

Report on Division 3 Activities in 2019 (August)

There are currently 1559 active members of Division 3 from Europe, Asia, North and South Americas, Africa and Oceania. Division 3 is the second largest Division after Division 4 in the International Society of Electrochemistry (total ca 4000 members).

1) Division Officers for 2019 term:

Chair: **Francesca Soavi** (Italia)
Past Chair: **Robert Kosteki** (USA)
Chair Elect: **Andrea Balducci** (Germany)
Vice- Chairs: **Kiyoshi Kanamura** (Japan), **Clara Santato** (Canada)

2) Annual Meetings

70^h ISE Annual Meeting, Durban, South Africa 4-9 August, 2019. Division 3 is sponsoring the following symposia:

Symposium 3: Fuel Cells, Biofuel Cells and Electrolyzers (Co-sponsored with Division 2)

Organizers:

Kiyoshi Kanamura, Japan (Coordinator)
Marian Chatenet, France
Pieter Levecque, South Africa
Elisabeth Lojou, France
Peter Strasser, Germany
Hiroyuki Uchida, Japan

This symposium focuses on all types of low, middle and high temperature fuel cells including enzymatic and microbial fuel cells, as well as electrolyzers for the production of hydrogen.

This symposium includes:

- Synthesis and characterization of novel materials and new cell components for these fuel cells and water electrolysis devices for low-, medium- and high-temperature applications.
- Electrocatalysts, bioinspired and biocatalysts for oxygen reduction, hydrogen oxidation, organic redox system, other fuels and oxidants usable by biocatalysts, oxygen evolution, and hydrogen evolution.
- Ion conductive membrane, separator and ionomers for fuel cells and biofuel cells, water electrolysis systems, and CO₂/water co-electrolysis systems, especially synthesis and characterization of polymeric, ceramic, ionic liquid and nanocomposite systems.
- Understanding of electrochemical and chemical reactions for the degradation of materials and components of these fuel cells and electrolyzers in low-, middle- and high-temperature applications.
- Operando (in situ) observation for phenomena in these fuel cells and electrolyzers, theoretical studies and computational modeling of functional materials and cell components.

Symposium 4: Renewable Energy and Photo-Electrochemistry (Co-sponsored with Divisions 4 and 6)

Organizers:

Federico Rosei, Canada (Coordinator)
Baodan Liu, China
Csaba Janaky, Hungary
Frank Marken, UK
Malik Maaza, South Africa
Mmantsae Diale, South Africa

Materials electrochemistry plays a critical role in harnessing and storing solar energy as well as in solar device fabrication and application. This symposium is focused on the various aspects of photo-electrochemical energy conversion, from fundamental concepts and materials design and synthesis to solar devices and integration. Studies on thin film semiconducting materials, including bandgap engineering using various doped binary and ternary oxides or sulfides for improved optical absorption properties, and fast charge-transport are primary focus areas of this symposium. The symposium aims to bring together scientists from different areas working on different aspects of such photo-induced electrochemical systems or on basic investigations clarifying the influence of light on electrochemical reactions.

Symposium 7 Batteries for Powering Tomorrow's World

Organizers:

Stefano Passerini, Germany (Coordinator)

Mesfin Kebede, South Africa

Robert Kostecki, USA

Hiten Parmar, South Africa

The next generation of advanced rechargeable batteries will continue to rely on the maturing Li-ion chemistry, possibly with the integration of alloying, conversion and conversion-alloying anode materials. Innovative doping and coating of active electrode materials are expected to enhance safety, power and energy performance. Post Li-ion systems - such as Li-S, Li-NCM, Na-ion, etc. - are expected to enter the market, however, in the foreseeable future. Irrespective of the technology, the development of a detailed understanding of the fundamental properties of battery materials and the interactions of these materials with their environment will be the key to further improvements in the energy density, safety, and lifetime of batteries. The electrolyte is also crucial for the improvements of these devices, especially with respect to the overall battery safety. This symposium is therefore devoted to recent progress in the fundamental science related to batteries, especially for advanced battery systems. Studies related to all other (applied) aspects of batteries, including solid-state electrolytes, are also included.

Symposium 8 Sustainable Resources, Processes and Design of High Power Supercapacitors

Organizers:

Francesca Soavi, Italy (Coordinator)

Daniel Belanger, Canada

Katlego Makgopa, South Africa

Ncholu Manyala, South Africa

This symposium covers all fundamental and practical aspects of electrochemical capacitor research, development and applications with a focus on the use of raw materials and precursors from industrial, agricultural and civil waste resources. Basic studies on supercapacitor new materials, interfaces and processes are included. Novel characterization techniques, including in situ and in operando methods, and modelling studies are presented. The use of supercapacitors to improve the exploitation of renewable energy sources for different applications: for remote areas and grid electric quality, is a topic. New concepts and new devices for applications ranging from micro- to large-size energy storage, with attention to materials and system integration, are also included.

Symposium 21 (General Section, All Divisions) General Session

Organizers:

Bernard Tribollet, France (Coordinator)

Paul Ejikeme, Nigeria

Chi-Chang Hu, Taiwan

Samson Khene, South Africa

Duduzile Nkosi, South Africa

This Symposium covers all ISE areas not compatible with topical symposia

3) Topical Meetings

Division 3 did not support/co-organized the 2019 ISE Topical Meetings

4) Sponsored Meetings:

ISE Division 3 supports academic events, which are aligned with ISE mission and relevant to Division 3 science and technology areas of interest in electrochemical energy conversion and storage. Financial support is primarily dedicated to the sponsorship of Student Poster Awards.

Division 3 has sponsored the following meetings in 2019:

- **16th Symposium on Modeling and Experimental Validation of Electrochemical Energy Technology**, 12-13 March 2019, Braunschweig, Germany
- **International Symposium on Enhanced Electrochemical Capacitors**, 6-10 May 2019, Nantes, France (co-sponsored with Division 4)
- **INTERNATIONAL SPRING SCHOOL OF ELECTROCHEMISTRY** - Smart Materials for and from Electrochemistry 19-23 May 2019, Castellammare del Golfo (Trapani - Italy), (co-sponsored with Division 4)
- **35th Swiss Electrochemistry Symposium: On the Role of Batteries in Future Energy Systems**, 22 May 2019, Aarau, Switzerland
- **Organic Battery Days 2019**, 3-5 June 2019, Jena, Germany
- **2nd “Nucleation and Growth Research Conference (NGRC)” -Electrochemical/Materials Processing for Energy Conversion & Storage Systems toward CO₂ Zero-Emission Society-** 10-13 June 2019, Kyoto, Japan, (co-sponsored with Division 4)
- **International Workshop on Supercapacitors and Energy Storage** 27-28 June 2019, Bologna, Italy

Division 3 will sponsor the upcoming 2019 meetings:

- **Waste-Water-Energy as Resource for a Sustainable Future**, 07-09 August 2019, Durban South-Africa (Patronage)
- **Advanced Batteries, Accumulators and Fuel Cells (ABAF-20)**, 25-28 August 2019, Brno, Czech Republic
- **6th International Conference on Advanced Capacitors**, 8-12 September 2019, Ueda, Japan
- **Electrolysis and Fuel Cell Discussions – Towards Catalysts free of Critical Raw Materials for Fuel Cells and Electrolysers**, 15-18 September 2019, La Grande Motte, France
- **Symposium on Insights into Gas Diffusion Electrodes: From Fundamentals to Industrial Applications**, 23-25 September 2019, Magdeburg, Germany
- **12th International Symposium of Advanced Lithium Batteries for Automobile Applications (ABAA 12)**, 6-9 October 2019, Ulm, Germany

5) Get-together/Networking:

Division 3 held a luncheon meeting during 70th ISE Annual Meeting in Durban, Italy in 2018. The primary purpose of this informal gatherings was to inform

Division 3 members on the Division business activities. It was always an open forum for Division 3 members to discuss various issues and inquiries.

6) Division Poster Awards

The Division sponsored Student Poster Awards at the ISE-sponsored conferences listed above.

7) Scientific Meetings Committee

Francesca Soavi attended the SMC meeting on March 22nd, 2019 in Lausanne. The information received at the meeting was distributed promptly to Division 3 Officers. This annual meeting of Division Officers and other ISE Staff is dedicated to discussions of ISE business matters, including elections of ISE officers, divisional budget and fund raising efforts, ISE awards, organization of future ISE annual, topical and sponsored meetings, selection of prospective symposia topics.

8) Contribution to *Electrochimica Acta* Special Issues

Electrochimica Acta Special Issue containing selected papers presented at the 70th ISE Annual Meeting in Durban, South Africa is planned. Editor* and Guest Editors for Division 3 sponsored symposia (3, 4, 7, and 8) are:

Symposium 3: Marian Chatenet

Symposium 4: Csaba Janaky

Symposium 7: Robert Kostecky*

Symposium 8: Daniel Belanger

Francesca Soavi
(on behalf of ISE Division 3)
05/08/2019