activated Carbon for Sustainable High Performance Electrical Double-Layer Capacitors**

Elisabetta Petri

*Alma Mater Studiorum-University of Bologna, Bologna, Italy*

12.30-12.45

### **Potentiometric studies of corrosion resistance of fuel cell structural material using modern devices**

Yuliana Hapon

*National University of Civil Defence of Ukraine. Kharkiv, Ukraine*

- 12.45-13.00 **Electrode Materials as the Basis of the Electrochemical Sensor System for Oxygen Detection**  
Oleksandr Butenko  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 13.00-13.15 **Electrochemical performance of NiFe<sub>2</sub>O<sub>4</sub>/rGO composites synthesized via surfactant- assisted co-precipitation method**  
Volodymyr Kotsyubynsky  
*Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine*
- 13.15-13.30 **Study of the dynamics of the formation of oxide films on Ti6Al4V titanium alloy in fluoride-containing electrolytes**  
Oleksii Pylypenko, Inna Zaitceva, Darya Bulavina, Valeriia Apalkova  
*O.M.Beketov National University of Urban Economy in Kharkiv, Kharkiv, Ukraine*
- 13.30-13.45 **BREAK**
- 13.45-14.00 **Resistance to corrosion cracking of a welded joint made of X70 steel in a model soil electrolyte**  
Lisovskiy Yurii  
*E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine, Kyiv, Ukraine*
- 14.00-14.15 **Hydrogen generation at iron dissolution in electrolytes based on HCl and NaCl**  
Bichai A. I.<sup>1</sup>, Matveev V. V.<sup>1,2</sup>, Nefedov V. G.<sup>1,2</sup>  
<sup>1</sup>*Ukrainian State University of Science and Technologies, Dnipro, Ukraine.*  
<sup>2</sup>*Institute of Geotechnical Mechanics NAS of Ukraine, Dnipro, Ukraine*
- 14.15-14.30 **Peculiarities of corrosion cracking of ferrite-pearlite steel of X70 class under conditions of thin-film corrosion in soil medium with pH close to neutral**  
Nyrkova L. I., Goncharenko L. V., Osadchuk S. O., Bratochkin O. V., Kovalenko S. Yu.  
*E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine, Kyiv, Ukraine*
- 14.30-14.45 **The effect of osmotic phenomena on the stability of energy storage systems in the composition of liquid electrolytes separated by a polymer membrane**  
Volodymyr Matiukha  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*

## LIGHTNING TALKS

### Section 1. ELECTROCHEMICAL POWER SOURCES

- 1.1 **Optimization of Lithium-Ion Battery Anodes Using Natural Graphite and Silicon Nanocomposites**  
Nathalie Herlin Boime<sup>1</sup>, Suzy Surble<sup>1</sup>, Volodymyr Khomenko<sup>2</sup>  
*<sup>1</sup>Nanomaterials Department Commissariat for Atomic Energy and Alternative Energy Technologies and the National Center for Scientific Research (CIA-CNRS) of the University of Paris- Saclay, France;*  
*<sup>2</sup>Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 1.2 **Recycling of spent lithium-ion battery cathodes using electrolysis**  
Borys Halyuk<sup>1</sup>, Artem Mishuk<sup>2</sup>, Roman Derkach<sup>1</sup>, Vyacheslav Barsukov<sup>1</sup>  
*<sup>1</sup> Institute of Sorption and Endoecology Problems, Kyiv, Ukraine*  
*<sup>2</sup> National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine*
- 1.3 **Iron preplating as a method of increasing roundtrip efficiency of an all-iron redox flow battery**  
Bondar Andrii  
*National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine*
- 1.4 **Fabrication of a Hybrid Lithium-Ion Capacitor Using Natural Graphite**  
Volodymyr Khomenko, Dmytro Patlun  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 1.5 **Influence of graphite purity on the characteristics of lithium-ion batteries**  
Zabolotny A. A., Khomenko V. G., Makyeyeva I. S.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 1.6 **Strategy for pH control of all-iron flow battery electrolytes**  
Yaroslav Kolosovskiy  
*National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine*
- 1.7 **La-based metal oxide electrode materials for supercapacitor application**  
Pavlo Kolkovskiy  
*Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine*
- 1.8 **Development of Advanced Polyvinylidene Fluoride-Based Membranes for Lithium Batteries**  
Volodymyr Khomenko, Leonid Kovalenko, Ivan Lisovskiy, Dmytro Patlun, Oleksandr Potapenko, Anatolii Belous  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 1.9 **Polymer electrolyte for lithium-sulfure batteries**  
Oleksandr Potapenko  
*Joint Department of Electrochemical Energy Systems of NAS of Ukraine, Kyiv, Ukraine*



1.10 **Modeling of impedance spectra obtained for the porous electrode/electrolyte system**

Andriy Soltys

*Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine*

Section 2. **ELECTRODEPOSITION AND CORROSION PROTECTION**

2.1 **Electrolytes for applying copper coating on printed boards**

Kryukova O. A., Vorona O. A., Plesa M. M.

*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

2.2 **Improvement of wastewater treatment process of the electroplating production**

Lev M.O., Mukhamedov T.M., Kyslova O.V.

*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

2.3 **Deposition of binary cobalt alloys**

Andrii Romaniuk

*Kharkiv National Automobile and Highway University, Kharkiv, Ukraine*

2.4 **Intensification of the method for applying protective zinc coating on complex configuration parts**

Volodymyr Khomenko, Nataliya Gryshchynshyn

*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

2.5 **Anticorrosive properties of Hybrid Glasses obtained via Sol-Gel Chemistry**

Patrick Garana<sup>1</sup>, Alfusainey Samateh<sup>1</sup>, Michael Grzenda<sup>2</sup>, Jennifer Guzman<sup>1</sup>, Jadra Mosa<sup>3</sup>, Lin Lei<sup>2</sup>, M. Aparicio<sup>3</sup>, Lisa C. Klein<sup>4</sup>, Jonathan P. Singer<sup>2</sup> and Andrei Jitianu<sup>1,5</sup>

*<sup>1</sup>Department of Chemistry, Lehman College, City University of New York, New York, US; <sup>2</sup>Department of Mechanical and Aerospace Engineering, Rutgers University, New Jersey, USA; <sup>3</sup>Instituto de Cerámica y Vidrio, Consejo Superior de Investigaciones Científicas (CSIC), Madrid, Spain; <sup>4</sup>Department of Materials Science and Engineering, Rutgers University, New Jersey, USA; <sup>5</sup>Ph.D. Program in Chemistry and Biochemistry, The Graduate Center of the City University of New York, New York, USA*

2.6 **Characteristics of the electrochemical formation of PbO<sub>2</sub> layers on valve metals**

Andrii Yaresko

*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*

2.7 **Electrodeposition of nickel-based polyfunctional coatings**

Andrii Zabaluiev

*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*

Section 3. **ELECTROCHEMICAL SENSORS AND BIOSENSORS**

3.1 **Luminous bacteria photobacterium phosphoreum as potential biosensor for metals nanoparticles**

Ihor Hretskyi

*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

3.2 **Assessing the state of viscous liquids in food technology using electrical conductivity measurements**

Koshel S.A., Koshel N.D.

*The Institute of Transport Systems and Technologies of the National Academy of Sciences of Ukraine, Dnipro, Ukraine*

## Section 4. COMPOSITE MATERIALS FOR A SPECIFIC APPLICATION

- 4.1 **Electrochemical synthesis of metal nanoparticles on the silicon surface**  
Mariana Shepida  
*Lviv Polytechnic National University, Lviv, Ukraine*
- 4.2 **Composite materials filled with finely dispersed metal powders for decorative finishing of domestic premises**  
Viktor Ragozin<sup>1</sup>, Viktoriia Plavan<sup>2</sup>  
<sup>1</sup>*LLC "MBA", Odessa, Ukraine*  
<sup>2</sup>*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 4.3 **Composite Materials in Limb Prosthetics**  
Ivan Iungin, Olena Mokrousova  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.4 **Influence of electrospinning parameters on biopolymer nanofibers with chitosan**  
Olena Ishchenko, Irina Liashok, Ihor Okhrimenko, Ivan Motsok, Viktoriia Halahan  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.5 **Biosynthesis of bacterial cellulose for obtaining materials for medical purposes**  
Iryna Voloshyna  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.6 **Composite carbon-polymer coatings for protection against electromagnetic radiation**  
Oksana Butenko, Kateryna Marchukova  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 4.7 **Multilayer coatings for protection against electromagnetic radiation**  
Oksana Butenko, Yevhen Nikolskyi  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 4.8 **Electrospinning of PVA solutions based on plant extracts**  
Irina Liashok, Olena Ishchenko, Andrii Sikora, Viktoriia Medianska, Maksym Antonenko  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.9 **Application of carbon composite coatings for the creation of electromagnetic radiation reflection surfaces**  
Svistilnik R.F., Fedoriv T.R., Limaz Ya.Ye.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.10 **Thermal conductivity of polymer composites after additive manufacturing**  
Pushkarov D.V., Osaulenko S.I., Stefaniv T.A.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.11 **Nonwovens with composite electrically conductive fillers**  
Bulhakov Ye.S., Rozvora L.V. Pyliuchenko I.V.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.12 **Composite fillers and cyclic processing of polymeric materials**  
Savchuk B.P., Savchuk A.P., Suvorov O.S.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 4.13 **Exploring the use of basalt composites for housing components in electrochemical devices**  
Oleinikova I., Novosad B.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

## Section 5. MODERN ELECTROCHEMICAL AND RELATED TECHNOLOGIES

- 5.1 **Hybrid energy system based on piezoelectric generators integrated into footwear**  
Dmytro Patlun, Volodymyr Khomenko, Nataliia Pervaia, Anastasiia Kucher  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.2 **Influence of the shiny additives on the quality nickel plating**  
Kryukova O. A., Tishchenko D. I.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.3 **Prospects of the electrochemical methods application for regeneration of electroplating technological solutions**  
Denisyuk V.A., Gordiyshuk Y.M., Kyslova O.V.  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.4 **Integrated Chemical Processes for Graphite Purification and Wastewater Management**  
Volodymyr Khomenko, Iryna Makeeva, Olga Kyslova, Dmytro Patlun, Viktoriia Plavan  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.5 **Mechanical and corrosion properties of electrochemically printed copper parts**  
Kotyck M.M., Ushchapovskiy D.Yu., Vorobyova V.I., Vasylyev G.S.  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 5.6 **Thermochemical effects in hydrogen production using a combined system with a soluble anode**  
Sukhyi M. K., Girenko D. V., Nefedov V. G., Polishchuk Yu.V.  
*Ukrainian State University of Science and Technologies, Dnipro, Ukraine*
- 5.7 **Analysis of the electrochemical method of hydrogen release using the Evans diagram**  
Mykhailo Sukhyi, Volodymyr Nefedov, Yuliya Polishchuk  
*Educational and scientific institute "Ukrainian State University of Chemical Technology" of Ukrainian State University of Science and Technologies, Dnipro, Ukraine*
- 5.8 **Influence of polymers on the parameters of ISM-band antennas**  
Dmytro Novak, Kyrylo Voznyuk  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.9 **Study of the influence of solution layer thickness on the electrochemical properties of steel**  
Svetlana Osadchuk  
*E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine, Kyiv, Ukraine*
- 5.10 **Development and implementation of antenna using 3D printing technology**  
Dmytro Novak, Bohdan Harkusha  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*
- 5.11 **Nozzle moving speed influence on accuracy of electrochemical 3D-printing**  
Babchuk R.V., Ushchapovskiy D.Yu., Vorobyova V.I., Vasylyev G.S.  
*National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine*
- 5.12 **Additive technology application in the Internet of Things**  
Dmytro Novak, Oleksandra Bocharova  
*Kyiv National University of Technologies and Design, Kyiv, Ukraine*

*For notes*