
Progress
2008
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**Progress in MEA components for Medium and High Temperature
Polymer Electrolyte Fuel Cells**
First CARISMA international Conference

**Conference Centre, Palais des Congrès
La Grande Motte, France
21st -24th September 2008**

FINAL CONFERENCE PROGRAMME

AT A GLANCE

SUNDAY SEPTEMBER 21ST, 2008

11H30: Registration

- **Afternoon Session (13.30 – 17.30)**

Membrane and Catalyst Components

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- **Evening Session (19.00 – 21.00)**

Poster Session I and Exhibition with Welcome Buffet Supper and Drinks

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MONDAY SEPTEMBER 22ND, 2008

- **Morning Session (8.45 – 12.50)**

Advances in Membrane Research

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- **Afternoon Session (14.20 – 17.50)**

Proton Transfer and Water transport of PEMFC membranes
Modelling and Simulation

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- **Evening Session (19.00 – 21.00)**

Poster Session II and Exhibition with Buffet Supper and Drinks

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TUESDAY SEPTEMBER 23RD, 2008

- **Morning Session (9.00 – 12.15)**

Advances in FC Catalysts and Catalyst Supports

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- **Afternoon Session (13.45 – 17.15)**

Electrode and MEA Development
Novel Techniques for MEA Characterisation

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- **Evening Session (19.30 –)**

Pre-dinner drinks and beachside dinner, Restaurant "La Voile Bleue" La Grande Motte

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WEDNESDAY SEPTEMBER 24TH, 2008

- **Morning Session (9.00 – 12.30)**

Ageing, Degradation and Mitigation Strategies

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FINAL CONFERENCE PROGRAMME

SUNDAY SEPTEMBER 21ST, 2008

AFTERNOON SESSION (13.30 – 17.30)

- 11.30 Registration
- 13.30 – 13.40 Opening Session
Chair: **Deborah Jones**
- **Membrane and Catalyst Components**
- 13.40 – 14.20 **Invited Lecture: James E. McGrath**
Virginia Tech, USA
Disulfonated Poly(Arylene Ether) Random and Block Copolymers for Polymer Electrolyte Membranes
- 14.20 – 15.00 **Invited Lecture: Giulio Alberti**
University of Perugia, Italy
A systematic investigation on the evolution of viscoelastic deformations of ionomer membranes with temperature, relative humidity and time and its importance for forecasting water-uptake and membrane durability in medium temperature PEMFC
- 15.00 – 15.30 Coffee Break (Exhibition and Posters)
- Chairman: Giulio Alberti**
- 15.30 – 16.00 **Invited Lecture: Masahiro Watanabe**
Clean Energy Research Center, University of Yamanashi, Japan
Design of Pt Alloy Electrocatalysts for ORR and Catalysis Studied with in-situ Analysis Tools
- 16.00 – 16.30 **Invited Lecture: Jacques Rozière**
University of Montpellier II, France
PBI-type PEMFC blend and interpenetrating network membranes with mixed sulfonic, phosphonic and heterocycle functionalities
- 16.30 – 17.00 **Invited Lecture: André Martin**
New Energy World, Belgium
The European Joint Technology Initiative on Fuel Cells and Hydrogen
- 17.00 - 17.20 **Kathy Epping-Martin, N. Garland, and J. Kopasz**
US Department of Energy and Argonne National Laboratory, USA
The US DOE High Temperature Membrane Effort
- 17.20 – 17.40 **J. O. Jensen, Q. Li, C. Pan, N. J. Bjerrum, A. Selimowic, A. Bodén, L. Johansen, F. Seland, M. Tsyppkin, O. E. Kongstein R. Tunold, M. Mamlouk, K. Scott, M. Nilsson, T. Steenberg, F. Schonberger, M. Hein, J. Kerres, M. Walter, M. van Driel, A. Scholten, J. Smolenaars, K-D. Wagner, J. Wolf, S. Yde-Andersen, T. De Rycke, C. Kontoyannis, I. Zacharaki, G. Papatheodoru, T. Häring, and J. Nähring**
Denmark Technical University, Denmark
A 2 kW Diesel Powered Auxiliary Power Unit with a High Temperature PEMFC Stack: The EU FURIM Project

17.40 – 18.00 **Goesta Pfundtner, Daimler, Germany**
MEAs for automotive application, the EU autobrane Project

EVENING SESSION (19.00 – 21.00)

19.00 – 21.00 **Poster Session I and Exhibition with Welcome Buffet Supper and Drinks**

MORNING SESSION (8.45 – 12.50)

Chairman: Jacques Rozière

• Advances in Membrane Research

- 8.45 – 9.15 **Invited Lecture: Brian Benicewicz,
University of South Carolina, USA**
PBI polymers: An update on structure, durability, and devices
- 9.15 – 9.45 **Invited Lecture: Klaus-Dieter Kreuer,
Max Planck Institute for Solid State Research, Germany**
Exploring the application limits of sulfonic acid ionomers for PEM fuel cell applications
- 9.45 – 10.05 **Howard Colquhoun, Z. Zhu, W. Mortimore, N.M. Walsby, and D. Thompsett
University of Reading, UK**
Control of Ionic Sequence-Distribution in Fuel-Cell Membrane Ionomers
- 10.05 – 10.25 **Patric Jannasch, and J. Parvole
University of Lund, Sweden**
Design, synthesis and properties of polymers and membranes functionalised with phosphonic acids
- 10.25 – 10.45 **G.Brunklaus, M.Klapper, K.D.Kreuer, Wolfgang Meyer, F.Müller-Plathe, M.Rehahn, and G.Seifert
Max Planck Institute for Polymer Research, Mainz, Germany**
The "DryD" Approach for New Polymer Separator Membranes
- 10.45 – 11.00 Coffee Break (Exhibition and Posters)

Chairman: Bruno Améduri

- 11.00 – 11.30 **Invited Lecture: Andreas Graichen,
3M, Germany**
3M's fuel cell and membrane technology
- 11.30 – 11.50 **H. Shimoda and Shinji Kinoshita
Asahi Glass, Japan**
Performances of Highly Durable PFSA Polymer based MEAs at High Temperature Low RH & Dry-Wet Conditions
- 11.50 – 12.10 **Michael Jeske, M. Schuster, W. Zhang, N. Rischer and B. Bauer
FuMA-Tech, Germany**
Proton conducting membranes for Mid-Temperature operation
- 12.10 – 12.30 **Mario Casciola, D. Capitani, A. Donnadio, V. Frittella, M. Pica, and M. Sganappa
University of Perugia, Italy**
Preparation, proton conductivity and mechanical properties of Nafion 117 - zirconium phosphate sulfophenylphosphonate composite membranes
- 12.30 – 12.50 **Takami Masayoshi, T. Yoshida, and M. Ueda
Toyota Motor Corporation, Japan**
Preparation and Characterization of Olefin-Type Electrolyte Membrane for PEMFC
- 12.50 – 14.20 Lunch

AFTERNOON SESSION (14.20 – 17.50)

Chairman: Klaus-Dieter Kreuer

• Proton Transfer and Water transport of PEMFC membranes

- 14.20 – 14.50 **Invited Lecture: Klaus Schmidt-Rohr
Iowa State University, USA**
Elucidation of the nanostructure of Nafion and Nafion-based nanocomposites by small-angle scattering analysis and NMR

- 14.50 – 15.20 **Invited Lecture: Gérard Gebel**
CEA Grenoble, France
Structure and transport properties in hydrated Nafion membranes
- 15.20 – 15.40 **P. M. Mangiagli, C. S. Ewing, K. Xu, Q. Wang, and Michael Hickner**
Pennsylvania State University, USA
Water Uptake and Transport in Flexible Proton Exchange Membrane Networks
- 15.40 – 16.00 **Carla Araujo, M. Schuster, H. Mendil-Jakani, G. Gebel, K.D. Kreuer, and J. Maier**
Max Planck Institute for Solid State Research, Germany
Fully Sulfonated Poly(phenylene sulfone): A Proton Transport Study
- 16.00 – 16.20 **Barbara Mecheri, A. D'Epifanio, F. Chen, E. Traversa, L. Pisani, F.C. Weise, S. Greenbaum, and S. Licoccia**
University of Rome Tor Vergata, Italy
Effect of a proton conducting filler on the transport properties of SPEEK-based membranes
- 16.20 – 16.40 Coffee Break (Exhibition and Posters)

Chairman: Masahiro Watanabe

• **Modelling and Simulation**

- 16.40 – 17.10 **Invited Lecture: Stephen Paddison**
University of Tennessee, USA
Effects of side chain length and equivalent weight on hydrated morphology and proton diffusion in PFSA membranes
- 17.10 – 17.30 **Tiago Sousa, M. Mamlouk, and K. Scott**
University of Newcastle, United Kingdom
A non-isothermal model for PBI-based High Temperature PEMFC cell
- 17.30 – 17.50 **Jörg Kleemann, F. Finsterwalder, M. Quintus, and W. Tillmetz**
Daimler, Germany
Dependency of structural and transport properties of PEMFC gas diffusion layer materials and their influence on cell performance and cost

EVENING SESSION (19.00 – 21.00)

- 19.00 – 21.00 **Poster Session II and Exhibition with Buffet Supper and Drinks**

MORNING SESSION (9.00 – 12.15)

Chairman: Graham Hards

• Advances in FC Catalysts and Catalyst Supports

- 9.00 – 9.30 **Invited Lecture: Peter Strasser**
University of Houston, USA
Structure, Strain, and Reactivity of de-alloyed Pt alloy fuel cell electrocatalysts
- 9.30 – 10.00 **Invited Lecture: Fred Wagner**
General Motors, USA
Automotive Challenges and Opportunities for Oxygen Reduction Catalysts
- 10.00 – 10.20 **N.P. Lebedeva, A.S. Booiij, and Gaby Janssen**
ECN, The Netherlands
Cathodes for proton-exchange-membrane fuel cells based on ordered mesoporous carbon supports
- 10.20 - 10.40 **L. Timperman and Nicolas Alonso-Vante**
LACCO, Université de Poitiers, France
Electrocatalytic Enhancement and Selectivity of Platinum on oxide/carbon composite supports
- 10.40 – 10.55 Coffee Break (Exhibition and Posters)

Chairman: Ulrich Stimming

- 10.55 – 11.25 **Invited Lecture: Bryan Pivovar**
National Renewable Energy Laboratory, USA
Catalyst Utilization in Polymer Electrolyte Fuel Cells
- 11.25 – 11.45 **K.M. Brace, B.E. Hayden, C. Milhano, T. Le Gall, and Christopher Lee**
Ilika Ltd., United Kingdom
High Throughput Preparation and Electrochemical Screening of Thin Films and Supported Nanoparticles for Electrocatalysis in Low Temperature Fuel Cells
- 11.45 - 12.05 **A.S. Booiij, Natalia P. Lebedeva, I.N. Voropaev, P.A. Simonov, A.V. Romanenko**
Energy research Centre of the Netherlands ECN, The Netherlands and Boreskov Institute of Catalysis, Russia
Sibunit carbon based cathodes for proton-exchange-membrane fuel cells
- 12.05 -12.25 **Sarah Ball, A. Davies, S. Hudson, J. Leung, D. Thompsett, B. Theobald, M. Rodlert, and M.E. Spahr**
Johnson Matthey Technology Centre, United Kingdom
Characterisation of new carbon and catalyst materials for high temperature PEMFC
- 12.25 – 13.45 Lunch

AFTERNOON SESSION (13.45 – 17.15)

Chairman: Claude Lamy

• Electrode and MEA Development

- 13.45 – 14.15 **Invited Lecture: Ulrich Stimming**
Technical University of Munich, Germany
Membrane Electrode Assemblies (MEAs) for Direct Alcohol Fuel Cells: Towards an Efficient Conversion of Ethanol in Low Temperature Fuel Cells
- 14:15 – 14.35 **Stéphanie Roualdès, A. Ennajdaoui, J. Durand, P. Brault, A. Caillard, M. Cavarroc, C. Charles, R. Boswell, C. Corr, and C. Coutanceau**
IEMM, University of Montpellier II, France
Plasma deposition of PEMFC

- 14.35 - 14.55 **Stelios Neophytides, N. Triantafyllopoulos, M. Geormezi, and E. Theodorakopoulou**
Institute of Chemical Engineering and High Temperature Chemical Processes, and
Advent Technologies S.A., Greece
High Temperature MEAs and their fuel cell performance
- 14.55 - 15.15 **Jochen Kerres, F. Schönberger, A. Chromik, M. Hein, Th. Häring, J. O. Jensen,**
C. Pan, P. Noyé, N. J. Bjerrum, V. Bandur, Qingfeng Li, and M. S. Nilsson
University of Stuttgart, Germany
Denmark Technical University, Denmark
Partially Fluorinated Arylene Polyethers and Their Ternary Blend Membranes with PBI and H3PO4. Synthesis, Characterization of Polymers and Binary Blend Membranes and Characterizations and Fuel Cell Tests of corresponding Ternary Membranes.
- 15.15 - 15.35 **S. Altmann, T. Kaz, and Andreas Friedrich**
German Aerospace Center (DLR), Germany
Development of Unitized Regenerative Fuel Cell Electrodes
- 15.35 - 15.55 Coffee Break (Exhibition and Posters)

Chairman: Gérard Pourcelly

• **Novel Techniques for MEA Characterisation**

- 15.55 - 16.15 **Deborah Myers, M. Smith, A.J. Kropf, J. Chlistunoff, C. M. Johnston, S. D. Conradson,**
and P. Zelenay
Argonne National Laboratory, USA
In Situ X-ray Absorption and Scattering Studies of Cathode Electrocatalysts
- 16.15 - 16.35 **Luca Merlo, A. Ghielmi, and V. Arcella**
Solvay-Solexis, Italy
Low equivalent weight PFSA membranes: a new method for in situ conductivity evaluation
- 16.35 - 16.55 **Jesper L. Jespersen, S.T. Ali, C. Mathiasen, and S.K. Kær**
Danish Technical Institute, Denmark
Degradation and Performance Analysis of a Single Cell PBI-based MEA using Distributed Temperature Sensors and AC Impedance Spectroscopy
- 16.55 - 17.15 **Hans Lustfeld, M. Reißel, U. Schmidt, and B. Steffen**
Forschungszentrum Juelich, Germany
Tomographic reconstruction of electric currents in the MEA of a fuel cell

EVENING: BEACHSIDE DINNER

- 19.30 Pre-dinner drinks and beachside dinner
 Restaurant "La Voile Bleue" La Grande Motte

MORNING SESSION (9.00 – 12.30)

Chairman: Gérard Gébel

• Ageing, Degradation and Mitigation Strategies

- 9.00 – 9.30 **Invited Lecture: Karren More**
Oak Ridge National Laboratory, USA
In Situ Microscopy Characterization of Cathode Catalyst Degradation
- 9.30 – 9.50 **Björn Wickman, H. Grönbeck, P. Hanarp, and B. Kasemo**
Chalmers University of Technology, Sweden
Degradation of Pt/C Electrodes Studied with Electrochemical Quartz Crystal Microbalance
- 9.50 - 10.10 **Magnus S. Thomassen, T.A. Aarhaug, J.G. Sørli, S. Møller-Holst, and A. Ødegård**
SINTEF Materials & Chemistry, Norway
Designed Experimental Approach to Screening of PEMFC Performance and Durability
- 10.10 - 10.30 **Cédric Grolleau, J.M. Léger, and C. Coutanceau**
LACCO, University of Poitiers, France
Effect of the carbon support oxidation on the catalyst degradation under potential control
- 10.30 – 10.50 Coffee Break (Posters and Exhibitions)

Chairman: Jean-Michel Léger

- 10.50 – 11.10 **Robert Makkus, A.J. Grootjes, and G.J.M. Janssen**
ECN, The Netherlands
Freeze/thaw and cool down/start-up experiments
- 11.10 – 11.30 **J. Belack, Isabel Kundler, and T. J. Schmidt**
BASF Fuel Cell GmbH, Germany
Celtec-MEAs: Life time, degradation modes and mitigation strategies
- 11.30 - 11.50 **Philippe Mocotéguy, B. Ludwig, I. Kundler, J. Scholta, Y. Nedellec, J. Rozières, D. Jones, R. Barrera, and S. Ginocchio**
EIfER, Germany
A novel 500 W stack using PBI/H3PO4 technology: performance characterisation from single cell to stack
- 11.50 - 12.10 **Peter Gray, M.I. Petch, and T.R. Ralph**
Johnson Matthey Fuel Cells Ltd, United Kingdom
Higher durability materials and MEAs for PEM Fuel Cells
- 12.10 Closing Session
- 12.30 Lunch