

## Division 5: Electrochemical Process Engineering and Technology

### Report on Annual Activities 2018-2019

June 25, 2019

**Members:** There are currently 674 active members in Division 5

#### 1. Division Officers

Gerardine G. Botte, Chair (Ohio, USA)



Manuel Rodrigo, Chair Elect (Ciudad Real, Spain)



Karel Bouzek, Past Chair (Prague, Czech Republic)



Simonetta Palmas, Vice Chair (Cagliari, Italy)



Minhua Shao, Vice Chair (Hong Kong, China)



## 2. Contributions to Annual Meetings

### 70<sup>th</sup> ISE Meeting, August 4-9<sup>th</sup> 2019, Durban, South Africa

Division 5 contributed in four symposia. The division will sponsor three poster prizes. See details below:

#### Symposium 17 Electrochemical Technologies for Sustainable and Advanced Manufacturing, with Division 4

##### Organizing committee:

Gerardine Botte (Co-ordinator), Ohio University  
Takayuki Homma, Waseda University  
Peter Olubambi, University of Johannesburg  
Herman Potgieter, University of the Witwatersrand  
Dongping Zhan, Xiamen University

“Current chemical industrial production methods have approached their practical performance limits, therefore, new transformational, disruptive, and enabling technologies are needed that will provide solutions to the chemical industry beyond incremental manufacturing improvements.

Electrochemistry and electrochemical technologies provide the potential to develop transformational technologies to make more efficient traditional chemical and biological processes. This symposium will provide an international forum for the presentation and discussion of the most recent developments on the application of electrolysis and electrochemical processes in traditional chemical processes that had enabled and/or could lead to sustainable manufacturing.”

The symposium will host 36 scientific presentations distributed as followed: 1 Keynote lecture, 1 invited lecture, 17 regular lectures and 17 posters.

#### Symposium 18 Electrochemistry and Mining: Minerals and Metal Processing, with Division 4

##### Organizing committee:

Antoine Allanore (Coordinator), Massachusetts Institute of Technology  
Bouzek Karel, University of Chemistry and Technology Prague  
Jochen Petersen, University of Cape Town  
Yasuhiro Fukunaka, Waseda University  
Toru Okabe, University of Tokyo

Contributions include: “cathode phenomena (both high and low temperature), including role of impurities, fundamentals of metal deposition in solid and liquid state, novel process evolving gaseous or powder products; electrolyte transport properties and physical chemistry; anode: inert anode materials development, role of gas evolution on process performance, novel design;

cell design: modeling, scale-up; energy efficiency: process model, trends in a given industry, new frontiers.”

The symposium will host 20 scientific presentations distributed as followed: 1 Keynote lecture, 5 invited lectures, 7 regular lectures and 7 posters.

### **Symposium 9 Electro-physical Chemistry and Application of Platinum Group Metals, with Division 4 and 7**

#### **Organizing committee:**

Cobus Kriek (Coordinator), North-West University  
Stanko Brankovic, University of Houston  
Jessica Chamier, University of Cape Town  
Angel Cuesta Ciscar, University of Aberdeen  
Gary Patrick, Johannesburg

“Over 98% of the world’s supply of platinum group metals (PGM) comes from just three countries, South Africa, Canada and Russia, with the first dominating the western world supply of Pt. It is only fitting that this symposium should be held in Durban. PGMs present a somewhat similar physical chemistry, but exhibit a rich coordination chemistry, leading to many available complexes. In addition, PGMs feature a wide variety of important applications, including (electro)catalysis, both homo- and heterogenous, antitumor chemistries, jewellery, high temperature technical applications, and the nuclear industry. This symposium will cover advances in the PGM physical chemistry, molecular compounds, metals and alloys that include at least one PGM and novel synthesis methods or materials.”

The symposium will host 11 scientific presentations distributed as followed: 1 Keynote lecture, 1 invited lecture, and 9 regular lectures.

### **Symposium 12 Electrochemical Technology for Water and the Environment for Social, Health and Economic Development, with Division 4**

#### **Organizing committee:**

Manuel A. Rodrigo (Coordinator), Universidad de Castilla-la-Mancha  
Henry Bergmann, Anhalt University  
Ioannis Ieropoulos, University of the West of England  
Chi-Chang Hu, National Tsing Hua University  
Heidi Richards, University of the Witwatersrand

“Water supply and recycling, and soil and natural water system protection are becoming important issues in most countries around the world. Although tools to remediate problems and

the circumstances may widely differ. New concepts about the circular economy are key components to understand and support the way of thinking of developed countries, in which sustainability is becoming the key paradigm. Meanwhile, developing countries are focusing on solving the social impact of the unsolved environmental problems of their population. In particular, it is paramount to provide safe water to the population and to avoid health problems associated with polluted environments. An array of electrochemical technologies and processes can help to face both contexts, with new greener and safer technologies. Development and advances of new technological approaches, novel reactor constructions, clarification of electrochemical mechanisms, new electrode materials and mathematical modeling may strengthen this strategy. This symposium aims to be a meeting point between environmental and electrochemical technologists, together with researchers in sustainable water working in disparate regions all around the World. The symposium will also attempt to obtain consensus about best practices in implementing new electrochemical technologies to solve the most serious water supply and environmental problems that humankind has to face in the near future.”

The symposium will host 39 scientific presentations distributed as followed: 2 Keynote lectures, 2 invited lectures, 18 regular lectures and 17 posters.

### **69<sup>th</sup> ISE Meeting, September 2-7<sup>th</sup> 2018, Bologna, Italy**

Division 5 contributed in two symposia

#### **Symposium 14: Electrochemical engineering: research towards deployable technology**

##### Organizing committee:

Karel Bouzek (Coordinator), University of Chemistry and Technology Prague, Czech Republic  
Henry Bergman, Anhalt University, Germany  
Maarten Biesheuvel, Wetsus Leeuwarden, Netherlands  
Geoffrey Kelsall, Imperial College London, UK  
Simonetta Palmas, University of Cagliari, Italy  
Onofrio Scialdone, University of Palermo, Italy

The symposium focused on recent advances in the field of applied electrochemistry and electrochemical engineering with contributions on the conception, modelling, design, fabrication, performance characterization, control and optimization of prototype electrodes / electrocatalysts, electrochemical reactors and processes.

The symposium hosted 119 scientific presentations distributed as followed: 2 Keynote lectures, 3 invited lectures, 56 regular lectures and 58 posters. Three poster prizes were sponsored by the division.

**Symposium 9: Photo-electrochemical energy conversion: Symposium in Honor of Prof. Jan Augustynski, with Divisions 2, 3, 6**

Organizing committee:

Robert Kostecki, (Coordinator), Lawrence Berkeley National Laboratory, USA  
Federico Bella, Politechnic of Torino, Italy  
Stefano Caramori, University of Ferrara, Italy  
Clara Santato, Polytechnic of Montreal, Canada  
Renata Solarska, University of Warsaw, Poland

2 Keynote lectures, 1 invited lecture, 24 regular lectures and 48 posters.

**3. Contribution to Topical Meetings**

Division 5 co-organized with Division 4 the 22<sup>nd</sup> Topical Meeting of the International Society of Electrochemistry.

**Materials Engineering and Process Optimization at Electrified Solid/Liquid Interfaces**

15-18 April 2018, Tokyo, Japan

Organizing Committee:

Mario Ferreira, University of Aveiro, Portugal  
Takayuki Homma, Waseda University, Japan (co-chair)  
Chi Chang Hu, National Tsing Hua University, Taiwan  
Susumu Kuwabata, Osaka University, Japan (co-chair)  
Sudipta Roy, University of Strathclyde, Glasgow, UK  
Giovanni Zangari, University of Virginia, USA

Division 5 co-organized with Division 7 the 24<sup>th</sup> Topical Meeting of the International Society of Electrochemistry

**New electrochemical processes for the energy and the environment**

12-15 May 2019, Toledo, Spain

Organizing Committee

Manuel A. Rodrigo , Universidad de Castilla La Mancha, Ciudad Real, Spain  
Enrique Herrero, Universidad de Alicante, Alicante, Spain  
Karel Bouzek, University of Chemistry and Technology, Prague, Czech  
Francois Lapicque, Laboratoire des Reactions et Genie des Procedes, CNRS, Nancy,  
France  
Angel Cuesta , University of Aberdeen, Department of Chemistry, Aberdeen, UK  
Mark Symes , University of Glasgow, School of Chemistry, Glasgow, UK

**4. Sponsored Meetings**

Division 5 sponsored 6 major meetings in electrochemical engineering and technology.

- First International Young Researchers Symposium on Applications of Electrochemical Technology , Santander, Spain, June 19-21, 2019
- 5th Ertl Symposium on Catalytic and Adsorption Reactions in Chemical Processes, 25-28 November 2018, Gwangju, Korea, Division 5
- 2nd Symposium on Physics of Membrane Processes, 2 September 2018, Bologna, Italy, Division 5
- 8th European Summer School on Electrochemical Engineering, 27-31 August 2018, Toulouse, France, Division 5
- 20th YUCORR International conference: "Meeting Point of the Science and Practice in the Fields of Corrosion, Materials and Environmental Protection", 21-24 May 2018, Tara mountain, Serbia, Division 5
- 15th Symposium on Fuel Cell and Battery Modeling and Experimental Validation, 12-13 April 2018, Aarau, Switzerland

#### **5. Forthcoming Sponsor meetings**

- XVII International Symposium on Electrokinetic Remediation, San Miguel de Allende, Mexico September 22-27, 2019

#### **6. Scientific Meetings Committee**

Gerardine Botte attended the Scientific Meeting Committee held in Lausanne on March 22, 2019.

Prepared by Gerardine G. Botte

On behalf of Division 5

June 25, 2019