




Division 5: Electrochemical Process Engineering and Technology


Report on Annual Activities 2020-2021

October 18, 2021

Members: There are currently 714 active members in Division 5 (5.3% decrease with respect to year 2019-2020)

1. Division Officers

		
Division Chair: Manuel Rodrigo, Spain	Chair Elect: Carlos Alberto Martínez-Huitle, Brazil	Past Chair: Gerardine G. Botte, USA

	
Vice-chair: Carlos Ponce de Leon Albar, UK	Vice-chair: Minhua Zhou, China

2. Contributions to Annual Meetings

 <p>72nd Annual Meeting of the International Society of Electrochemistry 29 August - 03 September 2021 Jeju Island, Korea</p> <p>Electrochemistry from Fundamentals to Products</p> <p>First Announcement</p> <p>In association with The Korean Electrochemical Society</p>	<p>29 August - 3 September, Jeju Island, Korea Hybrid</p> <p>(72nd Annual Meeting)</p> <p>Electrochemistry from Fundamentals to Products</p>
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The Division 5 has participated in the organization of 7 symposia (S11, s13, s14, s15, s16, s21 and S23) although symposium s13 was finally integrated into S14. We also collaborated in S24 and S25. Below it is the description of all symposiums.

<p>Symposium 11 Electrochemical Conversion of Carbon Dioxide and its Utilization <i>Sponsored by:</i> Division 3, Electrochemical Energy Conversion and Storage Division 5, Electrochemical Process Engineering and Technology</p> <p>This symposium will focus on the recent advances in electrochemical Carbon Dioxide (CO₂) conversion from fundamental understanding to industrial application toward producing valuable fuels and chemicals. It covers the topics of CO₂ reduction catalysts, electrolyzers, in-situ techniques, theoretical and experimental approaches, and the scale-up technologies, as well as beyond CO₂ chemistry.</p> <p>Topics include but are not limited to:</p> <ul style="list-style-type: none"> •Electrocatalysts; metals, metal-oxides, single atoms, metal-carbon catalysts etc. •Interfacial engineering •Electrolyzers; gaseous- and aqueous-phase CO₂ electrolysis •In-situ / operando characterization techniques •Computational modeling •New chemistry of CO₂ for valuable chemicals •Parameters for activity, selectivity, and stability of catalysts and electrolyzers •Low and high temperature CO₂ electrolysis •Techno-economic analysis •Large-scale CO₂ electrolysis system for industrial application <p>Beyond CO₂: valorization of nitrogen (N_xH_yO_z), carbon (C_xH_yO_z), and sulphur (S_xO_y) compounds</p> <p>Symposium Organizers Youngkook Kwon (main organizer), ykwon@unist.ac.kr Yun Jeong Hwang (co-organizer) Christopher Hahn (co-organizer) Boon Siang Yeo (co-organizer) Ruud Kortlever (co-organizer)</p>	<p>Symposium 13 Advanced Processes for Materials Recycling: from Batteries to E-Waste <i>Sponsored by:</i> Division 5, Electrochemical Process Engineering and Technology Division 3, Electrochemical Energy Conversion and Storage Division 4, Electrochemical Materials Science</p> <p>The demand for batteries continues to grow including applications such as electric vehicles and electronics devices. The proper disposal of these batteries and the recycling and reutilization of materials is a critical need. Furthermore, metals such as Ni, Co, Cr, Ag, Au, Fe, Cu, Zn, and V are widely used as based catalysts for multiple applications, including: oil refining, batteries, chemical processes, air emissions control, etc. During such processes, these catalysts will degrade over time, losing their catalytic utility and eventually become waste. In the electronics industry especially, these metals represent a significant portion of the waste from deprecated board circuits. The production of such wastes (spent catalysts, batteries, and board circuits) has become one of the major environmental concerns in these industries, mainly due to their toxicity and metal emissions.</p> <p>This symposium will provide an international forum for the presentation and discussion of the most recent developments on the advanced processes for the recovery and recycling of materials. Topics of interest include, but are not limited to:</p> <ol style="list-style-type: none"> (1) new electrochemical technologies for metals recycling; (2) scale up demonstration; (3) Materials processing and testing; (4) life-cycle analysis demonstrating the impact of the technology in recycling of batteries components/e-waste; (5) recycling of graphite anodes and carbon materials; (6) electrochemical performance of recycle batteries and materials; (7) applications and economic analysis <p>Symposium Organizers Gerardine Botte (coordinator, division 5, gerri.botte@ttu.edu) Clara Santato (co-chair, division 3) Fabio La Mantia (co-chair, division 4) Il-Chan Jang (co-organizer, local) Youngsik Kim (co-organizer, local)</p>
<p>Keynote 4</p> <p>Oral 48</p> <p>Poster 33</p>	<p>Cancelled and integrated into S14</p>

<p>Symposium 14 Electrochemical Technology for Process Intensification and Sustainability <i>Sponsored by:</i> Division 5, Electrochemical Process Engineering and Technology Division 4, Electrochemical Materials Science Process intensification consists on the combination of multiple unit operations in a process with the intend of reducing operational costs, equipment size, energy consumption, and/or waste generation while maintaining a production goal. Chemical engineers had been working in process intensification since the early 1990. With the availability of renewables, electrification had become a viable option for providing energy in the form of electricity. Electrochemical technologies can play an important role in process intensification by enabling process pretreatment and efficient separations. This symposium will provide an international forum for the presentation and discussion of approaches for the incorporation of electrochemical routes in process intensification. Topics of interest include, but are not limited to: (1) hybrid electrochemical/thermal chemical reactors, (2) novel electrochemical reactor designs, (3) electrochemical separations, (4) selective oxidation/reduction processes, (5) applications and economic analysis</p> <p>Symposium Organizers Manuel Rodrigo (coordinator, division 5, Manuel.Rodrigo@ucim.es) Minhua Shao (coordinator, division 5, kemshao@ust.hk) Monica Santamaria (co-chair, division 4) Chan-Soo Kim (co-chair, local), KIER (Korea Institute of Energy Research) Sang Hoon Kim (co-chair, local), KIST (Korea Institute of Science and Technology)</p>	<p>Symposium 15 Anodization and Its Applications in Environmental and Energy Research <i>Sponsored by:</i> Division 5, Electrochemical Process Engineering and Technology Division 4, Electrochemical Materials Science Anodic processes have the ability to form a wide range of metal oxide nanostructures on any refractory metal and many semiconductors on a scale from nm to mm. The symposium will deal with all aspects of anodic reaction systems such as anodization mechanisms of advanced materials, formation of self-organized metal oxides, surface modification of metals and semiconductors as well as state of art applications such as binder-free electrode, catalysis and environmental/energy applications. Papers presenting experimental as well as theoretical and modelling aspects of anodization systems and processes will be considered. This symposium will show the current state of anodic synthesis engineering science and practice, novel anodization method and new materials as well as innovative methodologies, and will hopefully suggest a way forward.</p> <p>Topics include but are not limited to: • Anodic self-organization (experimental and theoretical approaches) • Electrochemical anodization on surfaces, generating functional nanostructures • Anodization of metals/semiconductors/alloys • Electrochemical doping in anodic oxides • De-alloying or anodic conversion of metal to multi-purpose functional metal oxide structures • High aspect ratio or extreme thin anodic oxide film: anti-corrosion and coloring purposes • Novel applications of electrochemically synthesized anodic materials</p> <p>Symposium Organizers Jinsub Choi (coordinator) Inha University (jinsub@inha.ac.kr) Giovanni Zangari (co-coordinator), University of Virginia Hiroki Habazaki, Hokkaido University Kiyoun Lee, Kyungpook National University</p>
<p>Keynote 4 Oral 33 Poster 25</p>	<p>Keynote 5 Oral 21 Poster 19</p>

<p>Symposium 16 Mathematical modelling in electrochemistry – from molecular scale to the process design <i>Sponsored by:</i> Division 5, Electrochemical Process Engineering and Technology Division 3, Electrochemical Energy Conversion and Storage Division 7, Physical Electrochemistry Mathematical modelling represents a powerful tool of increasing importance in all domains of research and development, including electrochemistry and related fields. Its role is inevitable in understanding processes occurring on a molecular scale, as well as in analysis of complex experimental data or in design and optimization of electrochemical processes and systems. With increasing power of standard computers accompanied by rapid development of mathematical methods and related software, problems of high complexity can nowadays be solved. This rapid development however, raises a number of new important questions and challenges. Efficient approaches are searched allowing to approach new problems and/or to reduce the number of simplifying assumptions. Reliable mathematical methods are developed able to solve complex models of limited stability. The target of this Symposium is to bring together specialists from fundamental and engineering sciences. This will allow fostering interdisciplinary collaboration and advancement of the novel approaches in the field of mathematical modelling of electrochemical processes and devices through discussion of experts in the individual fields.</p> <p>Symposium Organizers Karel Bouzek (coordinator, division 5, Karel.Bouzek@vscht.cz) Francois Lapicque (Division 5) Alejandro Franco (Division 3) Jürgen Fuhrman (Division 7) Hyungjun Kim (Local) Hyung Chul Ham (Local)</p>	<p>Symposium 21 Electrochemical Solar Energy Conversion and Storage: from Fundamentals to Applications <i>Sponsored by:</i> Division 7, Physical Electrochemistry Division 5, Electrochemical Process Engineering and Technology Natural photosynthesis is the most important and complex electrochemical reaction on Earth. It combines the delicate balance of absorbing visible photon energy, generating (molecular) charge carriers and reaction centers in a highly complex natural scaffold organization. Life, as it is now, is underpinned by this highly efficient energy conversion system. However, the huge increase in energy demand and the need of significant cuts in carbon emission require solar energy conversion processes that are faster, more efficient and robust than natural photosynthesis. To explore advances in the area of electrochemical solar energy conversion, this symposium will bring together scientists in key domains such as material science, solid state physics, photochemistry and molecular design. The symposium will be covering the following topics: 1. <i>Emergent inorganic semiconductor electrodes</i>: new materials such as nitrides, oxy-halides, III-V and complex transition metal oxides beyond TiO₂, Fe₂O₃ and BiVO₄ 2. <i>Semiconductor/electrolyte interfaces</i>: first principle modelling as well as in situ spectroscopy and microscopy studies of the photoactive interfaces 3. <i>Dynamic photoelectrochemistry</i>: recombination kinetics and mechanism; time and frequency response analysis photoelectrochemical systems; charge transport in mesoscopic systems 4. <i>Solar Fuels</i>: photoelectrochemical water-splitting and CO₂ conversion 5. <i>Hybrid photoactive systems</i>: dye sensitized photoelectrodes; photoactive polymer systems, photoelectrochemistry at molecular interfaces 6. <i>Toward femto electrochemistry</i>: ultrafast charge transfer, adiabatic vs nonadiabatic charge transfer, response of electric double layer after ultrashort pulse irradiation 7. <i>Plasmonic effects</i>: Hot electron driven electrochemistry, light matter interaction on nanoscale, electrochemical active site vs optical local field</p> <p>Symposium Organizers David Fermin (U. Bristol) Yujin Tong (Fritz Haber Institute) R. Abe (Kyoto U.) Chi-Hwan Han (KIER) Hong Chul Moon (Univ. Seoul) Hyunwoong Park</p>
<p>Keynote 4 Oral 23 Poster 12</p>	<p>Keynote 3 Oral 22 Poster 29</p>

<p>Symposium 23 Electrochemistry Knowledge transfer: from academy to Startup Company and Industries. <i>Sponsored by:</i> Division 3, Electrochemical Energy Conversion and Storage Division 1, Analytical Electrochemistry Division 2, Bioelectrochemistry Division 4, Electrochemical Materials Science Division 5, Electrochemical Process Engineering and Technology Division 6, Molecular Electrochemistry</p> <p>This symposium will provide an international forum focused on knowledge transfer in electrochemistry and electrochemical engineering. It will highlight how innovation in several fields where electrochemistry plays a key role, from energy storage and conversion, to materials processing and engineering, sensing, water treatment, biomedical devices, and bioelectrochemistry impacts on the economic growth of our society by creating skilled job opportunities from an entrepreneurial point of view. It will also highlight activities related to open innovation and strategic industry/university partnership towards research, development, and commercialization.</p> <p>Topics of interest include, but are not limited to: i) spin off experiences of academic research products from academy, ii) public organisations programs that are supporting knowledge transfer actions, iii) successful cases of established companies funded as spin off, iv) Open Innovation programs and strategic industry/university partnerships, v) funding opportunities by business angel associations and venture capitals.</p> <p>Symposium Organizers Francesca Soavi (coordinator, division 3) Francesco Di Franco (division 4) Gerardine Botte (Co-Chair, division 5) Jose Zagal (Co-Chair, division 6) Chang Hyun Lee Jae Ho Shin</p>	<p>Symposium 24 Electrochemistry, Looking Back Looking Forward: Personal Perspectives <i>Sponsored by:</i> All Divisions</p> <p>Electrochemistry, dating back to Galvani, Volta, and Faraday, has been evolving over the past two centuries and pervading every region of the globe that includes east asia. Harmonizing with recent technological revolutions, it is getting into a new phase to drive many other related disciplines. Modern electrochemistry is now at the center of human life as well as industry, undoubtedly owing to the immense contribution of numerous electrochemists. Electrochemistry is what electrochemists do. The lives of electrochemists are the history of electrochemistry. This symposium is to share invaluable experiences and achievements of the main figures who have been leading the national and international electrochemical societies. All speakers will be invited to give their experiences in research and education in conjunction with their life stories. This will be homage to the predecessors and also inspiration to the successors for the sustainable future of electrochemistry.</p> <p>Topics of interest are widely open to every aspects of electrochemistry.</p> <p>Symposium Organizers Woonsup Shin, (Coordinator) Sogang University, South Korea Taek Dong Chung (Local)</p> <p>Symposium 25 General Session <i>Sponsored by:</i> All Divisions</p> <p>This symposium will cover conceptual aspects, fundamentals, and applications of all ISE areas which are not compatible with the topical symposia. This symposium will provide a forum for researchers and graduate students to present their recent advanced research results of general interests to the ISE meeting attendees. The purpose of this symposium is to foster and promote work in both electrochemical sciences and technologies, and to stimulate researcher and student interests and participation in ISE. A competition for the best poster in electrochemical sciences and technologies will be part of the symposium. A best student prize will be given to the presenting student author on the winning paper.</p> <p>This symposium will cover all ISE areas not compatible with topical symposia. Oral contributed papers will be programmed in some related order, depending on the titles and contents of the submitted abstracts.</p> <p>Symposium Organizers Chi-Chang Hu (coordinator, National Tsing Hua University, Taiwan), Laurence J. Hardwick (University of Liverpool, UK), Hochun Lee (DGIST, Korea)</p>
<p>Keynote 2</p> <p>Oral 6</p> <p>Poster 1</p>	

3. 29th Topical Meeting of the International Society of Electrochemistry 18-21 April 2021, Mikulov, Czech Republic

On-line meeting with the attendance of 186 participants. The Conference Theme was Energy and water: electrochemistry in securing the sustainable society development and it contained 4 Symposiums: S1: Environmental electrochemistry; S2: Energy conversion and storage; S3: Utilisation of the waste materials as an energy source; S4: Mathematical modelling as an efficient tool in cell and process design; and S5: Cross-cutting issues

The organizing committee was led by Karel Bouzek, Miroslav Fojta (co-chairs) and participated Yolina Hubenova, Mark E. Orazem, Manuel A. Rodrigo and Carlo Santoro. The local committee counted on Jiří Barek, Tomáš Bystroň, Martin Hof, Ladislav Kavan, Roman Kodým, Karel Lacina, Jan Macák, Martin Paidar, Petr Sába, Jiří Zima.

The keynote speakers were Plamen Atanassov, University of California Irvine, USA; Rebeca Marcilla, IMDEA Energy, Spain; Vladimír Matolín, Charles University, Czech; Thomas von Unwerth, TU Chemnitz. The invited speakers were: Francesca Soavi University of Bologna, Italy; Xiao Su University of Illinois, USA; Marta Hatzell Georgia Institute of Technology, USA; Thomas

Turek TU Clausthal, Germany; Stylianos Neophytides FORTH/ISE-HT, Greece; Oluf Jenssen DTU, Denmark; Ann Cornel KTH, Sweden; Syed-Asif Ansar DLR, Germany; Robert Hillman University of Leicester, UK

Main data are shown in the table

Meeting attendance:	National distribution	
186 participants	Germany	20
106 oral presentations	Spain	19
	Italy	18
	Czech Republic	15
	Netherlands	13
	France	11
	UK	10
	China	7
	Korea	6
	USA	5
	Belgium	5

4. Sponsored Meetings

Division 5 sponsored one in electrochemical engineering and technology:

- 1st International workshop on Advanced Electrochemical for Water Reuse (ELO.WatR 2020)

5. Forthcoming Sponsor meetings

- Not scheduled because of pandemic

6. Proposals of Division 5 for Xiamen, China, 2022

<p>10) Fuel cells, Electrolysis and Electrofuel Synthesis</p> <p><i>Overview: The limited energy storage capability of batteries and supercaps has fuelled recent development and analysis of fuel cells and electrolyzers. It is accompanied by the rapidly growing interest in power-to-chemistry, electrofuel synthesis beyond H₂ generation as well as CO₂ utilisation. The symposium is therefore devoted to recent advances in understanding, analysing and designing fuel cells, electrolysis and electrofuel synthesis from electrode surface to stack or reactor level; contributions may also comprise electrosynthesis beyond fuels, e.g. of bulk or fine chemicals. The inclusive forum for theoreticians, material scientists, surface and operando analysis experts, modelers and engineers aims to get a multiscale view on the processes in electrodes and cells and structure-performance relationships to catalyse future development. Specific topics are as follows: novel electrocatalysts and material developments; advanced in-situ, operando and model-based analysis on all levels; novel synthesis routes and reactor concepts; effective transport and operational influences; structure/design-performance relationships; Insights into degradation via experiment and modeling.</i></p> <p>Organizers: Ulrike Krewer (ulrike.krewer@kit.edu), Germany Iryna Zenyuk (Iryna.Zenyuk@uci.edu), USA Christophe Coutanceau (christophe.coutanceau@univ-poitiers.fr), France Karel Bouzek (Karel.Bouzek@vscht.cz), Czech Republic Shaojun Guo (guosj@pku.edu.cn), China Deli Wang (wangdl81125@hust.edu.cn), China</p>	<p>12) Electrochemical Energy Storage/Conversions within the Circular Economy</p> <p><i>Sponsored by:</i> Division 3, Electrochemical Energy Conversion and Storage Division 5, Electrochemical Process Engineering and Technology</p> <p><i>Overview: As the world moves toward electromobility and a concomitant decarbonization of its electrical supply, modern society is also entering a so-called fourth industrial revolution marked by a boom of electronic devices and digital technologies. Consequently, the rechargeable battery market is keep growing together with the demand for ores and metals pointing out, as corollary, there is a real need for truly sustainable solutions in the future electrochemical energy storage landscape. Within this background, the symposium will focus on innovative/disruptive chemical solutions in the field, the exploitation of non-critical materials as electrode compounds (including organic batteries, air batteries), the design of sustainable manufacturing and recycling processes or the second-use of devices in alignment with new political goals and economy models (like the "green growth" models or the circular economy governed by Reduce, Reuse, and Recycle).</i></p> <p>Organizers: Philippe Poizot (Philippe.Poizot@cnr-immn.fr), France (coordinator) Alexandru Vlad (alexandru.vlad@uclouvain.be), Belgium Yan Yao (yyao4@central.uh.edu), USA Li Zhang (zhangli81@xmu.edu.cn), China (local coordinator)</p>
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13) Electrochemistry Knowledge Transfer: from Academy to Startup Company and Industries

Sponsored by:

Division 5, Electrochemical Process Engineering and Technology

Division 3, Electrochemical Energy Conversion and Storage

Division 1, Analytical Electrochemistry

Overview: the symposium will focus on knowledge transfer in electrochemistry and electrochemical engineering. It will highlight how innovation in several fields where electrochemistry plays a key role, from energy storage and conversion, to materials processing and engineering, sensing, water treatment, biomedical devices, and bioelectrochemistry impacts on the economic growth of our society by creating skilled job opportunities from an entrepreneurial point of view. It will also highlight activities related to open innovation and strategic industry/university partnership towards research, development, and commercialization. Topics of interest include, but are not limited to: 1) spin off experiences of academic research products from academy, 2) public organisations programs that are supporting knowledge transfer actions, 3) successful cases of established companies funded as spin off, 4) Open Innovation programs and strategic industry/university partnerships, 5) funding opportunities by business angel associations and venture capitals.

Organizers: Thierry Brousse (thierry.brousse@univ-nantes.fr), France (coordinator)

Yitao Long (yitaolong@nju.edu.cn), China (local coordinator)

14) Advanced Electrochemical Processes for the Production of Chemicals

Sponsored by:

Division 5, Electrochemical Process Engineering and Technology

Division 4, Electrochemical Materials Science

Division 6, Molecular Electrochemistry

Overview: Electrochemical synthesis of value-added chemicals from nitrogen, carbon dioxide, water, and biomass using renewable electricity has attracted great attention. It provides an opportunity to store renewable energies. This symposium will cover electrochemical processes including but not limited to carbon dioxide reduction, nitrogen reduction, hydrogen evolution, oxygen evolution, and electrochemical hydrogenation reactions. In particular, electrocatalyst design, synthesis and evaluation, theoretical modelling, system optimization, economic feasibility are welcome.

Organizers: Minhua Shao (kemshao@ust.hk), China

(coordinator)

Carlos Martinez-Huitle (carlosmh@quimica.ufrn.br), Brazil

Cheng Wang (wangchengxmu@xmu.edu.cn), China (local coordinator)

15) Electrochemical Technologies for Sustainability within the Water Energy Nexus

Sponsored by:

Division 5, Electrochemical Process Engineering and Technology

Division 3, Electrochemical Energy Conversion and Storage

Overview: The wide variety of refractory species released to water sources, atmosphere, and soil challenges sustainable development. The ever-increasing energy consumption force scientists and engineers to innovate and propose increasingly efficient and sustainable manufacturing and/or remediation processes. Electrochemical engineering can advance the increasingly efficient technologies (electrochemical and bio-electrochemical) that respond to the emergence of new pollutants and extract precious resources, like lithium, from aqueous media. Such technologies are undertaken in sustainability and meet the energy challenge. This symposium will discuss the latest advances, including but not limited to (1) electrochemical processes for (waste)water treatment, (2) bio-electrochemical technologies and microbial fuel cells, (3) disinfection, (4) soil remediation, and (5) energy conversion from (e-)waste. Topics of interest are combined technologies and hybridization, design of electrochemical reactors, new materials, and modelling in the field of waste/wastewater treatment, soil remediation, and disinfection.

Organizers:

Karine Groenen Serrano (serrano@chimie.ups-tlse.fr), France (coordinator)

Sergi Garcia-Segura (sgarcias@asu.edu), USA

Carlo Santoro (carlo.santoro830@gmail.com), Italy

Volker Presser (presser@presser-group.com), Germany

Kang Shi (kshi@xmu.edu.cn), China (local coordinator)

18) Cutting Edge Electrolysis and Electrochemical Technologies

Sponsored by:

Division 5, Electrochemical Process Engineering and Technology

Division 6, Molecular Electrochemistry

Overview: Within the goals of electrification and integration of electrochemical technologies in the industry, this symposium will cover topics such as: hydrogenation, Electrosynthesis, Electrification), systems modelling, techno-economics analysis, life cycle analysis

Organizers:

Xiao Su (x2su@illinois.edu), USA (coordinator)

Gerardine G. Botte (gerri.botte@ttu.edu), USA

Haichao Xu (haichao.xu@xmu.edu.cn), China (local coordinator)

<p>23) Sonoelectrochemistry: fundamentals and applications</p> <p><i>Sponsored by:</i> Division 7, Physical Electrochemistry Division 5, Electrochemical Process Engineering and Technology</p> <p><i>Overview: The use of ultrasound in electrochemistry, i.e., sonoelectrochemistry, has considerable influence on mass transport, electrode surface activity and electrochemical reaction rates and mechanisms. Sonoelectrochemistry is therefore interesting from both a fundamental physical electrochemistry standpoint, and in terms of its applications, which include electroplating, electrodeposition, electro-polymerisation, organic electro-synthesis, water & wastewater purification, materials synthesis, prevention of electrode fouling and electro-analysis, among others. This symposium will focus on all aspects of sonoelectrochemistry, from fundamental principles through to applications."</i></p> <p>Organizer: Mark Symes (mark.symes@glasgow.ac.uk), UK (coordinator) Manuel A. Rodrigo (manuel.rodrigo@uclm.es), Spain Fengru Fan (frfan@xmu.edu.cn), China (local coordinator)</p>	<p>25) Recent Advances in Photoelectrochemistry: catalysts, mechanisms, and applications</p> <p><i>Sponsored by:</i> Division 7, Physical Electrochemistry Division 3, Electrochemical Energy Conversion and Storage Division 5, Electrochemical Process Engineering and Technology</p> <p><i>Overview: Photoelectrochemistry is a vigorous discipline that investigates the effects and dynamics of light on various photoelectrodes, which has been attracting significant interest in the scientific community toward addressing increasingly urgent environmental, clean energy, and climate change issues. This symposium provides an international and interdisciplinary forum for the presentation and discussion of the latest advances in photoelectrochemistry. Topics of interest include, but are not limited to: (i) synthesis and characterization of photocatalysts; (ii) exploration of new materials for solar energy conversion; (iii) generation of fuels (e.g., hydrogen, hydrocarbon fuels) with photocatalysis and photoelectrochemical cells (e.g., water splitting, CO₂ reduction); (iv) light-driven environmental remediation and disinfection; (v) sunlight-driven production of biofuels and bio-hydrogen with enzymes and photoautotrophic microorganisms; and (vi) simulation and modelling of materials, devices, and systems for solar energy conversion.</i></p> <p>Organizers: Aicheng Chen (aicheng@uoguelph.ca), Canada (coordinator) Pawel J. Kulesza (pkulesza@chem.uw.edu.pl), Poland Peng Wang (pw2015@zju.edu.cn), China Yang Cao (caoyang@xmu.edu.cn), China (local coordinator)</p>
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In addition, Division 5 will also participate in general symposium and is organizing a tutorial on electrochemical engineering

<p>26) General session (including Young Electrochemists Symposium)</p> <p><i>Sponsored by:</i> All Divisions</p> <p><i>Overview: This symposium will cover conceptual aspects, fundamentals, and applications of all ISE areas which are not compatible with the topical symposia. A special topic will be arranged to bring together new-generation electrochemists working in energy storage and conversion and to facilitate the creation of new collaborative networks between PhD students, PostDocs and established researchers around the world.</i></p> <p>Organizers: Andrea Balducci (andrea.balducci@uni-jena.de), Germany (coordinator) Francesca Soavi (francesca.soavi@unibo.it), Italy Yonggang Wang (ygwang@fudan.edu.cn), China (local coordinator)</p>	<p>1) Tutorials on Electrochemical Engineering</p> <p><i>Overview: Special topics on tutorials related to design of Electrochemical Reactors, Electrocatalysis, Modeling and simulation.</i></p> <p>Organizers: Emmanuel Mousset (emmanuel.mousset@univ-lorraine.fr), France Ana Sofia Fajardo (adossan3@asu.edu), USA Yucheng Wang (wangyc@xmu.edu.cn), China</p>
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7. Proposals of Division 5 for Lyon, France 2023 (still in progress)

Symposium Proposal for the 74th ISE Annual Meeting (Lyon 2023)

As a result of the division meeting the following proposals were made. During the next weeks a complete proposal will be made by responsible. Division 5 will also join other proposals if invited.

Electrochemistry for resource and Energy recovery and added value product synthesis	Prof. Dr. Xiao Su. Chemical and Biomolecular Engineering. University of Illinois Urbana-Champaign Email : x2su@illinois.edu Dr. Simonetta Palmas University di Cagliari Email: Simonetta.palmas@dimcm.unica.it
New materials and devices for electrochemical advanced or hybrid processes and Energy storage	Dr. Emmanuel Mousset Laboratoire Réactions et Génie des Procédés (LRGP) CNRS/University of Lorraine Email : emmanuel.mousset@univ-lorraine.fr Dr. Carlos Ponce de Leon Albarran Faculty of Engineering and the Environment, Engineering Sciences University of Southampton Email : capla@soton.ac.uk
Electrocatalysis (With Div 4)	Dr. Tanja Vidakovic-Koch. Max Planck Institute for Dynamics of Complex Technical Systems Email : vidakovi@mpi-magdeburg.mpg.de Prof. Sergi Garcia-Segura. Arizona State University. Email : sergigs_87@hotmail.com
Microbial electrochemical technologies (with div1 and 3)	Pending responsables from div. 5

8. Scientific Meetings Committee

Due to the COVID 19 pandemic the annual meeting was online and it took place on September 24 2021

Prepared by Manuel A. Rodrigo

On behalf of Division 5

October 18, 2021