



## **Progress in MEA components for Medium and High Temperature Polymer Electrolyte Fuel Cells**

**19<sup>th</sup>-22<sup>nd</sup> September 2010**

**Palais des Congrès – Conference Centre  
La Grande Motte, near Montpellier,  
France**

# **CONFERENCE PROGRAMME**

## Sunday September 19th, 2010

### • Afternoon Session (14.00 – 17.40)

14.00 – 14.10

**Opening Session**  
**Chair: Deborah Jones**

• **Membrane and Catalyst Components & Programme Overviews**

14.10 – 14.40

**Invited Lecture: James E. McGrath, Virginia Tech, USA**

*Recent Developments in Linear, Postfluorinated and Terminally Crosslinked Hydrophilic-Hydrophobic Multiblock Copolymer Polymer Electrolyte Membranes*

14.40 – 15.10

**Invited Lecture: Jean-Pol Dodelet, University of Quebec, Canada**

*Achievements in Non-noble Metal Electrocatalysts for O<sub>2</sub> Reduction in PEM Fuel Cells*

15.10 – 15.40

**Coffee Break**

Chairman: Jacques Rozière, ICGM-AIME, University Montpellier 2, France

15.40 – 16.10

**Invited Lecture: Thomas Zawodzinski, University of Tennessee and Oak Ridge National Laboratory, USA**

*PEM Fuel Cell Electrodes: Structural and Functional Aspects*

16.10 – 16.40

**Invited Lecture: Dimitrios Papageorgopoulos, Department of Energy, USA**

*Overview of the DOE Fuel Cell Technologies Program's Activities - Progress in MEA Component R&D*

16.40 – 17.10

**Invited Presentation: Bert De Colvenaer, Executive Director Fuel Cells and Hydrogen Joint Undertaking, Belgium:** European Joint Technology Initiative: objectives and status

17.10 - 17.40

**Invited Lecture: Isotta Cerri, Toyota Motor Europe, Belgium**

*Toyota's Fuel Cell Vehicle: Progress and Challenges*

- **Evening Session (19.00 – 21.00)**

19.00 – 21.00    **Poster Session I (Odd Numbers) and Exhibition**  
with Welcome Buffet Supper and Drinks

## Monday September 20th, 2010

### • Morning Session (9.00 – 12.30)

#### • Advances in Membrane Research

Chairman: Bruno Améduri, ICGM-IAM, ENSCM, France

- 9.00 – 9.30 **Invited Lecture: Vincenzo Arcella, Solvay-Solexis, Bollate, Italy**  
*The Solvay-Solexis SSC Ionomer and High Temperature PEM Applications*
- 9.30 – 10.00 **Invited Lecture: Kenji Miyatake, Clean Energy Center, Yamanashi University, Japan**  
*Novel Hydrocarbon Ionomer Membranes for High Temperature/Low Humidity Operable Fuel Cell*
- 10.00 – 10.20 **Markus Gross, Polymaterials, Germany**  
*Will Hydrocarbon Membranes be able to Compete with PFSA's?*
- 10.20 – 10.40 **Stephen Paddison, University of Tennessee, USA**  
*The Hydration and Transport of Protons in Model Polymeric Systems with High Perfluorosulfonic Acid Density and Minimal Water*
- 10.40 – 11.00 **Coffee Break (Exhibition and Posters)**  
  
Chairman: Giulio Alberti, University of Perugia, Italy
- 11.00 – 11.30 **Invited Lecture: Mario Casciola, University of Perugia, Italy (confirmed)**  
*On the Stability of Proton conductivity of PEMs at Medium Temperature and Approaches to its Enhancement: from Thermal Treatment to the Development of Inorganic - Organic Composite Membranes*
- 11.30 – 11.50 **Jin Hu, NEXT ENERGY, Germany**  
*Anhydrous Proton Conducting Membranes Based on Electron-Deficient Nanoparticles/PBI-OO/PFSA Composites for Intermediate Temperature DMFC Application*

- 11.50 – 12.10 **Jochen Kerres, University of Stuttgart, Germany**  
*Properties, Degradation and High Temperature Fuel Cell Test of Different Types of PBI and PBI Blend Membranes*
- 12.10 – 12.30 **Markus Klapper, Max-Planck-Institute for Polymer Research, Germany**  
*Organic Proton-Conducting Crystalline Molecules as Separator Materials for Fuel Cell Applications*
- 12.30 – 14.00 **Lunch**

• **Afternoon Session (14.00 – 17.00)**

• **Proton Transfer and Water transport of PEMFC membranes**

Chairman: Stephen Paddison, University of Tennessee, USA

- 14.00 – 14.30 **Invited Lecture: Klaus-Dieter Kreuer, Max-Planck-Institute for Solid State Research, Stuttgart, Germany**  
*Microstructural Aspects of Ionomer Membranes and their Implications for Transport: Evolution with Time, Temperature and Humidity*
- 14.30 – 15.00 **Invited Lecture: Jon Owejan, General Motors, USA**  
*PEMFC Water Transport and Material Properties Correlated with Neutron Diagnostic Methods*
- 15.00 – 15.20 **Giulio Alberti, University of Perugia, Italy**  
*Water-vapour Sorption Isotherms of Nafion 1100 Membranes Taking into account the Permanent Deformations Provoked by some Standard Pre-Treatment Procedures usually Performed before their use in Fuel Cells*
- 15.20 – 15.40 **Coffee Break (Exhibition and Posters)**

## • Alkaline Membrane Fuel Cells

Chairman: Christophe Coutanceau, University of Poitiers, France

- 15.40 – 16.00 **Dario Dekel, CellEra, Israel**  
*A review of the state-of-the-art of Anion Exchange Membranes for Fuel Cells*
- 16.00 – 16.20 **Michael Hickner, The Pennsylvania State University, USA**  
*Ion Motion and Water Uptake in Anion Exchange Membranes*
- 16.20 – 16.40 **Mohamed Mamlouk, Newcastle University, United Kingdom**  
*Fe-macro cycle a non-noble Metal Catalyst as Promising Alternative to Pt in Alkaline Membrane Fuel Cells*
- 16.40 – 17.00 **Carsten Cremers, Fraunhofer Institute for Chemical Technology ICT, Germany**  
*Influence of the pH value and the carbonate ion concentration of the electrolyte solution on the ethanol oxidation at polycrystalline platinum*

## • Evening Session (19.00 – 21.00)

- 19.00 – 21.00 **Poster Session II (Even Numbers) and Exhibition**  
with Buffet Supper and Drinks

## Tuesday September 21st, 2010

### • Morning Session (9.00 – 12.30)

#### • Advances in FC Catalysts and Catalyst Supports

Chairman: Claude Lamy, University of Poitiers, France

9.00 – 9.30 **Invited Lecture: Mark Debe, 3M Fuel Cell Components Lab, St. Paul, Minnesota, USA**  
*Nanostructured Thin Film Catalyst Developments at 3M*

9.30 – 9.50 **Amaël Caillard, GREMI CNRS-University of Orléans, France**  
*Plasma sputtering deposition of catalytic films based on platinum alloys and non-precious metal alloy catalysts*

9.50 – 10.10 **Natalia Lebedeva, ECN, The Netherlands**  
*Electrodes with thin catalytic layers for PEM fuel cells*

10.10 – 10.30 **Oliver Curnick, The University of Birmingham, United Kingdom**  
*The Influence of Nafion<sup>®</sup>-stabilised Colloidal Pt Nanoparticles on PEMFC Performance*

10.30 – 10.50 **Justo Lobato, University of Castilla-La Mancha, Spain**  
*Evaluation of PtRu/CNF catalysts for the electrooxidation of ethanol in a vapour-fed PBI-based direct ethanol fuel cell*

10. 50 – 11.10 **Coffee Break (Exhibition and Posters)**

#### • High Temperature MEAs

Chairman: Thomas Zawodzinski, University of Tennessee and Oak Ridge National Laboratory, USA

11.10 – 11.30 **Wiebke Maier, Forschungszentrum Jülich GmbH, Germany**  
*Synchrotron radiography as a promising tool for the investigation of phosphoric acid distribution in high-temperature polymer electrolyte fuel cells*

- 11.30 – 11.50 **Jens Oluf Jensen, Technical University of Denmark, Denmark**  
*A direct DME fuel cell based on acid doped PBI*
- 11.50 – 12.10 **Hans Aage Hujler, Danish Power Systems, Denmark**  
*Development and Characterizations of High Performance MEAs For High Temperature PBI Fuel Cells*
- 12.10 – 12.30 **Nora Gourdoupi, Advent Technologies, Greece**  
*Advent TPS® high temperature PEM MEAs*
- 12.30 – 14.00 **Lunch**
- **Afternoon Session (14.00 – 18.00)**
- **MEA Development and High Temperature PEMFC Stacks**  
Chairman: Joachim Scholta, ZSW, Germany
- 14.00 – 14.30 **Invited Lecture: Anders Korsgaard, Serenergy A/S, Denmark**  
*Commercial Status and Future Focus Areas of HTPEM MEA Development*
- 14.30 – 14.50 **Sivakumar Pasupathi, University of the Western Cape, South Africa**  
*Characterization of a 1kW HTPEMFC stack for integration with metal hydride storage tank into a hydrogen bike*
- 14.50 – 15.10 **Haruhiko Adachi, Tokyo Institute of Technology, Japan**  
*Improvements of Membranes and MEAs for Commercializing Residential PEMFC CHP Systems*
- 15.10 – 15.30 **Antonino Arico', CNR-ITAE, Italy**  
*Investigation of Proton Exchange Membrane Fuel Cell Stacks for High Temperature Operation*
- 15.30 – 15.50 **Coffee Break (Exhibition and Posters)**

• **Ageing, Degradation and Mitigation Strategies**

*DECODE project dissemination session*

Chairman: Georgios Tsotridis, Joint Research Centre,  
Petten, The Netherlands

- 15.50 – 16.20 **Invited Lecture: Andreas Friedrich, DLR, Germany**  
*Progress in the Understanding of PEFC Degradation Related to Liquid Water Interaction*
- 16.20 – 16.40 **Sylvie Escribano, CEA, France**  
*Electrodes ageing: local degradation insights*
- 16.40 – 17.00 **Joachim Scholta, ZSW, Germany**  
*Gas Diffusion Layer (GDL) Degradation in Polymer Electrolyte Fuel Cells*
- 17.00 – 17.20 **Joel Pauchet, CEA, France**  
*Analysis of Degradations of PEMFC combining Pore-Network Modelling of GDL and Performance Modelling*
- 17.20 - 17.40 **Dirk Kehrwald, Adam Opel GmbH, Germany**  
*Comprehensive Performance Simulation of PEM Fuel Cells*
- 17.40 - 18.00 **Rainer Glück, DANA Power Technologies, Germany**  
*Interaction between MEA design and ion contamination in PEFC stacks*

• **Evening Session (19.30 –)**

- 19.30 **Pre-dinner drinks, beachside dinner and poster awards**

## Wednesday September 22nd, 2010

### • Morning Session (8.45 – 13.00)

#### • Ageing, Degradation and Mitigation Strategies

Chairman: Andreas Friedrich, DLR, Germany

- 8.45 – 9.15 **Invited Lecture: Satish Kandlikar, Rochester Institute of Technology, USA**  
*Water Management in a PEMFC: Water Transport Mechanism and Material Degradation in Gas Diffusion Layers*
- 9.15 – 9.45 **Invited Lecture: Michael Eikerling, Simon Fraser University, Canada (confirmed)**  
*Protons and Water in PEM Fuel Cells: Friend and Foe?*
- 9.45 – 10.05 **Renate Hiesgen, University of Applied Sciences Esslingen, Germany**  
*Investigation of fuel cell components degradation by AFM*
- 10.05 – 10.25 **Luca Merlo, Solvay Solexis, Italy**  
*Degradation study of PFSA membranes in DECODE project*
- 10.25 – 10.45 **Gaby Janssen, ECN, The Netherlands**  
*Knowledge to Enhance the Endurance of PEM fuel cells by Accelerated Lifetime Verification Experiments: Keepemalive*
- 10.45 – 11.05 **Coffee Break**
- Chairman: Gérald Pourcelly, IEM, University Montpellier2, France
- 11.05 – 11.35 **Invited Lecture: Juergen Stumper, AFCC Automotive Fuel Cell Cooperation, Burnaby, Canada**  
*In situ diagnostic methods for investigating PEFC durability*

- 11.35 – 11.55 **Qingfeng Li, Technical University of Denmark, Denmark**  
*Polymer Degradation and Catalyst Sintering in High Temperature PEMFC Based on Acid Doped Polybenzimidazole Membranes*
- 11.55 – 12.15 **Lorenz Gubler, Paul Scherrer Institut, Switzerland**  
*Kinetics of HO· Radical Attack on an Ionomer Model Compound: A Pulse Radiolysis Study*
- 12.15 – 12.35 **Katrin Kortsdottir, KTH, Sweden**  
*The Influence of Ethene as an Impurity in the Gas Feeds on the activity of PEM Fuel Cells*
- 12.35 – 12.55 **Frédéric Maillard, LEPMI Grenoble, France**  
*Nanoscale compositional changes and modification of the surface reactivity of Pt<sub>3</sub>Co/C electrocatalysts during PEMFC operation*
- 12.55 **Closing Session**
- 13.00 **Lunch**