



Preface

SSPC-16 Conference Proceedings SSI Special Issue

SSPC is the world-wide reference conference for pure and applied science of Solid State Protonic Conductor materials. It focuses on chemistry and physics of proton conduction, ranging from elementary processes to ultimate applications in electrochemical devices. In 2012, SSPC was back to Europe, after previous editions in North America (Santa Barbara, 2010) and Asia (Kyoto, 2008). Exactly twenty years after the 6th SSPC conference held in the Vercors mountains (Villard de Lans, France), Grenoble, the Capital of the French Alps, was proud to host the 16th edition in September 2012.

The audience of the conference comprised more than 170 scientists, gathering from Europe, Asia and North-America. Most represented countries were France (35%), Japan (23%), UK, US and South Korea (10% each). SSPC-16 opened with a plenary lecture by Sossina Haile, Professor at the California Institute of Technology. 15 keynote lectures and 42 contributed talks followed, selected among more than 150 abstracts received. Two extended evening cocktail sessions were dedicated to lively discussions around about 100 poster presentations, cheered up by French wine and organic local gastronomy. Speakers and posters covered issues as diverse as innovative chemistry of complex nanostructured materials, characterization of bulk systems and interfaces, structure/transport interplay from molecular to macroscopic length scales. Innovative applications were also explored, including electro-chemistry of novel energy devices. Focus was on both soft and hard materials, with particular emphasis on cutting edge spectroscopic and scattering techniques, modern modeling and simulation work.

Grenoble is one of the most outstanding and innovative research areas in France for pure and applied science. It is also the leading site for the national development of new technologies for energy. The conference wished to reflect this unique scientific environment which includes two world-class large-scale facilities, the European Synchrotron Radiation Facility (ESRF) and the European neutron source at the Laue-Langevin Institute (ILL). A special-session day was devoted to the use of these modern scattering techniques (X-rays and Neutrons) in studying properties of materials for novel energy applications. The session was opened with keynote lectures by Andrew Harrison and Francesco Sette, Directors General of the ILL and ESRF, respectively. A guided tour of both facilities was a highlight of the conference.

The local organizing committee was composed of scientists with professional affiliations including the "Commissariat à l'Énergie Atomique et aux Énergies Alternatives" (CEA), the "Centre National de la Recherche Scientifique" (CNRS), the "Joseph Fourier" University, the Grenoble Institute of Technology (INPG), the ILL and the ESRF. The generous financial aid of these institutions and public agencies, together with industrial sponsoring from Areva, Saint Gobain, the Netherlands Organization for Scientific Research, and the European Spallation Source, made a smooth organization of SSPC-16 possible. The City of Grenoble

and the Local Metropolitan Area also provided substantial financial support to the event. The Rhône-Alpes Region is gratefully acknowledged for having funded the production of the present proceedings issue.

A collection of 23 articles is presented here, with the intention of giving a large perspective on the panoply of approaches and scientific cases discussed during the conference. In particular, solid state materials naturally take the lion's share, with almost two third of the total number of communications. Yet, the list of papers nicely mirrors the increasing interest in polymer studies evident from the conference program. In this volume emphasis has been put on the most relevant physical processes at stake rather than categorizing articles on the basis of materials or techniques employed. The reader will note that half of the papers report on modern scattering experiments performed at the large scale facilities, as a natural outcome of the special scope of SSPC in Grenoble. Large part of the titles included in the first section, "Proton Transport at the Nanoscale", focuses on the analysis of Quasi-Elastic Neutron Scattering (QENS) experiments. Small-Angle Neutron and X-ray Scattering (SANS and SAXS, respectively) studies are well represented in the second section, "Structure-Function Interplay". Also included in both sections are reports on Density Functional Theory (DFT) calculations, *ab-initio* Molecular Dynamics, and advanced Monte Carlo techniques, which testify of the growing interest in theoretical approaches. The final third section, "Degradation and Systems", gathers together more application-oriented papers, with focus on fuel cells and electrolysis.

This volume aims at witnessing the unique intellectual opportunity lived in Grenoble, where the feeling of a true scientific enterprise and an enlightening cultural exchange were indeed shared by the entire audience. After being held in the middle of the mountains, the next SSPC-17 will move to the Pacific shores in Seoul, Korea in September 2014. We wish to the organizers a great success and have no doubts that they will convey, one more time, tradition and spirit of SSPC.

Sandrine Lyonnard*

Stefano Mossa

CEA, INAC, SPrAM, UMR 5819 (UJF, CNRS, CEA), 17 Rue des Martyrs,
38054 Grenoble Cedex 9, France

*Corresponding author.

E-mail address: sandrine.lyonnard@cea.fr (S. Lyonnard).

Florence Lefebvre-Joud

CEA-LITEN, 17 Rue des Martyrs, 38054 Grenoble Cedex 9, France