

## **Division 7 Physical Electrochemistry**

### **2017 Report**

#### **Division 7 officers:**

A. A. Gewirth, U. Illinois (Chair)

A.E. Russell, U. Southampton (Past Chair)

A. Cuesta-Ciscar, U. Aberdeen, (Chair Elect)

A. O'Mullane, Queensland University of Technology, L. Zhuang, Wuhan U. (Vice-Chairs, 2017-18)

#### **The activities of Division 7 in 2017 are summarised below:**

##### **1. Organization and co-organization of symposia at annual ISE meetings**

###### **68th Annual Meeting of the ISE, Aug. 27-Sept. 1, 2017, Providence, RI, USA**

###### **Symposium 16: Electrochemistry of Metal Clusters and Nanoparticles**

Sponsored by:

Division 6, Molecular Electrochemistry

Division 7, Physical Electrochemistry

Monolayer-protected metal clusters (MPCs) and small nanoparticles characterized by a well-defined composition are very promising materials in various applied areas, such as catalysis, sensing and biomedicine. MPCs and nanoparticles display chemical and physicochemical properties that are defined, mostly but not exclusively, by their size. When very small, they display a distinct electrochemical behavior or, more generally, a well-defined electrochemical activity. The ease by which they can undergo reduction or oxidation, also through surface modification, makes them as valuable electron-transfer reactants or redox catalysts in which the metal core may play an active role. Therefore, the number of electrochemical studies of MPCs and nanoparticles in solution, supported on electrodes, or in films keeps increasing. This symposium will highlight the most recent advances in this broad area with a special emphasis on the pivotal role played by electrochemistry and electrochemical methods in understanding the properties of these nanomaterials on a molecular level and developing possible redox applications.

Symposium Organizers

Flavio Maran (Coordinator), University of Padova, Italy [flavio.maran@unipd.it](mailto:flavio.maran@unipd.it)

Anne Co, Ohio State University, USA

Dongil Lee, Yonsei University, South Korea

Michael V. Mirkin, City University of New York Energy Institute, USA

###### **Symposium 17: Advances in Theory and Modeling of Electrochemical Systems**

Sponsored by:

Division 7, Physical Electrochemistry

Physical-mathematical theory and electrochemical simulations provide increasingly powerful tools to understand, predict and interpret phenomena in electrochemical materials and systems. Relations between structure, properties and performance of any electrochemical material or system must be investigated in consistency with basic theoretical principles of transport and reaction phenomena. This fundamental rationale applies across scales and disciplines, including: molecular electrochemical processes in complex matter; charge storage and transfer at microscopic electrochemical interfaces; electrostatic, kinetic and transport phenomena in nanostructured materials; self-assembly and emergence of structure vs. property relations in random heterogeneous materials for ion transport, charge storage and charge transfer (e.g. colloids, porous media, composites); interplay of functional components and electrochemical cells in energy storage and conversion systems. The symposium will address the full bandwidth of methods and approaches and it will showcase numerous applications of modeling tools to basic understanding of electrochemical phenomena, materials design, advanced diagnostics and optimization of complex electrochemical systems. Contributions will embrace spatial scales from the atomic to the macroscopic level, and time scales from fast reactions to long-term degradation processes.

#### Symposium Organizers

Michael Eikerling (Coordinator), Simon Fraser University, Canada [meikerl@sfu.ca](mailto:meikerl@sfu.ca)

Alejandro A. Franco, Université de Picardie Jules Verne, France

Adam Weber, Lawrence Berkeley National Laboratory, USA

Douglas P. Riemer, Hutchinson Technology, Inc., USA

#### **69<sup>th</sup> Annual Meeting of the ISE, Bologna, Italy**

- **Symposium 16** Micro and Nanoscale Platforms to study electron transport in [bio] molecular systems (I. Diez-Perez)
- **Symposium 17** Physical Electrochemistry (Rob Hillman, Maria Escudero-Escribana)
- **Symposium 18** Theory (A. Franco)
- **Symposium 19** Single Entity Electrochemistry (P. Unwin)
- **Symposium 20** Interfacial Electrochemistry in Non-Aqueous Electrolytes (H. Baltruschat)

Please look out for the call for abstracts for the Annual meeting and plan on submitting yours in good time to support the Division's symposia.

#### **2. Organization and co-organization of ISE Topical Meetings**

- Past meetings:
  - **21st ISE Topical Meeting** "(Photo)electrochemistry of semiconductors at the nanoscale: from fundamental aspects to practical applications", April 2017, Szeged, Hungary
- Future meetings:

**2019 Toledo, Spain** “New electrochemical processes for the energy and the environment”

### **3. Sponsoring of International Conferences**

The Division has sponsored or agreed to sponsor the following Meetings:

**“Redox Films for Energy Conversion – Bioelectrochemical and Molecular Systems” from September 28<sup>th</sup> to September 29<sup>th</sup> 2017 in Marseille (France).**

**“Fundamental Electrocatalysis: Theory meets experiments”, 26-30 June 2017 Leiden, The Netherlands**

**“2017 International Workshop on Electrified Interfaces for Energy Conversions” 18 – 21, May, 2017, Hayama-machi Miura-gun, Japan**

If you are seeking support for a school, symposium, or conference from the Division, please submit your request as early as possible using the forms provided on the ISE website. Please make it very clear if you are seeking financial support (typically only €300 to €400 is provided per event in total from the ISE).

### **4. Awards**

The **Alexander Kuznetsov Prize for Theoretical Electrochemistry** was awarded to Michael Eikerling (Simon Fraser University, Canada), in recognition of his ground-breaking work modelling polymer electrolyte /proton exchange fuel cells with an emphasis on water management, transport, and electrocatalysis. Eikerling is particularly recognized for his research combining nanoscale statistical and condensed matter physics with continuum modelling and systems engineering.

Award Committee (two excellent nominations received)

A. A. Gewirth (chair)  
A.E. Russell  
A. Cuesta  
W. Schmickler  
L. Curtiss

In 2018 the Division is associated with the **Brian Conway Prize for Physical Electrochemistry** and committee will be chaired by A. Gewirth.

### **5. Miscellaneous (discussion topics)**

- Nomination for Fellows of the ISE.
- New Div. 7 symposia (for the 70<sup>th</sup> and 71<sup>th</sup> Annual Meetings) and suggestions for topical meetings organized by (with support of) Div. 7: send suggestions to executive committee of division.
- Elections will be held for Division Chair and Vice Chairs in 2018.