# Report

on the

7th International Workshop on Electrochemistry of Electroactive Materials, WEEM-2012

3–8 June 2012, Szeged – Hódmezővásárhely, HUNGARY

This conference was the seventh event in the series of international meetings following those in Moscow, Russia 1995, Dourdan, France 1997, Poraj, Poland (2000), Germany (Bad Herrenalb, 2003), Russia (Repino, 2006) and Poland (Szczyrk, 2009). WEEM is a scientific conference of a special type designed for the detailed analysis of the state-of-art and intensive discussions of key issues related to the research and applications of various chemical electroactive systems, such as electron-conducting and redox polymers, mixed-valence transition-metal inorganic solids, solid ion conductors possessing a sufficient electronic conductivity, in particular certain "superionic conductors" and lithium-cation conducting systems as well as composite organic-inorganic systems. Complete understanding of the complex mechanism of their functioning in the course of the charging/discharging process, redox reactions of solute species at their surfaces, charge transfer at the interfaces between different components of these materials or their interaction with an external electromagnetic field, requires bringing together the leading researchers actively working in these fields to provide them with an opportunity to combine their presentations of original results with extensive exchange of opinions, with an emphasis on non-conventional approaches.

All these conferences were devoted to experimental and theoretical studies of structure, properties and electrochemical phenomena in electroactive films. To make these meetings the most productive, they were arranged in the form of workshops aiming at bringing together a limited number of experts in this scientific area and producing atmosphere for intensive discussions of the latest findings and unresolved problems. A gradual extension of the conference scope from conducting polymers to other classes of electroactive materials including mixed-valence inorganic solids, hybrid inorganic-polymer materials, electroactive sol–gel systems and various lithium-cation-based conductors resulted in the change of the title from “Electrochemistry of Electroactive Polymer Films” to “Electrochemistry of Electroactive Materials”. The success of the conference was possible thanks to a great work done on its preparation and realization by the Organizing Committee. Great efforts of the Local Organizing Committee (Electrochemistry Research Group at the Department of Physical Chemistry & Materials Science of the University of Szeged), who proposed a conference place – living up to expectations in Hódmezővásárhely, where a faculty of the University of Szeged is situated and working – and made the stay of participants pleasant and comfortable, should be appreciated. The choice of the lecturers and the preparation of the program were realized together by the Scientific Committee: L. M. Abrantes (Portugal), V. Z. Barsukov (Ukraine), C. Deslouis (France), J. Heinze (Germany), A. R. Hillman (UK), G. Inzelt (Hungary), P. J. Kulesza (Poland), O. A. Petrii (Russia), P. G. Pickup (Canada), M. A. Vorotyntsev (France) and the Advisory Board: D. Aurbach (Israel), D. Mandler (Israel), V. M. Mirsky (Germany), R. Seeber (Italy), O. A. Semenikhin (Canada), M. Skompska (Poland), V. Tsakova (Bulgaria), C. Visy (Hungary).

Contributions were related to all aspects of electroactive materials and their composites, from their synthesis and characterization to potential or actual applications:

-Synthesis and characterization of electroactive (conducting/conjugated and redox) polymers and inorganic electroactive solids. Mechanisms of electrochemical and chemical synthetic routes to electroactive polymers.

-Electroactive copolymers, hybrid materials and nanocomposites containing metal, carbon, semiconductor or insulator particles/structures.

-Reactions at electrodes modified by electroactive materials or their (nano)composites.

-Recent developments of experimental techniques for characterization of pure and composite electroactive materials, with emphasis on in situ methods realized under control of the oxidation state of the system by the electrode potential.

-Applications of electroactive polymers, inorganic and composite materials: catalysis and electrocatalysis, electroanalysis, sensors and actuators, membranes, energy storage, batteries and supercapacitors, solar energy conversion, electrochromic and nonlinear-optic materials, nanosciences and molecular electronics etc, in relation to fundamental properties of the used electroactive material.

This conference was sponsored by Divisions 1, and 4 of ISE. Metrohm Autolab B.V. – participating as exhibitor – acted also as outstanding sponsor. Besides, well-appreciated sponsorship has arrived from local – eventually international – firms: EDF-DÉMÁSZ, GDF SUEZ ÉGÁZ-DÉGÁZ, Continental Contitech Rubber, Florin Cosmetics, Medikémia Vehicle Maintenance and Care, TETA Magnetics, Swedisch Match Gyufagyár Ltd. as well as non-profit Association of Hungarian Chemists, or Mayor's Office at Hódmezővásárhely. Owing to these sponsorships as well as a well-established reputation of this series of workshops, almost all lectures were delivered by leaders of the principal research teams specializing in this field (see below).

There were representatives of 22 countries (Argentina, Canada, Estonia, Finland, France, Germany, Hungary, India, Israel, Italy, Lithuania, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Turkey, Ukraine, United Kingdom, United States), with the largest participation from France, Germany, Hungary, Poland and Russia. The scientific program consisted of eight half-day sessions. A specific feature of the conference was the absence of a rigid timetable: only the overall duration of the session was fixed while a significant part of this time was left at the disposal of the session's chairpersons. To achieve the maximum "scientific efficiency", each lecture was accompanied by an intensive discussion whose duration was determined by chairpersons (practically, the discussions after lectures occupied above a half of the overall time). Discussions were also continued between the sessions, at the evenings, even during the meals, and they led to the creation of new international collaborative links.

The scientific sessions of the workshop were organized according to seven principal areas:
(1) Synthesis and Characterization of Electroactive Polymer Films

(2) Electroactive copolymers

(3) Electroactive polymers and composites: nanostructure and morphology

(4) Inorganic electroactive solids

(5) Electroactive polymer-inorganic materials: Nanocomposites

(6) Experimental techniques. Ionic transport. Charging process

(7) Applications of electroactive materials

In addition to lectures, numerous important results were presented as posters. To attract the attention of participants to posters, special session has been organized where each poster's author made a 5-minute oral advertisement by the author. This arrangement increased enormously the interest to the content of posters, according to the great number of participants discussing vividly their results, moreover it insured opportunity for young researchers to debut in oral presentation.

As a whole, the program was very intensive, and participants were obviously tired each evening, despite of the open-air discussion and wine degustation  The conference hall was full at all times, and vigorous discussions inspired by lectures were always limited by the available time.

On the behalf of the Organizing Committee of the workshop, we express a deep gratitude to the participants of the workshop and also to the Divisions 1 and 4 for their sponsoring.

Chairmen of the Organizing Committee

G. Inzelt, C. Visy and M. A. Vorotyntsev