

## **PREFACE**

The quality of life and safeness of the present and future generations are strongly intertwined with the availability of energy sources and the sustainability of the energy infrastructure.

Therefore, one of the fundamental priorities for our planet is to find several renewable energy sources and environmentally friendly energy conversion technologies.

Hydrogen and fuel cells will play a dominant role in this scenario and will represent, respectively, the main energy carrier and energy conversion devices.

It is with great pleasure that we present you the *Book of Abstracts* of the 1st World Conference: *European Fuel Cell Technology and Applications: EFC05*.

EFC05 is the result of the effort of more than 40 people belonging to the international scientific community that have worked and will work in the organizing and scientific committee and that will chair the conference sessions. To them our greatest gratitude.

A first edition and surely a great success. About 300 papers have been accepted by the scientific committee and will be presented in 26 sessions of the conference concerning all fuel cell technologies, all kind of application and representing the update state of the art in the world.

All regions of the world will be represented (Europe, Australia, USA, Canada, Korea, Japan) and outstanding people will attend from Academia, Industry and the main institutions involved in the preparation of the Hydrogen and Fuel Cell era.

The organizing committee welcomes all participants and is ready to listen to all remarks and suggestions in order to improve the next event held in 2007.

Angelo Moreno

Piero Lunghi

Roberto Bove

## CONFERENCE COMMITTEE

**Conference Chair:**

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ENEA, CR Casaccia, Italy

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University of Perugia, Italy

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# Journal of Fuel Cell Science and Technology

Transactions of the ASME

All the accepted abstracts are published in the *Book of Abstract* that every registered attendee received at the conference.

Selected papers will be published on the ASME Transactions ***Journal of Fuel Cell Science and Technology*** special issue (August 2006).

The Journal of Fuel Cell Science and Technology is published quarterly (Feb., May, Aug., Nov.) by ASME.

For more info on the journal special issue, please contact the Journal Editor, and the Guest Editors.

**Journal Editor:**

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Perugia, Italia

More info on the ASME Transactions Journal of Fuel Cell Science and Technology can be found on [www.asme.org](http://www.asme.org)

## December 14<sup>th</sup>, 2005

08.00 → 09.00 Registration

09.00 → 09.30 Welcome to the First EFC05 from the chairman and other EFC05 representatives

09.30 → 09.45 Welcome to the First EFC05 from a representative of CNR

09.45 → 10.00 Welcome to the First EFC05 from Umberto Di Matteo, Vice Capo di Gabinetto Tecnico, *Italian Ministry for the Environment and the Territory Preservation*.

10.00 → 10.40 Plenary Session (live on the web): “*European Initiatives in the Field of Fuel Cell&H2 Research*”. Ángel Pérez Sainz, Head of Unit of the "Energy Production and distribution Systems" of the Directorate Energy of the DG Research

10.40 → 11.10 Plenary Session (live on the web): “*Development Prospective of Fuel Cell Technology in Italy*”. Guido Possa, *Vice-Minister of the Italian Ministry of Education, University and Research (MIUR), Italy*. Raffaele Vellone, *ENEA, Italy*.

11.10 → 11.30 Coffee break

### PARALLEL SESSIONS

Session 1a *International Research Programs and Activities (INVITED SESSION)*

Duration: 11.30 → 13.00

Session Chair: Angelo Moreno, *ENEA, Italy*

Location: Room A

11.30 → 12.00 “Research and Development within the Hydrogen and Fuel Cell Technology Platform”  
Detlef Stolten, *Forschungszentrum Jülich (FZJ), Germany*

12.00 → 12.30 “International Status of Molten Carbonate Fuel Cells”  
Angelo Moreno, *ENEA, Italy*, Roberto Bove, *University of Perugia, Italy*

12.30 → 13.00 “International Status of SOFC Technology”  
Heinz Nabelek, *Forschungszentrum Jülich (FZJ), Germany*

Session 1b *Environmental and Strategic Issues*

Duration: 11.30 → 13.00

Session Chair: Umberto Desideri, *University of Perugia, Italy*

Location: Room B

11.30 → 12.00 *Keynote*:  
“Assessing Benefits from Hydrogen Technologies, by means of an Integrated Multicriteria Evaluation Approach”  
Sergio Ulgiati, *University of Siena, Italy*

12.00 → 12.20 “MAHRES: Spanish Hydrogen Geography”  
C. García<sup>1</sup>, B. Sarmiento<sup>1</sup>, C. Rodríguez<sup>1</sup>, V. Gallardo<sup>1</sup>, A. Fernández<sup>2</sup>, R. Brey<sup>2</sup>, A. Hernández-Díaz<sup>2</sup>, I. Contreras<sup>2,1</sup> *Hynergreen Technologies, S.A.,<sup>2</sup> University Pablo de Olavide, Spain.*

12.20 → 12.40 “Cleaning the Air with Fuel Cell Vehicles: Net Impact on Emissions and Energy Use of Replacing Conventional Internal Combustion Engine Vehicles with Hydrogen Fuel Cell Vehicles”  
W. Colella, *Stanford University, USA*

12.40 → 13.00 “Renewable Energy and Hydrogen for Rome-Valmontone Amusement Park”.  
F. Zuccari, A. Santiangeli, F. Villatico, F. Orecchini, *University "La Sapienza" of Rome, Italy*

13.00 → 15.00 Lunch + poster session

Lunch sponsored by:



Session 2a *Market Analysis and Novel Applications for Fuel Cells*

Duration: 15.00 → 16.20

Session Chair: Piero Lunghi, *University of Perugia, Italy*

Location: Room A

15.00 → 15.20 “Potential of Fuel Cells from a Customer Point of View”

B. Kott, A. Neumann, G. Biscardini, *Booz Allen Hamilton*

15.20 → 15.40 “MicroCHP Technologies – the Role of MTS – Market Opportunity and Threats”

M. Frei-Hardt, *ELCO Heating Solutions, Germany/Italy*

15.40 → 16.00 “Financial Comparison of Control Strategies for Combined Heat and Power Fuel Cell Systems within Electrical and Thermal Networks”.

W. Colella, *Stanford University, USA*

16.00 → 16.20 “Fuel Cells as Energy Sources for Future Mobile Devices”

S. Tasa, T. Aapro, *Nokia Research Center, Finland*

Session 2b *System Design, Testing and Feasibility Analyses*

Duration: 15.00 → 16.20

Session Chairs: Rolf Rosenberg, *VTT Processes, Finland*

Detlef Stolten, *Forschungszentrum Jülich (FZJ), Germany*

Location: Room B

15.00 → 15.20 “SOFC System and the Economical Feasibility”

E. Fontell, T. Phan, T. Kivisaari, K. Keränen, *Wärtsilä Corporation, Finland*

15.20 → 15.40 “Performance of a PEM Fuel Cell System Fuelled with Hydrogen Generated by a Fuel Processor”

E. Jannelli, M. Minutillo, E. Galloni *University of Cassino, Italy*

15.40 → 16.00 “Integrated Testing of a Catalytic Partial Oxidation Diesel Reformer with a Solid Oxide Fuel Cell”

L. Frost<sup>1</sup>, B. Carrington<sup>1</sup>, R. McKain<sup>2</sup>, D. Witmer<sup>3, 1</sup>, *Idaho National Laboratories, <sup>2</sup> SOFCO-EFS, <sup>3</sup> University of Alaska – Fairbanks, USA*

16.00 → 16.20 “SOFC System Configuration through Pinch Analysis”

V. Verda, M. Cali, S. Saroglia, *Politecnico di Torino, Italy*

16.20 → 16.40      Coffee Break

Session 3a *R&D Programs of Governmental and Private Organizations*

Duration: 16.40 → 18.10

Session Chair: Bert Rietveld, *Energy Research Centre of the Netherlands (ECN), The Netherlands*

Location: Room A

16.40 → 17.10 *Keynote*

“The Role of Demonstration Projects as a Key Step Towards Commercialisation: Direct Experience and Programs at Ansaldo Fuel Cells”

Elio Ferrari, Bartolomeo Marcenaro, Pietro Bedont, *Ansaldo Fuel Cells S.p.A., Italy*

17.10 → 17.30 “The Status of Solid Oxide Fuel Cells Development at Forschungszentrum Juelich”

L. Blum, H. Buchkremer, L.G.J. (Bert) de Haart, K. Hilpert, J. L. Quadackers, U. Reisinger, R. Steinberger-Wilckens, R. W Steinbrech, F. Tietz  
*Forschungszentrum Jülich (FZJ), Germany*

17.30 → 17.50 “SOFC System Development in VTT”

R. Rosenberg, J. Kiviahho, M. Halinen, M. Noponen, J. Saarinen, *VTT Technical Research Centre of Finland*

17.50 → 18.10 “Development of SOFC Power Generation System Using Segmented-in-series Cell Stacks Operating In Low Temperatures”

K. Nakamura<sup>1</sup>, S. Yamashita<sup>2</sup>, T. Sobue<sup>3</sup>, S. Takehiro<sup>4</sup>,<sup>1</sup> *Tokyo Gas Co., Ltd.*,<sup>2</sup> *Kyocera Corporation*,<sup>3</sup> *Rinnai Corporation*,<sup>4</sup> *Gastar Co., Ltd., Japan*

Session 3b *High Temperature Fuel Cell Hybrids*

Duration: 16.40 → 18.10

Session Chair: Loredana Magistri, *University of Genoa, Italy*

Location: Room B

16.40 → 17.10 *Keynote*

“Gas Turbine Assessment for Air Management of Pressurized SOFC/GT Hybrid Systems”

A. Traverso<sup>1</sup>, A. Massardo<sup>1</sup>, R. Roberts<sup>2</sup>, S. Samuelson<sup>2</sup>, J. Brouwer<sup>2</sup>,<sup>1</sup> *University of Genoa, Italy*,<sup>2</sup> *University of California Irvine, USA.*

17.10 → 17.30 “Test Results and Efficiencies of MCFC/GT Combined System”

F. Yoshida, *Central Research Institute of Electric Power Industry, Japan.*

17.30 → 17.50 “The Influence of Electrolyte Type and Thickness on Solid Oxide Fuel Cell Hybrid System Performance”

J. Milewski, A. Miller, *Warsaw University of Technology, Poland*

17.50 → 18.10 “Thermo-economic Optimization of a Solid Oxide Fuel Cell, Gas Turbine Hybrid System”

F. Palazzi, N. Autissier, F. Marechal, J. Van herle, D. Favrat, *Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

## **POSTER SESSION 1**

Please note that the number indicated for each poster (i.e. pos#xx, where xx is a number) identifies where the poster is located. The number indicated corresponds to a panel in the room where the poster session will take place.

### **Cell, Stack, System Operation and Applications**

**POS#01** "Propane Conversion on Ru/CGO Catalysts for Application in Intermediate Temperature". Massimiliano lo Faro, *CNR-TAE Institute, Italy*.

**POS#02** "Direct Electrochemical Oxidation of Methane at Optimized NiCu-CGO Anodes for Application in IT-SOFCs". Daniela la Rosa, *CNR-TAE Institute, Italy*.

**POS#03** "A Methodology for Assessing Fuel Cell Performance under a wide Range of Operational Conditions: Results for a Molten Carbonate Single Cell". Andrea Baratella, Roberto Bove, Umberto Desideri, Pierio Lunghi, *University of Perugia, Italy*.

**POS#04** "Design and Characterization of a Passive Air-Breathing PEMFC Stack". Haluk Gorgun, Frano Barbir, *University of Connecticut, USA*.

**POS#05** "Effect of Additional Anode sub-layer on Hydrogen Peroxide Generation in PEMFC". Sung Hyun Kim, Un Ho Jung, *Korea University, South Korea*.

**POS#06** "5 kW SOFC Power Plant Test Station". Matias Halinen, Jaakko Saarinen, Jari Kiviaho, Matti Noponen, *VTT Technical Research Centre of Finland, Finland*.

**POS#07** "Effects of on/off Cycles on the Degradation of PEM Fuel Cells". EunAe Cho<sup>1</sup>, Jin-Hwa Lee<sup>2</sup>, Hyoung-Juhn Kim<sup>1</sup>, Sang-Yeop Lee<sup>1</sup>, Tae-Hoon Lim<sup>1</sup>, In-Hwan Oh<sup>1</sup>, Seong-Ahn Hong<sup>1</sup>, <sup>1</sup>*Korea Institute of Science and Technology*, <sup>2</sup>*Sejong University, South Korea*.

**POS#08** "Research on Molten Carbonate Fuel Cell Technology- Guidelines and Recent Developments". Elena Bergaglio, Gianluigi Durante, Serena Dellepiane, Paolo Capobianco, *Ansaldo Fuel Cells SpA, Italy*.

**POS#09** "First Experimental Characterization of a SOFC-based CHP Plant". Enrico Fontana<sup>1</sup>, Michele Cali<sup>1</sup>, Valter Giretto<sup>1</sup>, Pierluigi Leone<sup>1</sup>, Gianmichele Orsello<sup>2</sup>, Massimo Santarelli<sup>1</sup>, Stefano Saroglia<sup>1</sup>, <sup>1</sup>*Politecnico di Torino*, <sup>2</sup>*Gas Turbine Technologies, Italy*.

**POS#10** "Comparison between two Different System of Driving a Centrifugal Water Pump with a DC Motor Powered either by a Proton Exchange Membrane Fuel Cell Stacks or by Photovoltaic Generators". Fabio Lo Mastro, Gandolfo Blando, *University of Palermo, Italy*.

**POS#11** "Dynamic Test and Real-time Control Platform of Anode Recirculation for PEM Fuel Cell Systems". Cheng Bao<sup>1</sup>, Kexun Zhang<sup>1</sup>, Minggao Ouyang<sup>1</sup>, Baolian Yi<sup>2</sup>, Pingwen Ming<sup>2</sup>, <sup>1</sup>*Tsinghua University, China*, <sup>2</sup>*Dalian Institute of Chemical Physics, China*.

**POS#12** "Study of an Electrochemical Alcohol Concentration Sensor: Optimization of the Anode Structure". Mauro Sgroi, Gianluca Bollito, *Centro Ricerche FIAT, Italy*.

**POS#13** "Polymer Electrolyte Fuel Cell Stacks at CNR-ITAE. State of the Art". Gaetano Squadrito, Francesco Urbani, Orazio Barbera, Giosuè Giacoppo, Enza Passalacqua, *CNR-ITAE, Italy*.

**POS#14** “PEM Fuel Cells: Characterizations for Practical Applications”. Fabio Rinaldi, Renzo Marchesi, *Politecnico di Milano, Italy*.

**POS#15** “Systematic Experimental Analysis of Direct Methanol Fuel Cells”. Andrea Casalegno, Renzo Marchesi, Fabio Rinaldi, *Politecnico di Milano, Italy*.

**POS#16** “A Reversible Solid Oxide Fuel Cell Energy Storage System”. Paul Connor, Purdie Building, Pierrot Attedikou, John T.S. Irvine, Julie Nairn, Fran G E Jones, Jim Rennie, *University of St Andrews, UK*.

**POS#17** “A Fuzzy Controller for Stabilizing Fuel Cell Systems”. Michael Mlynski, Francesco Turoni, Michael Schreiber, *EUtech Scientific Engineering GmbH, Germany*.

**POS#18** “Steady State Optimization of a PEM Fuel Cell System Operational Parameters”. Giuseppe Pepe <sup>1</sup>, Jussi Suomela <sup>1</sup>, Jorma Selkäinaho <sup>1</sup>, Matti Valkiainen <sup>2</sup>, <sup>1</sup>*Helsinki University of Technology*, <sup>2</sup>*VTT, Finland*.

**POS#19** “A Feasibility Study of a PEM Fuel Cell Generator Set for on Board Marine Yacht Application”. Michele Bagnoli, Andrea De Pascale, Michele Bianchi, Antonio Peretto, Bruno Belvedere, *University of Bologna, Italy*.

**POS#20** “Demonstration of a F-Design 4-Cells Stack Behaviour under Different Experimental Conditions”. Massimo Bertoldi <sup>1</sup>, Thomas Zandonella <sup>1</sup>, Vincent A.C. Haanappel <sup>2</sup>, Josef Mertens <sup>2</sup>, Josef Remmel <sup>2</sup>, Bert de Haart <sup>2</sup>, <sup>1</sup>*Eurocoating SpA, Italy*, <sup>2</sup>*Forschungszentrum Jülich (FZJ), Germany*.

**POS#21** “Polymer Electrolyte Fuel Cell Design for Low-Pressure Operation”. Stefano Galli <sup>1</sup>, Ivano Laganà <sup>1</sup>, Giulia Monteleone <sup>1</sup>, Alfonso Pozio <sup>1</sup>, Jinfeng Wu <sup>2</sup>, <sup>1</sup>*ENEA, Italy*, <sup>2</sup>*Dalian Institute of Chemical Physics, China*.

**POS#22** “A Study of Spiral Flow Configuration on the Performance of Polymer Electrolyte”. Yur-Tsai Lin, Fangbor Weng, *Yuan Ze University, Taiwan*.

**POS#23** “Production of Microtubular SOFC Fuel Cells and their Use in Stacks With Ultra Short Warm-Up Time”. Thomas Raab, Stefan Griesser, Gerhard Buchinger, Dieter Meissner, *Upper Austrian University of Applied Science: Eco Energy, Austria*.

**POS#24** “Durability of PEM Fuel Cells with Graphite and Stamped Stainless Steel Gas Flow Field Plates”. Jean Granier, Laurent Antoni, *CEA-Grenoble (DRT/LITEN/DSEN/SGPAC/LPAC), France*.

### **Non Conventional Fuels**

**POS#25** “Feasibility of Replacing Oxygen with Nitrogen in a Fuel Cell”. Meher Surendra, *Jntu, India*.

**POS#26** “Bio-Ethanol Fuelled Molten Carbonate Fuel Cell: Comparative Study of a Theoretical Model and Experimental Results”. Davide Nevoso <sup>1</sup>, Vitaliano Chiodo <sup>1</sup>, Salvatore Donato <sup>1</sup>, Natale Mondello <sup>1</sup>, Stefano Cavallaro <sup>2</sup>, Salvatore Freni <sup>2</sup>, <sup>1</sup>*CNR-ITAE*, <sup>2</sup>*Università degli studi di Messina, Italy*.

**POS#27** “Direct Ethanol Solid Oxide Fuel Cells: The Case of Pt Anodes”. Costas Poulianitis, Vasiliki Maragou, Efrosini Dio, Shuqin Song, Panagiotis Tsiakaras, *University of Thessaly, Greece*

**POS#28** “A Direct Carbon Fuel Cell”. Sneha L. Jain, J Barry Lakeman, Dstl, Kevin D. Pointon, Dstl, John T.S. Irvine, *University of St. Andrews, UK*.

**POS#29** “Exergy Analysis of Ethanol and Methane Fed Molten Carbonate Fuel Cell System”. Huisheng Zhang, *Shanghai Jiao Tong University, China*.

**POS#30** “Thermodynamic Analysis of Direct Steam Reforming of Ethanol in Molten Carbonate Fuel Cell”. José L. Silveira, Antonio C. C. Souza, Márcio E. Silva, *São Paulo State University, Brazil*.

## System Modeling

**POS#31** “Dynamic Model of SOFC CHP Power Plant”. Jaakko Saarinen, Matias Halinen, Matti Noponen, Jukka Ylijoki, Jari Kiviaho, *VTT Technical Research Centre of Finland, Finland*.

**POS#32** “System Configurations of Molten Carbonate Fuel Cells for Optimal Power Production”. Hannes Seys, Hendrik-Jan Steeman, Abdullatif Musa, Michel De Paepe, *Ghent University, Belgium*.

**POS#33** “Analysis of Thermal Behavior of Small SOFC Systems”. Takano Shimada<sup>1</sup>, Tohru Kato<sup>2</sup>, Toshinori Kashihara<sup>2</sup>, Kiyonami Takano<sup>2</sup>, Susumu Nagata<sup>2</sup>, Ken Nozaki<sup>2</sup>, Yohei Tanaka<sup>2</sup>, Yoko Iimura<sup>2</sup>,<sup>1</sup> *Tokyo University of Science*,<sup>2</sup> *National Institute of Advanced Industrial Science and Technology (AIST), Japan*.

**POS#34** “Dynamic Simulation and Optimization of Fuel Cell Systems - Ricardo Fuel Cell Library for MSC.EASY5”. Josef Fulem, *Ricardo Prague s.r.o., Czech Republic*.

**POS#35** “Model Based Design of a Controller For Fuel Cell Systems”. Francesco Turoni, Michael Schreiber, Michael Mlynski, Abas Sadatsakak, *EUtech Scientific Engineering GmbH, Germany*.

**POS#36** “Model-based Fault Diagnostic for a Pressurized Automotive PEM Fuel Cell System”. Pierluigi Pisu, Annalisa Scacchioli, Alfonso Di Domenico, Alessandro Miotti, Giorgio Rizzoni, Yann Guezennec, *Ohio State University, USA*.

**POS#37** “Multi-variable Control of a Pressurized PEM Fuel Cell System for Automotive Applications”. Alfonso Di Domenico, Alessandro Miotti, Mishaal Alhetairshi, Sai S V Rajagopalan, Yann Guezennec, Steve Yurkovich, *Ohio State University, USA*.

**POS#38** “Simulink-Femlab Integrated Dynamic Simulation Model for a PEM Fuel Cell System”. Robert Radu, Rodolfo Taccani, *University of Trieste, Italy*.

**POS#39** “Simulation of Biomass and/or Coal Gasification Systems Integrated with Fuel Cells”. Sibel OZDOGAN<sup>1</sup>, Atila Ersoz<sup>2</sup>, Hayati Olgun<sup>2</sup>,<sup>1</sup> *Marmara University, Turkey*,<sup>2</sup> *TUBITAK MRC, Turkey*.

**POS#40** “Performance Estimation of a Polymer Electrolyte Fuel Cell Operating on Diluted Hydrogen Feed”. Mariagiovanna Minutillo, Elio Jannelli, Federico Tunzio, *University of Cassino, Italy*.

**POS#41** “Performance and Combustion Analysis of a MGT-SOFC Hybrid System”. Maria Cristina Cameretti, Renzo Piazzesi, Antonino Pontecorvo, Raffaele Tuccillo, *Università di Napoli "Federico II", Italy*.

**POS#42** “Reliability, Availability, Maintainability (R.A.M.) Analysis of High Temperature Fuel Cell Hybrid Systems”. Elisa Carlucci, Loredana Magistri, Aristide Massardo, *University of Genova, Italy*.

**POS#43** “Comparison Between Uncontrolled and Controlled Solid Oxide Fuel Cell Hybrid Systems”. Mario Ferrari, Aristide Massardo, *Università di Genova, Italy*.

**POS#44** “An overview of Hybrid Solid Oxide Fuel Cells (SOFCs) Power Systems”. Nacéra Larbi, *University of Sciences and Technology of Oran (USTO), Algeria*.

**POS#45** “System design and performance prediction of SOFC-GT combined power generation system”. Gary Cheung<sup>1</sup>, A Turan<sup>1</sup>,<sup>1</sup> *University of Manchester, UK*, S.M. Guo<sup>2</sup>,<sup>2</sup> *Louisiana State University, USA*.

**POS#46** “Energy and Exergy Analysis of Molten Carbonate Fuel Cell/Micro Gas Turbine Hybrid Power Systems”. Hongliang Hao, CoHuisheng Zhang, *Shanghai Jiao Tong University, China*.

**POS#47** “Minimization Analysis of Hybrid Power Sources for On-board Applications”. Mario Pagano, *Department of Electrical Engineering - University of Naples, Italy.*

**POS#48** “High Temperature Fuel Cell Hybrid Systems: from Natural Gas to Alternative Fuels and Hydrogen”. Loredana Magistri, Matteo Pascenti, Aristide Massardo, *University of Genoa, Italy.*

### **Environmental and Strategic Issues**

**POS#49** “Sustainable Development in Urban Transport: Feasibility Study for a Plant to Produce and Store Hydrogen from Wind Energy in the Urban Transport in Western Sicily”. Vincenzo Franzitta, Marco Beccali, Maurizio Cellura, *University of Palermo, Italy.*

**POS#50** “Tomorrow’s Energy, Hydrogen Fuel Cell: Clean and Efficient Way of Cogeneration”. Amine Boudghene Stambouli <sup>1</sup>, Nacéra Larbi <sup>1</sup>, E. Traversa <sup>2, 1</sup> *University of Sciences and Technology of Oran (USTO), Algeria, <sup>2</sup> University of Roma "Tor Vergata", Italy.*

**POS#51** “The Use of Hydrogen in Residential Sector: Economic Aspects and Environmental Benefits”. Marco Beccali, Vincenzo Franzitta, Maurizio Cellura, *University of Palermo, Italy*

**POS#52** “The Use of Hydrogen in Residential Sector: Economic Aspects and Environmental Benefits”. Marco Beccali, Vincenzo Franzitta, Maurizio Cellura, *University of Study of Palermo, Italy.*

**POS#53** “Technological, Technical and Economic Barriers to the development and Commercialization of Solid Oxide Fuel Cells (SOFCs) Systems”. Nacéra Larbi <sup>1</sup>, Amine Boudghene Stambouli <sup>1</sup>, E. Traversa <sup>2, 1</sup> *University of Sciences and Technology of Oran (USTO), Algeria, <sup>2</sup> University of Roma "Tor Vergata", Italy.*

**POS#54** “Fuel Cells: Highly Efficient and Clean Combined Heat & Power Production”. Amine Boudghene Stambouli, Nacéra Larbi, *University of Sciences and Technology of Oran (USTO), Algeria.*

**POS#55** “Bayes Inference in Multicriteria Analysis for hybrid Electrical transportation Systems Design”. Elio Chiodo, Giovanni Velotto, Mario Pagano, *University of Naples, Italy.*

## December 15<sup>th</sup>, 2005

08.00 → 8.30 Registration

08.30 → 09.00 Plenary Session: “Fuel cells from a 25-year perspective – from technical advances to economic challenges and societal strategies”. J. Robert Selman, *Center for Electrochemical Science and Engineering, Illinois Institute of Technology IIT, Chicago USA*

### Session 4a PEMFC Cell & Stack Modeling

Duration: 09.00 → 10.30

Session Chair: Robert Moore, *University of Hawaii at Manoa, USA*

Location: Room A

09.00 → 09.30 *Keynote:*

“Thermal-Fluid-Dynamic Simulation of a PEM Fuel Cell Using a Hierarchical 3D-1D Approach”  
S. Cordiner, V. Mulone, F. Romanelli, *University of Roma Tor Vergata, Italy*

09.30 → 09.50 “Dynamic Performance of the Proton Exchange Membrane Fuel Cells”  
G. Lazaroiu<sup>1</sup>, U. Desideri<sup>2</sup>, D. Zaninelli<sup>3</sup>, C. Lazaroiu<sup>3</sup>,<sup>1</sup> *University Polytechnic of Bucharest, Romania*,<sup>2</sup> *University of Perugia, Italy*,<sup>3</sup> *Politecnico di Milano, Italy*

09.50 → 10.10 “A Reduced Fuel Cell Stack Model for Control and Fault Diagnosis”  
D. Di Penta<sup>1</sup>, K. Bencherif<sup>2</sup>, M. Sorine<sup>3</sup>, Q. Zhang<sup>4</sup>.  
<sup>1</sup> *RENAULT/Université de Rennes 1*,<sup>2</sup> *RENAULT*,<sup>3</sup> *INRIA Rocquencourt*,<sup>4</sup> *IRISA Rennes, France*

10.10 → 10.30  
“Numerical Analysis of Current Density Distribution at PEMFC and Comparison with Measured Distribution by Segmented Electrode Cell”  
K. Onda, T. Taniuchi, T. Araki, D. Sunakawa,  
*Toyohashi University of Technology, Japan*

10.30 → 10.40 Coffee Break

### Session 4b MCFC Materials

Duration: 09.00 → 10.30

Session Chair: María Escudero, *CIEMAT, Spain*

Location: Room B

09.00 → 9.30 *Keynote:*

“New Trends in MCFC Technology and Materials”  
M. Cassir, *ENSCP-Laboratoire d'électrochimie et de Chimie Analytique, France*

09.30 → 09.50 “Development of Stabilized NiO Cathodes for Molten Carbonate Fuel Cells”  
B. Ryu<sup>1</sup>, I. Chang<sup>1</sup>, K.-H Moon<sup>1</sup>, J. H. Han<sup>2</sup>, T-H Lim<sup>2</sup>,<sup>1</sup> *Doosan Heavy Industry & Construction*,<sup>2</sup> *Fuel Cell Research Center, Korea Institute of Science and Technology, South Korea*

09.50 → 10.05 “An Overview of the Electrospark Deposition Process for Aluminization of MCFC Bipolar Plates”  
S. Frangini, A. Masci, *ENEA, Italy*

10.05 → 10.20 “Investigation On a Novel MCFC Cathode Material Formed by a LiMg<sub>0.05</sub>Co<sub>0.95</sub>O<sub>2</sub> Thin Film On Porous Ni/NiO Electrode”  
E. Simonetti, R. Lo Presti, *ENEA, Italy*

10.20 → 10.30 “Research on Materials to Improve MCFC Lifetime”  
P. Capobianco, G. Durante, E. Bersaglio, *Ansaldo Fuel Cells S.p.A., Italy*

### Session 5a SOFC Systems Modeling

Duration: 10.40 → 12.00

Session Chair: Andreas Podias, *Joint Research Centre, Petten, The Netherlands*  
Stefano Ubertini, *University of Rome "Tor Vergata", Italy*

Location: Room A

10.40 → 11.00 "Dynamic Model of a Pressurized SOFC/Gas Turbine Hybrid Power Plant for the Development of Control Studies"

C. Waechter, F. Joos, *Helmut-Schmidt-University, University of the Federal Armed Forces Hamburg, Germany*

11.00 → 11.20 "Implementation of a Fuel Cell Model into Building Energy Simulation Software"

T. Vesanen, K. Klobut, J. Shemeikka, *VTT Building and Transport, Finland*

11.20 → 11.40 "Benchmark Characterization of a Tubular SOFC CHP Generator: Part I: Model Description"

V. Verda, M. Santarelli, P. Leone, M. Cali, *Politecnico di Torino, Italy*

11.40 → 12.00 "Modelling of SOFC Anode Fuelled by Methane: Thermodynamic Analysis of Carbon Deposition"

Y Bulte, J. Klein, *LEPMI-INPG, France*

### Session 5b Fuel Processing

Duration: 10.40 → 12.00

Session Chairs: Salvatore Freni, *CNR-ITAE, Messina, Italy*

Location: Room B

10.40 → 11.00 "Development of a Bioethanol Processor for PEMFC Feeding"

M. Benito<sup>1</sup>, R. Padilla<sup>2</sup>, R. Isabel<sup>1</sup>, J. L. Sanz<sup>2</sup>, L. Daza<sup>1</sup>. <sup>1</sup> *Instituto de Catalisis y Petroleoquímica, Spain*, <sup>2</sup> *Greencell (ABENGOA-BIOENERGÍA), Spain*

11.00 → 11.20 "Selective CO oxidation in H<sub>2</sub>-rich streams by means of catalytic (Pt-Y) membranes"

P. Bernardo, C. Algieri, G. Barbieri, E. Orioli, *Institute on Membrane Technology of the Italian National Research Council, Italy*

11.20 → 11.40 "Diesel Steam Reforming for PEM Fuel Cells"

C. Mengel, *Oel-Wärme-Institut, Germany*

11.40 → 12.00 "Physical-Chemical and Thermodynamic Analyses of Steam Reforming of Ethanol to Hydrogen Production"

A. C. C. Souza, J. L. Silverira, M. I. Sosa, *São Paulo State University, Brazil*

## Session 6a SOFC Cell & Stack Modeling

Duration: 12.00 → 13.20

Session Chair: Stefano Ubertini, *University of Rome "Tor Vergata", Italy*

Location: Room A

12.00 → 12.20 "A Microstructure-Based Modelling Approach Using the Lattice-Boltzmann Equation Method: Deriving the Permeability Tensor of a Stochastically Reconstructed Replica of a Real SOFC Cathode"

A.K.M. Podias, P. Moretto, G. Tsotridis, European Commission, *DG Joint Research Centre, Institute for Energy, The Netherlands*

12.20 → 12.40. "Diffusion and Chemical Reaction in the Porous Structures of Solid Oxide Fuel Cells"

B. Haberman, J.B. Young, *University of Cambridge, UK*

12.40 → 13.00 "Effects of Mass Transport on the Performance of SOFC Composite Electrodes"

M. Cannarozzo<sup>1</sup>, S. Grosso<sup>1</sup>, Gerry Agnew<sup>2</sup>, Paola Costamagna<sup>1,1</sup>, *DICHEP-University of Genoa, Italy*,<sup>2</sup> *Rolls-Royce Fuel Cell Systems Ltd., UK*

13.00 → 13.20 "Modeling and Study of the Influence of Sealing on a Solid Oxide Fuel Cell"

Z. Wuillemin, N. Autissier, J. Van herle and D. Favrat, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*

## Session 6b Catalytic Materials

Duration: 12.00 → 13.20

Session Chair: Bruno Scrosati, *University of Rome "La Sapienza, Italy*

Location: Room B

12.00 → 12.20 "Biosyngas Utilization in Solid Oxide Fuel Cells with Ni/GDC Anodes"

J. P. Ouweltjes<sup>1</sup>, P. V. Aravind<sup>2</sup>, N. Woudstra<sup>2</sup>, B. Rietveld<sup>1,1</sup>, *Energy research Centre of the Netherlands (ECN)*,<sup>2</sup> *TU Delft, The Netherlands*

12.20 → 12.40 "Intermediate Temperature Anode Supported Micro-Tubular Solid Oxide Fuel Cell Running on Methane"

J. Pusz<sup>1</sup> and N. Sammes<sup>2,1</sup>, *Connecticut Global Fuel Cell Center*,<sup>2</sup> *University of Connecticut, USA*

12.40 → 13.00 "Processing of R-Nickel Catalysts for Alkaline Fuel Cell Applications"

J.A. Linnekoski<sup>1</sup>, A.O.I Krause<sup>1</sup>, J. Keskinen<sup>2</sup>, Tomi Anttila<sup>3,1</sup>, *Helsinki University of Technology*,<sup>2</sup> *VTT Processes, Hermiankatu*,<sup>3</sup> *Hydrocell Ltd, Finland*

13.00 → 13.20 "New Generation of Catalysts for PEMFC Application"

A. Smirnova<sup>1</sup>, X. Dong<sup>2</sup>, H. Hara<sup>2</sup>, N. Sammes<sup>1,1</sup>, *University of Connecticut*,<sup>2</sup> *Aerogel Composite, LLC c/o ICA, Inc., USA*

13.20 → 15.00 Lunch + poster session

Lunch sponsored by:



## Session 7a Hybrid Fuel Cells and Systems

Duration: 15.00 → 16.30

Session Chairs: Mauro Scagliotti, *CESI, Italy*  
Frano Barbir, *UNIDO-ICHET, Istanbul, Turkey*

Location: Room A

15.00 → 15.30 *Keynote*

“Performance Optimisation of a Hybrid System for Energy Generation Based in a Fuel Cell and a Photovoltaic Panel“

T. González Ayuso <sup>1</sup>, J.L. Serrano <sup>1</sup>, A.M. Chaparro <sup>1</sup>, M.J. Escudero <sup>1</sup>, M.A. Folgado <sup>3</sup>, A. Delgado <sup>2</sup>, L. Daza <sup>1,3</sup>, <sup>1</sup> *Departamento de Energía, CIEMAT*, <sup>2</sup> *Besel SL*, <sup>3</sup> *Instituto de Catálisis y Petroleoquímica, , Spain*

15.30 → 15.50 “Design And Control Options For An Intermediate Temperature Solid Oxide Fuel Cell / Zebra Battery Hybrid System for Vehicle Applications”

D. Brett <sup>1</sup>, N. Brandon <sup>1</sup>, S. Cope <sup>2</sup>, G. Hayes <sup>1</sup>, C. Mellors <sup>2</sup>. <sup>1</sup> *Imperial College, UK*, <sup>2</sup> *MIRA LTD*

15.50 → 16.10 “Performance of a Hybrid Wind-Turbine Fuel-Cell Power Generating System Investigated through a Small-Scale Experiment”

A. I. Kalfas <sup>1</sup>, N. Karageorgakis <sup>2</sup>, R. S. Abhari <sup>1</sup>. <sup>1</sup> *Swiss Federal Institute of Technology, ETH Zurich, Switzerland*, <sup>2</sup> *Aristotle University of Thessaloniki, Greece*

16.10 → 16.30 “Optimization and Economic Analysis of a - Hybrid Fuel Cell, PhotoVoltaic and Battery - Electric Power Generation System”

S. Jemei <sup>1</sup>, D. Hissel <sup>1</sup>, A. Coince <sup>2</sup>, B. Al-Nasrawi <sup>2</sup>, <sup>1</sup> *L2ES/UTBM, France*; <sup>2</sup> *European Institute for Energy Research, France*.

16.30 → 16.50

Coffee Break

## Session 7b PEM Materials

Duration: 15.00 → 16.30

Session Chair: Manuel Benito, *Instituto de Catálisis y Petroleoquímica (CSIC), Spain*

Location: Room B

15.00 → 15.30 *Keynote*

“An Italian National Project for the Development of New Microporous Proton Membranes for DMFC”

B. Scrosati, S. Panero, M. A. Navarra, *University of Rome "La Sapienza", Italy*

15.30 → 15.50 “MEAs for Polymer Electrolyte Fuel Cell (PEFC) Working at Medium Temperature”

E. Passalacqua, I. Gatto, A. Saccà, A. Carbone, R. Pedicini, *CNR-ITAE, Italy*

15.50 → 16.10 “State-of-the Art Methodology to Prepare PEMFC Electrode Gas Diffusion Layer (Materials and Processing Techniques)”

F. Mighri, D. Yakisir, M. Bousmina, *Laval University, Canada*

16.10 → 16.30 “Degradation Mechanisms of Alternative Polymers to Nafion used as Proton Exchange Membrane in Fuel Cell”

L. Gonon <sup>1</sup>, C. Perrot <sup>1</sup>, G. Gebel <sup>1</sup>, A. Morin <sup>1</sup>, S. Escribano <sup>1</sup>, K. Marestin <sup>2</sup>, <sup>1</sup> *CEA*, <sup>2</sup> *CNRS, France*

Session 8a *MCFC Cell, Stack & System Modeling*

Duration: 16.50 → 18.10

Session Chair: Stefano Ubertini, *University of Rome "Tor Vergata", Italy*

Location: Room A

16.50 → 17.10 ““Process Simulation of a Neutral Emission Plant Using Chestnut’s Coppice Gasification and Molten Carbonate Fuel Cell”

F. Orecchini, E. Bocci, A. Di Carlo, *CIRPS University of Rome La Sapienza, Italy*

17.10 → 17.30 “Validation of a Mathematical Model Using an Industrial MCFC Plant”

K. Sundmacher, M. Gundermann and P. Heidebrecht, *Otto-von-Guericke University Magdeburg, Germany*

17.30 → 17.50 “Development of a 3D MCFC Model and Application to Hybrid Cycle Simulations”

P. Iora<sup>1</sup>, S. Campanari<sup>2,1</sup> *Università degli Studi di Brescia,* <sup>2</sup> *Politecnico di Milano - Dip. di Energetica, Italy*

17.50 → 18.10 “CoCell: Optimisation of the Heat Balance for a Molten Carbonate Fuel Cell to Produce Hydrogen for a Proton Exchange Membrane Fuel”

L. Adamek and G. Huppmann, *MTU CFC Solutions GmbH, Germany*

Session 8b *SOFC Materials*

Duration: 16.50 → 18.10

Session Chair: Nigel Sammes, *University of Connecticut, USA*

Location: Room B

16.50 → 17.10 “LSCM based SOFC a suitable System for Direct Propane Operation”

D. M. Bastidas, J. T. S. Irvine, *St Andrews University, UK*

17.10 → 17.30 “Feasibility Of ZrO<sub>2</sub>-In<sub>2</sub>O<sub>3</sub> Materials for SOFC Application”

P. Mourot, A. Ringuedé, C. Alvarez-Lugano, J. C. Badot, M. Cassir, *Ecole Nationale supérieure de Chimie de Paris, France*

17.30 → 17.50 “Ceria-Based Anode-Supported Thin Films for SOFC Testing”

M. Fabrizio<sup>1</sup>, S. Barison<sup>1</sup>, G. Chiodelli<sup>1</sup>, C. Mortalò<sup>1</sup>, S. Daolio<sup>1</sup>, E. Roncari<sup>2</sup>, A. Sanson<sup>2</sup>, V. Calmieri<sup>3</sup>, D. Scagliusi<sup>4,1</sup> *CNR – IENI,* <sup>2</sup> *CNR-ISTEC,* <sup>3</sup> *INFN – LNL,* <sup>4</sup> *University of Padova, Italy.*

17.50 → 18.10 “Sintering Behaviour of (La,Sr)MnO<sub>3</sub>-Type Cathodes for Planar Anode-Supported SOFCs”

J. Mertens, V. A. C. Haanappel, H.-P. Buchkremer, *Forschungszentrum Jülich, Germany*

## **POSTER SESSION 2**

Please note that the number indicated for each poster (i.e. pos#xx, where xx is a number) identifies where the poster is located. The number indicated corresponds to a panel in the room where the poster session will take place.

### **High Temperature Fuel Cells Models**

**POS#01** “Finite Element Modelling of High Temperature Fuel Cells”. Fausto Arpino <sup>1</sup>, Nicola Massarotti <sup>1</sup>, Alberto Carotenuto <sup>2</sup>, Perumal Nithiarasu <sup>3, 1</sup> *University of Cassino, Italy*, <sup>2</sup> *University of Napoli Parthenope, Italy*, <sup>3</sup> *University of Wales Swansea, UK*.

**POS#02** “Studies on the Numerical Modeling of the Unit Butterfly-type Molten Carbonate Fuel Cell”. Gui-Yung Chung <sup>1</sup>, Min-Jung Yoo <sup>1</sup>, Hee-Chun Lim <sup>2</sup>, Tae-Hoon Lim <sup>2</sup>, Suk-Woo Nam <sup>2</sup>, Seong-Ahn Hong <sup>2, 1</sup> *Hong-Ik University, 2* *KEPRI, Korea*.

**POS#03** “Optimum Operating Temperature of a Molten Carbonate Fuel Cell as a Function of the Operating Conditions”. Abdullatif Musa, *Ghent University, Belgium*.

**POS#04** “Molten Carbonate Fuel Cell Dynamical Modelling”. Antonio Errigo <sup>1</sup>, Valter Prandoni <sup>1</sup>, Silvia Canevese <sup>2</sup>, Antonio De Marco <sup>2</sup>, Giorgio Giuffrida <sup>2</sup>, Sergio Bittanti <sup>2, 1</sup> *CESI S.p.A., Italy*, <sup>2</sup> *Politecnico di Milano, Italy*

**POS#05** “Simulation of Planar SOFC Electrical Performance Considering Gas Components Migration Through Porous Electrodes”. Vladimir Ruzhnikov, Vladimir Subbotin, Nikolai Khramushin, *Institute for Physics and Power Engineering, Russia*.

**POS#06** “Non-Isothermal Modelling of a Solid Oxide Fuel Cell with Internal Reforming”. An Stroobandt, Hendrik-Jan Steeman, Abdullatif Musa, Michel De Paepe, *Ghent University, Belgium*.

**POS#07** “One-Dimensional Model of a Tubular Solid Oxide Fuel Cell”. Francesco Calise, Massimo Dentice d'Accadia, Laura Vanoli, Adolfo Palombo, *University of Naples Federico II, Italy*.

**POS#08** “Differential Impedance Analysis for the Study of the Rate Limiting Step of Electrode Process in SOFC Cathodes”. Antonio Barbucci <sup>1</sup>, Paola Carpanese <sup>1</sup>, Paolo Piccardo <sup>1</sup>, Massimo Viviani <sup>2</sup>, Daria Vladikovaladikova <sup>3</sup>, Zdravko Stoyanov <sup>3, 1</sup> *Univeristy of Genova, Italy*, <sup>2</sup> *CNR, Italy*, <sup>3</sup> *CLEPS – BAS, Bulgaria*.

**POS#09** “Influence of the Temperature on the Distribution of Active Site for Oxygen Reduction in SOFC Composite Electrodes : Theoretical and Experimental Analysis”. Antonio Barbucci <sup>1</sup>, Andrea Riverberi <sup>1</sup>, Paola Carpanese <sup>1</sup>, Giacomo Cerisola <sup>1</sup>, Cristiano Nicoletta <sup>2</sup>, Massimo Viviani <sup>3, 1</sup> *University of Genova*, <sup>2</sup> *University of Pisa*, <sup>3</sup> *CNR, Italy*.

**POS#10** “Detailed Simulation of the Ohmic Resistance of SOFCs”. Laura Repetto <sup>1</sup>, Paola Costamagna <sup>1</sup>, Fabio Di Benedetto <sup>2</sup>, Gerry Agnew <sup>3, 1</sup> *University of Genoa, Italy*, <sup>2</sup> *DIMA-University of Genoa, Italy*, <sup>3</sup> *Rolls-Royce Fuel Cell Systems Ltd, USA*.

**POS#11** “A Detailed Numerical Model for Improving an SOFC System Design. Results for Current Collectors of a Micro-Tubular SOFC”. Mario Angeloni <sup>1</sup>, Roberto Bove <sup>1</sup>, Nigel Sammes <sup>2</sup>, William Holden <sup>2, 1</sup> *University of Perugia, Italy*, <sup>2</sup> *University of Connecticut, USA*.

**POS#12** “Modeling of a Tubular SOFC Cell Fed DME Fuel for Portable Power Supply”. Kenji Sugano <sup>1</sup>, Tohru Kato <sup>2</sup>, Lan Tulong Nguyen <sup>3</sup>, Susumu Nagata <sup>3</sup>, Yohei Tanaka <sup>2, 1</sup> *Tokyo University of Science, Japan*, <sup>2</sup> *National Institute of Advanced Industrial Science and Technology, Japan*.

**POS#13** “A Mathematical Model for SOFCs Based on Partial Differential Equations”. Roberto Bove, Piero Lunghi, Mario Angeloni, Pilar Lisbona, *University of Perugia, Italy*.

**POS#14** “Numerical Simulations of Reactive Mixture Flow in the Anode Layer of Electrolyte Supported Solid Oxide Fuel Cells by the Lattice Boltzmann Method”. Pietro Asinari<sup>1</sup>, Michele Cali<sup>1</sup>, Michael R. von Spakovsky<sup>2</sup>, Bhavani V. Casula<sup>2,1</sup> *Politecnico di Torino, Italy, <sup>2</sup> Virginia Tech, USA*.

### **Low Temperature Fuel Cells Models**

**POS#15** “Pressure and Flow Distribution in Inlet and Outlet Manifold of a 5KW PEMFC Stack”. Saeed Asghari, *Esfahan Engineering Research Center, Iran*.

**POS#16** “Simulation of the Operation of a Direct Ethanol Fuel Cell Anode”. George Andreadis, Shuqin Song, Panagiotis Tsiakaras, *University of Thessaly, Greece*.

**POS#17** “The Transient Pore-Network Water Transfer Model in GDL of PEM Fuel Cell”. Kyu Jin Lee, Jin Hyun Nam, *Mechanical and Aerospace Engineering School, Seoul National University, Seoul National University, Korea*.

**POS#18** “A Two Dimensional Finite Volume Model of a PEFC Gas Diffusion Layer”. Pascal Schott, *CEA, France*.

**POS#19** “Analysis and Design of Proton Exchange Membrane Fuel Cells for Maximum Power Density and Uniform Current Density Distribution”. Yanyan Zhang, Andryas Mawardi, Ranga Pitchumani, *University of Connecticut, USA*.

**POS#20** “An Experimental and Numerical Study of Two-Phase Flow and Transport in Miniature Open-Air Proton Exchange Membrane Fuel Cells”. Dean Modroukas<sup>1</sup>, Luc G. Fr chet te<sup>2</sup> Vijay Modi<sup>3,1</sup> *ATK GASL, USA, <sup>2</sup> Universit  de Sherbrooke, France, <sup>3</sup> Columbia University, USA*.

**POS#21** “The Effect of Slip Velocity on the Saturation in a Multi-Component-Condensing-Mixture System in PEM Fuel Cells”. Mohammad Jafar Kermani<sup>1</sup>, John M. Stockie<sup>2,1</sup> *Amir Kabir University of Technology (Tehran Polytecnic), Iran, <sup>2</sup> Simon Fraser University, Canada*.

**POS#22** “A Study of the PEM Fuel Cell with Axial Convection in Gas Channel”. Yur-Tsai Lin, Tsong-Ting Lin, Fangbor Weng, *Yuan Ze University, Taiwan*.

**POS#23** “Dynamic Simulation of PEMFC Stack for Vehicular Applications”. M. N. Kassem<sup>1</sup>, A. F. Gomez<sup>2,1</sup> *Royal Institute of Technology, KTH, Sweden, <sup>2</sup> ETSEIB-UPC, Universitat Polit cnica de Catalunya, Spain*.

**POS#24** “Design of the Anode Electrode Structure for the Micro Direct Methanol Fuel Cell by Using the Numerical Analysis of Fuel Flow”. Masahiko Sugimura, Kiyokazu Yasuda, Michiya Matsushima, Kozo Fujimoto, *Osaka University, Japan*.

**POS#25** “A Hierarchical Approach to Thermofluid Modeling of PEMFC”. Eden Mamut, *Ovidius University of Constantza / Center for Advanced Engineering Sciences, Romania*.

**POS#26** “Numerical Modeling of Proton Exchange Membrane Fuel Cell with Considering Thermal and Relative Humidity Effects on the Cell Performance”. P. H. Peter, Fangbor Weng, Ay Su, *Yuan Ze University, Taiwan*.

### **General Mathematical Models on Fuel Cells**

**POS#27** “A New Package for Fuel Cell Modeling”. Ed Fontes, Daniel Ericsson, *COMSOL, Sweden*.

**POS#28** “Computational Flow Analysis of Bi-polar Plate for Fuel Cells”. Pradip Majumdar, *Northern Illinois University, USA*.

**POS#29** “Numerical Simulation for Two-Phase flows in Fuel Cell Mini-channels”. Jean-Baptiste Dupont, Dominique Legendre<sup>1</sup>, Anna Maria Morgante<sup>2</sup>, <sup>1</sup>*IMFT, France*, <sup>2</sup>*Renault, France*.

**POS#30** “Prediction of Thermal-Mechanical Interface Stresses in Fuel Cell Stacks”. Ron Averill<sup>1</sup>, Sayed Nassar<sup>2</sup>, <sup>1</sup>*Red Cedar Technology, UK*, <sup>2</sup>*Oakland University, USA*.

**POS#31** “A Mathematical Model for Transport Phenomena”. Pradip Majumdar, *Northern Illinois University, USA*.

**POS#32** “Interfacial Shear Stresses between Fuel Cell Materials”. Sayed Nassar, Payam Matin, *Oakland University, USA*.

**POS#33** “Control Strategy Optimization of a Fuel-Cell Electric Vehicle”. Arturo de Risi, Vanessa Paladini, Teresa Donato, Domenico Laforgia, *University of Lecce, Italy*.

### **Hydrogen Generation, Storage and BoP**

**POS#34** “Hydrogenation Properties of Nano/Amorphous Ti-Cr-Nb Hydrogen Storage Alloys”. Tae Whan Hong, Soon Young Kweon, Young Geun Lee, Kyung Shin, *Chungju National University/Dept. of Mat. Sci. & Eng., South Korea*.

**POS#35** “Sodium Borohydride for Hydrogen Generation and Storage”. Caroline R. Cloutier, Akram Alfantazi, Elod Gyenge, *University of British Columbia, Canada*.

**POS#36** “CO-Free Hydrogen Production In A Two-Step Cyclic Reactor”. Kai Sundmacher<sup>1</sup>, Vladimir Galvita<sup>1</sup>, <sup>1</sup>*Max-Planck-Institute for Dynamics of Complex Technical Systems, Germany*, Peter Heidebrecht<sup>2</sup>, <sup>2</sup>*Otto-von-Guericke University Magdeburg, Germany*.

**POS#37** “Hydrogen Production Using Solid Oxide Electrolysis Cells Operated At Low Temperature”. Tohru Kato, Lan Tulong Nguyen, Takeo Honda, Yohei Tanaka, Ken Kato, Akira Negishi, Ken Nozaki, Masatsugu Amano, Miki Yoshihara, *National Institute of Advanced Industrial Science and Technology(AIST), Japan*.

**POS#38** “Polymeric membranes in purification of H<sub>2</sub> for PEMFC”. Francesco Scura<sup>1</sup>, Giuseppe Barbieri<sup>2</sup>, Enrico Drioli<sup>2</sup>, <sup>1</sup>*Università della Calabria, Italy*, <sup>2</sup>*Institute on Membrane Technology of the Italian National Research Council, Italy*.

**POS#39** “Role of Additives in Mg Hydride”. A. Montone<sup>1</sup>, Jasmina Grbovic<sup>1</sup>, Marco Vittori Antisari<sup>1</sup>, Luca Pasquini<sup>2</sup>, Ennio Sonetti<sup>2</sup>, Anna Lisa Fiorini<sup>2</sup>, <sup>1</sup>*ENEA C.R., Italy*, <sup>2</sup>*University of Bologna and INFM, Italy*.

**POS#40** “Techno-Economic Optimization of Hydrogen Production by Micro Wind Turbine – Electrolysis: “Renhydrogen” Simulation Program”. Adriano Santiangeli, Giovanni Andreussi, Federico Villatico, *University “La Sapienza” of Rome, Italy*.

**POS#41** “Bioethanol Steam Reforming over Pt and Ag in an Electrochemical CSTR Reactor”. Costas Poulianitis, Spilios Eliopoulos, Costas Giannopoulos, Shuqin Song, Panagiotis Tsiakaras, *University of Thessaly, Greece*.

**POS#42** “Novel Nanostructured Media for Gas Storage and Transport: Clathrate Hydrates of Methane and Hydrogen”. Gianfranco Savelli, Pietro Di Profio, Simone Arca, Raimondo Germani, *University of Perugia, Italy*.

**POS#43** “UV Laser-Induced Photochemical Synthesis of MOFs for Improved Hydrogen Storage”. Seong-Poong Lee, Houngh-Ha Jeon, Hong-Ki Chang, Ho-Jeong Paek, *Institute for Advanced Engineering, Korea*.

**POS#44** “Pressure Control Method for Absorption-Desorption of Hydrogen inside the Crystalline”. Alessandro Dell’Era, Fabio Orecchini, Fabrizio Zuccari, *University of Rome "La Sapienza", Italy*.

**POS#45** “An Application of the Hybrid MCR on the Fuel Processor for PEMFCs.”. Song Ho Cho <sup>1</sup>, Sung Hyun Kim <sup>1</sup>, Jong Soo Park <sup>2</sup>, Wang Lye Yoon <sup>2</sup>, Ho Tae Lee <sup>2</sup>, Seung Hoon Choi <sup>3</sup>, <sup>1</sup>*Korea University, Korea*, <sup>2</sup>*Korea Institute of Energy Research (KIER), Korea*, <sup>3</sup>*Seonam University, Korea*.

**POS#46** “Selective Production of Hydrogen for PEM Fuel Cells via Oxidative Steam Reforming of Methanol Using Cerium and Zinc Promoted Copper-Alumina Catalysts”. Sanjay Patel, K.K. Pant, *Indian Institute of Technology Delhi, India*.

**POS#47** “Theoretical Analysis on the Autothermal Reforming Process of Ethanol as Fuel for a PEMFC System”. Alessandra Perna, *University of Cassino, Italy*.

**POS#48** “5 kWe LPG Hydrogen Generator for PEFC”. Vincenzo Recupero, Francesco Cipiti, Lidia Pino, Antonio Vita, Massimo Laganà, *CNR Institute Advanced Technology for Energy, Italy*.

**POS#49** “Energy Analysis of PEM Fuel Cell Compressors”. Cesare Pianese, Ivan Arsie, Alfonso Di Domenico, Marco Sorrentino, *University of Salerno, Italy*.

**December 16<sup>th</sup>, 2005**

08.00 → 8.30 Registration

08.30 → 09.00 Plenary Session: "Fuel Cell Development in 2005 - The Where, When, Why and What of the past 12 months", Gemma Crawley, Fuel Cell Today.

Session 9a *Demonstration Projects*

Duration: 09.00 → 10.30

Session Chairs: Massimo Feola; *University of Rome "Tor Vergata", Italy*  
Luca Andreassi, *University of Rome "Tor Vergata", Italy*

Location: Room A

09.00 → 09.30 *Keynote:*  
"Fuel Cells: a Utilities Perspective"  
R. Neal, C. Hennesius, A. Ang, S. Hamilton, *Southern California Edison, USA.*

09.30 → 09.50 "Fuel Cell Systems For Distributed Power Generation; E.ON Energie's Practical Experience"  
H. Rainer, *E.ON Energie AG*

09.50 → 10.10 "Continuous Operation of PEM Regenerative Fuel Cell System For Energy Storage"  
B-J. Chang, *NASA Glenn Research Center, USA*

10.10 → 10.30 "The Underwater Vehicle "URASHIMA" Powered by A Closed-Cycle-PEFC"  
H. Yoshida et al., *JAMSTEC, Mitsubishi Heavy Industries, Ltd, Nippon Marine Enterprises, Ltd, Japan*

Session 9b *Non-Conventional Fuels*

Duration: 09.00 → 10.30

Session Chair: Angelo Moreno, *ENEA, Italy.*

Location: Room B

09.00 → 10.00 *Keynote:*  
"The Role of MCFC for the Exploitation of Biomass for Electricity Production"  
A. Casalegno, D. Caruso, E. Cerluini, F. Pavoni, F. Lucia, L. De Lorenzo, M. Buccarella, V. Cigolotti, *ENEA, Italy*

09.30 → 09.50 "Oxygenates and Ammonia as SOFC Fuels"  
J. B. Hansen, J. Pålsson, *Haldor Topsøe A/S, Denmark.*

09.50 → 10.10 "Highly Efficient Conversion of Ammonia in Electricity by Solid Oxide Fuel Cells"  
N. Dekker, B. Rietveld, *Energy research Centre of the Netherlands – ECN, The Netherlands*

10.10 → 10.30 "Hydrogen Sulfide and Siloxane Removal from Biogas for its Usage in Fuel Cells"  
W. Ahrer, F. Accettola, S. Trogisch, *Profactor Produktionsforschungs GmbH, Austria*

10.30 → 10.40 Coffee Break

Session 10a *Demonstration Projects (cont)*

*Duration: 10.40 → 12.00*

Session Chair: Bartolomeo Marcenaro, *Ansaldo Fuel Cells S.p.A., Italy*

Location: Room A

10.40 → 11.00 “Hydrogen Railway along Peru Pacific Coastline”

F. Orecchini, D. Marcelo, V. Naso, *University of Rome "La Sapienza", Italy*

11.00 → 11.20 “Helps: An Uninterruptible Power Supply Based On A Fuel Cell”

C. Lansade, D. Guichardot, *CREED, France*

11.20 → 11.40 “Grid Connected PEFC Modules Coupled with a Metal Hydride H<sub>2</sub> Storage”

A. Alberio<sup>1</sup>, A. Del Corno<sup>1</sup>, M. Scagliotti<sup>1</sup>, C. Valli<sup>1</sup>, A. Menapace<sup>2</sup>, A. Tomasi<sup>2</sup>. <sup>1</sup>*CESI S.p.A.*, <sup>2</sup>*SGS Future S.r.l., Italy*

11.40 → 12.00 “Hydrogenics Fuel Cell Hybrid Midibus”

W. Friede, K. H. Klug, *Hydrogenics GmbH, Germany*

Session 10b *Non-Conventional Fuels (cont)*

*Duration: 10.40 → 12.00*

Session Chair: Gerhard Huppmann, *MTU CFC Solutions GmbH, Germany*

Location: Room B

10.40 → 11.00 Operating micro-tubular SOFCs with wood-gas components

G. Buchiger, P. Hinterreiter, T. Raab, S. Griesser, D. Meissner, *Upper Austria University of Applied Science, Austria*

11.00 → 11.20 “Coal Gasification Integrated Plant For Hydrogen Enriched Stream and Power Production With Carbon Dioxide Separation”

F. Pratola<sup>1</sup>, F. Repetto<sup>1</sup>, M. Pelizza<sup>1</sup>, C. Amorino<sup>2</sup>, J. Foreman<sup>3</sup>, S. L. Swartz<sup>3</sup>, *AnsaldoRicerche S.p.A., Italy*, <sup>2</sup>*Sotacarbo S.p.A., Italy*, <sup>3</sup>*NexTech Materials, Ltd.*

11.20 → 11.40 “Saccharide Alkaline Fuel Cell”. P.

Schechner, E. Bubis, Z. Rubin, N. Sabag, L. Mor, *ORT Braude College, Israel.*

11.40 → 12.00 “Combination of Biological Processes and Fuel Cells to Harvest Solar Energy”

D. Ihrig et al., *University for Applied Sciences South Westfalia, Germany*

Session 11a *Operational Experience*

Duration: 12.00 → 13.20

Session Chair: Bert Rietveld, *Energy Research Centre of the Netherlands (ECN), The Netherlands*  
Rodolfo Taccani; *University of Trieste, Italy*

Location: Room A

12.00 → 12.20 “Operational Experiences with the EBZ Modular Energy Supply System based on Solid Oxide Fuel Cells”

O. Posdziech, C. Schurig, M. Schneider, *EBZ Entwicklungs- und Vertriebsgesellschaft Brennstoffzelle mbH., Germany*

12.20 → 12.40 “SOFCRoll Development at St Andrews Fuel Cells”

F. G. E. Jones et al., *St Andrews Fuel Cells, University of St Andrews, UK*

12.40 → 13.00 “The EOS Project: an Industrial SOFC Pilot Plant in Italy”

Enrico Fontana<sup>1</sup>, Michele Cali<sup>1</sup>, Gianmichele Orsello<sup>2, 1</sup> *Politecnico di Torino, Italy*<sup>2</sup> *Gas Turbine Technologies, Italy.*

13.00 → 13.20 “Durability of Anode Supported Solid Oxide Fuel Cells on Pre-Reformed Natural Gas”

M. Noponen, J. Kiviaho, M. Halinen, J. Saarinen, *VTT Technical Research Centre of Finland*

13.20 → 15.00 Lunch + poster session

Session 11b *Codes and Standards and Harmonized procedures*

Duration: 12.00 → 13.20

Session Chair: Roberto Bove, *University of Perugia, Italy*

Location: Room B

12.00 → 12.20 “Standardisation during R&D: a catalyst for development”

W. Winkler, *Hamburg University of Applied Sciences, Germany* (Invited)

12.20 → 12.40 “Harmonizing fuel cell testing procedures”

G. Tsotridis, *European Commission, Joint Research Centre, The Netherlands.* (Invited)

12.40 → 13.00 “Codes and Standards: A Necessary Evil or a Promotion for Fuel Cell Installations”

G. Huppmann, *MTU CFC Solutions GmbH, Germany*

13.00 → 13.20 “Standardization Activity in Japan on Components and Element Materials for SOFC: A New JIS/ISO proposal on Testing Methods of SOFC”

S. Yamaguchi, *University of Tokyo, Japan*

Session 12a *Operational Experience (cont)*

Duration: 15.00 → 16.20

Session Chairs: Umberto Desideri, *University of Perugia, Italy*  
Bartolomeo Marcenaro, *Ansaldo Fuel Cells S.p.A., Italy*

Location: Room A

15.00 → 15.20 “The Role of the Carbonate Fuel Cell HotModule in the System of Stationary Energy Supply and Waste Material Treatment and Utilization”  
G. Huppmann, *MTU CFC Solutions GmbH, Germany*

15.20 → 15.40 “Characterization of Tubular SOFCs Operated with Kerosene”  
Y. Tanaka, *Advanced Industrial Science and Technology (AIST), Japan*

15.40 → 16.00 “Benchmark Characterization of a Tubular SOFC CHP Generator. Part II: Model Validation”  
M. Santarelli, P. Leone, E. Fontana, V. Giretto, *Politecnico di Torino, Italy*

16.00 → 16.20 “Design, Fabrication and Performance Analysis of a PEM Fuel Cell Short Stack”  
F. Weng, *Yuan Ze University, Taiwan*

16.20 → 16.50 Coffee Break

Session 12b *General Issues on Fuel Cells*

Duration: 15.00 → 16.20

Session Chair: Wolfgang Winkler, *Hamburg University of Applied Sciences, Germany*

Location: Room B

15.00 → 15.20 “Reduction and re-oxidation processes of NiO/YSZ composite for Solid Oxide Fuel Cell anodes”  
S. Modena<sup>1</sup>, A. Tomasi<sup>1</sup>, S. Ceschini<sup>1</sup>, D. Montinaro<sup>2</sup>, V. M. Sgla<sup>2</sup>.<sup>1</sup> *ITC-Irst, Institute for Scientific and Technological Research*, <sup>2</sup> *Università degli Studi di Trento, Italy*

15.20 → 15.40 “Development and Characterization of Vacuum Plasma Sprayed Planar Solid Oxide Fuel Cells and Short Stacks Under Dynamic Operating Conditions”  
M. Lang, Z. Ilhan, T. Franco, P. Szabo, S. Cinque, G. Schiller, *German Aerospace Center (DLR), Germany*

15.40 → 16.00 “The Effect of Current Density Distribution on Bus-Bar Power Loss and Optimal Location of the Power Take-Off for SOFC Generators”  
R. Draper, G. DiGiuseppe, *Siemens, USA*

16.00 → 16.20 “Sodium Borohydride for Hydrogen Generation and Storage”  
C. R. Cloutier, A. Alfantazi, E. Gyenge, *University of British Columbia, Canada*

Session 13a *SOFC Cells, Stack and Design*

Duration: 16.50 → 18.20

Session Chair: Michel Cassir, *ENSCP-Laboratoire d'électrochimie et de chimie analytique, France*

Location: Room A

16.50 → 17.20 *Keynote*

“Innovative Flexible SOFC Stack Concept”

S. Diethelm<sup>1</sup>, R. Ihringer<sup>1</sup>, N. Autissier<sup>2</sup>, Z. Wuillemin<sup>2</sup>, G. Proserpi<sup>2</sup>, I. Duo<sup>3</sup>, O. Bucheli<sup>1</sup>, J. Van herle<sup>2</sup> <sup>1</sup>*HTceramix Inc.*, <sup>2</sup>*Laboratory of Industrial Energy Systems (LENI), Ecole Polytechnique Fédérale de Lausanne*, <sup>3</sup>*Laboratory of Electrochemical Engineering (GGEC), Ecole Polytechnique Fédérale de Lausanne, Switzerland*

17.10 → 17.30 “Qualification of Plasma Sprayed Diffusion Barrier Layers Based on Doped Perovskite-type LaCrO<sub>3</sub> at Substrate-Anode Interface in SOFC”

T. Franco, Z. HoshidarDin, M. Lang, G. Schiller, P. Szabo, *German Aerospace Center (DLR), Germany*

17.30 → 17.50 “Performance Improvement of (La,Sr)MnO<sub>3</sub>- and (La,Sr)(Co,Fe)O<sub>3</sub>-Type Anode-Supported SOFCs”

V. A.C. Haanappel, J. Mertens, A. Mai, *Forschungszentrum Jülich (FZJ), Germany*

17.50 → 18.10 “Metallic Interconnects for SOFC: Characterisation and Conductivity Evaluation at Operating Temperature of Differently Coated Ferritic Stainless Steels”

P. Piccardo<sup>1</sup>, A. Barbucci<sup>1</sup>, G. Caboche<sup>2</sup>, S. Chevalier<sup>2</sup>, C. Choux<sup>2</sup>, M. R. Pinasco<sup>1</sup>, A. Ubaldini<sup>1</sup>, M. Viviani<sup>3</sup>, <sup>1</sup>*University of Genova, Italy* <sup>2</sup>*Université de Bourgogne, France* <sup>3</sup>*CNR, Italy*

18.10 → 18.30 Conclusive remarks from the chairman

Session 13b *PEMFC System Modeling*

Duration: 16.50 → 18.20

Session Chairs: Frano Barbir, *UNIDO-ICHET, Turkey*

Location: Room B

16.50 → 17.20 *Keynote*

“Fuel Cell and Stack Models for Dynamic System Simulation Tools”

R. M. Moore, *Hawaii Natural Energy Institute, SOEST, University of Hawaii, USA*

17.10 → 17.30 “Dynamic Modeling of a PEFC System: Heat Management Considerations”

C. Graf<sup>1</sup>, N. Nicoloso<sup>2</sup>; A. K. Friedrich<sup>1</sup>, <sup>1</sup>*German Aerospace Center, Germany* <sup>2</sup>*TU Darmstadt, Germany*

17.30 → 17.50 “Control-Oriented Modeling and Analysis of Air Supply System for Fuel Reforming Fuel Cell (FC) Vehicle”

N. Romani, D. Beauvois, E. Godoy, V. Le Lay, *Renault / Ecole Supérieure d'Electricité (Supélec), France*

17.50 → 18.10 “Modelling of an Indirect Diesel Proton Exchange Membrane Fuel Cell (PEMFC) System for a Marine Application”

M. B. V. Virji<sup>1</sup>, R. M. Moore<sup>1</sup>, P. L. Adcock<sup>2</sup>, J. B. Lakeman<sup>3</sup>, <sup>1</sup>*University of Hawaii at Manoa, USA* <sup>2</sup>*Intelligent Energy Ltd, UK* <sup>3</sup>*Dstl Porton Down, UK*

### **POSTER SESSION 3**

Please note that the number indicated for each poster (i.e. pos#xx, where xx is a number) identifies where the poster is located. The number indicated corresponds to a panel in the room where the poster session will take place.

#### **Anode, Cathode and Electrolyte SOFC Materials**

**POS#01** “Structure and Conductivity Studies of Electrodeposited delta-Bi<sub>2</sub>O<sub>3</sub>”. Yamin Leprince-Wang, Arnaud Helfen, LPMDI, *Université de Marne la Vallée, France*.

**POS#02** “Ceria-Based Thin Films and Polycrystalline Materials For SOFCs”. Gaetano Chiodelli<sup>1</sup>, Monica Fabrizio<sup>1</sup>, Sergio Daolio<sup>1</sup>, Simona Barison<sup>1</sup>, Lorenzo Malavasi<sup>2</sup>, Eliana Quartarone<sup>2</sup>, Cristina Tealdi<sup>2</sup>, Vincenzo Massarotti<sup>1,2</sup>, PierCarlo Mustarelli<sup>1,2</sup>, Filippo Maglia<sup>1,2</sup>,<sup>1</sup> *CNR - IENI, Italy*,<sup>2</sup> *University of Pavia, Italy*.

**POS#03** “Production and Characterization of Co-Sintered NiO/8YSZ – 8YSZ Laminates for SOFC Applications”. Dario Montanaro<sup>1</sup>, Thomas Zandonella<sup>1</sup>, Vincenzo M. Sglavo<sup>1</sup>, Massimo Bertoldi<sup>2</sup>,<sup>1</sup> *Università degli Studi di Trento, Italy*,<sup>2</sup> *Eurocoating SpA, Italy*.

**POS#04** “Performance of Anode-supported Solid Oxide Fuel Cell with (La,Sr)MnO<sub>3</sub> Cathode Modified by Sol-gel Coating Technique”. Mohsen Saremi, Sahar Afroukhteh, Maryam Ferdowsi B. O., *Tehran University, Iran*.

**POS#05** “Comparison of The Properties of Plasma Sprayed Ni-YSZ as an Anode for Solid Oxide Fuel Cells”. Mohsen Saremi, Maryam Ferdowsi B. O., Sahar Afroukhteh, *Tehran University, Iran*.

**POS#06** “Materials selection for solid oxide fuel cells (SOFCs) systems”. Nacéra Larbi<sup>1</sup>, Amine Boudghene Stambouli<sup>1</sup>, E. traversa<sup>2</sup>,<sup>1</sup> *University of Sciences and Technology of Oran (USTO), Algeria*,<sup>2</sup> *University of Roma "Tor Vergata", Italy*.

**POS#07** “Investigation on Properties of Yttria Stabilized Bismuth Oxide for Composite Cathodes”. Behzad Mirfakhraei, Babak Raissi Dehkordi, Amir Maghsoudipour, Fattolah Moztarzadeh, *Materials & Energy Research Center (MERC), Iran*.

**POS#08** “Optimization of IT-SOFC with Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3</sub> Cathode”. Zaoshu Duan, Aiyu Yan, Baofeng Tu, Mojie Cheng, *Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China*.

**POS#09** “Synthesis and Characterization of La<sub>1-x</sub>Sr<sub>x</sub>CrO<sub>3</sub> and Ruthenium Modified La<sub>1-x</sub>Sr<sub>x</sub>CrO<sub>3</sub>”. Aiyu Yan, Bin Liu, Baofeng Tu, Yonglai Dong, Mojie Cheng, *Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China*.

**POS#10** “Synthesis and Chemical Compatibility between Yttria Stabilised Zirconia and La<sub>0.7</sub>Sr<sub>0.3</sub>Cr<sub>0.93</sub>Ru<sub>0.07</sub>O<sub>3</sub> for IT-SOFC Applications”. Lionel Combemale<sup>1</sup>, Gilles Caboche<sup>2</sup>, Olivier Heintz<sup>2</sup>, Real Roberge<sup>3</sup>, Sylvio Savoie<sup>3</sup>,<sup>1</sup> *University of Burgundy, France*,<sup>2</sup> *Université de Bourgogne - LRRS, France*,<sup>3</sup> *Hydro-Québec, France*.

**POS#11** “Nano-sized Mixed Oxides as Anodes for SOFC”. Loreto Daza, Araceli Fuerte, Rita X. Valenzuela, *CIEMAT, Spain*.

**POS#12** “Yttrium-Doped Barium Zirconates and Barium Cerates as Electrolyte Proton-Conductive Materials for Protonic Ceramic Fuel Cells (PCFCs)”. Stephanie Higgins, Nigel Sammes, Alevtina Smirnova, *University of Connecticut, USA*.

**POS#13** “Synthesis and Electrical Conductivity of Gd-doped BaPrO<sub>3</sub> Powders”. A. Magraso<sup>1</sup>, X.G. Capdevila<sup>1</sup>, F. Espiell<sup>1</sup>, M. Segarra<sup>1</sup>, John T.S. Irvine<sup>2</sup>, Purdie Building<sup>3</sup>,<sup>1</sup> *DIOPMA Center, University of Barcelona, Spain*,<sup>2</sup> *School of Chemistry, UK*,<sup>3</sup> *University of St. Andrews, UK*.

**POS#14** “Electrical Properties of Gd Doped Ceria Bases Composite and Stability of Material”. Santosh M. Bobade, *Indian Institute of Technology Bombay, India.*

**POS#15** “Preparation and Electrical Properties of Intermediate Temperature One Chamber Solid Oxide Fuel Cells Based on Ceria Electrolytes”. Salvador Piñol<sup>1</sup>, Xavier Capdevila<sup>1</sup>, Merçé Segarra<sup>2, 1</sup> *ICMAB-CSIC, Spain,*<sup>2</sup> *Universitat de Barcelona, Spain.*

**POS#16** “La<sub>2-x</sub>Sr<sub>x</sub>NiO<sub>4+d</sub> (x = 0-0.1) mixed conductors as cathodes for intermediate temperature solid oxide fuel cells”. Ainara Agüadero<sup>1</sup>, Marta Pérez<sup>1</sup>, José Antonio Alonso<sup>2</sup>, María José Escudero<sup>1</sup>, Loreto Daza<sup>2, 1</sup> *CIEMAT, Spain,*<sup>2</sup> *Instituto de Ciencia de Materiales de Madrid (CSIC), Spain.*

### **SOFC Materials for Stack Assembly**

**POS#17** “Oxidation and Electrical Conductivity of Stainless Steels with Ni, Co and Mn Coatings”. Kim Yeong Woo, *RIST, South Korea.*

**POS#18** “Active Metal Brazing for Anode Supported Tubular Solid Oxide Fuel Cells”. Arunabh Basak, Peter Menard, Nigel Sammes, *University of Connecticut, USA.*

**POS#19** “Glass-Ceramic Sealants for Solid Oxide Fuel Cells”. Alessandra Sanson, Andreana Piancastelli, Edoardo Roncari, *CNR - ISTE, Italy.*

**POS#20** “A High Temperature Sealing Material for SOFC Applications”. John Hoyes, *Flexitallic Ltd, UK.*

**POS#21** “Protective Coatings of Metallic Interconnects for IT-SOFC Application”. Massimo Bertoldi<sup>1</sup>, Thomas Zandonella<sup>1</sup>, Dario Montanaro<sup>2</sup>, Vincenzo M. Sglavo<sup>2</sup>, Alessio Fossati<sup>3</sup>, Alessandro Lavacchi<sup>3</sup>, Carlo Gialli<sup>3</sup>, Ugo Bardi<sup>3, 1</sup> *Eurocoating SpA, Italy,*<sup>2</sup> *Università degli Studi di Trento, Italy,*<sup>3</sup> *Università degli Studi di Firenze, Italy.*

### **MEAs for PEMFC/DMFC**

**POS#22** “Membrane Electrode Assembly for Polymer Electrolyte Fuel Cell Using Sulfonated Poly (ether sulfone)”. Hyoung-Juhn Kim, Nambi Krishnan, Mani Prasanna, EunAe Cho, Seong-Ahn Hong, In-Hwan Oh, Tae-Hoon Lim, *Korea Institute of Science and Technology, Korea.*

**POS#23** “Synthesis and Performance of Phosphotungstic Acid Modified New Sulfonated Copolyimides for PEMFC”. J. Alberto Blázquez, *Basque Country University, Spain.*

**POS#24** “Aqueous Deposition of Metals on MWCNT to be Used as Electrocatalyst for PEM Fuel Cells”. Ysmael Verde<sup>1</sup>, Arturo Keer<sup>2</sup>, Mario Miki<sup>2</sup>, Francisco Paraguay<sup>2</sup>, Gabriel Alonso<sup>2</sup>, Sergio Gamboa<sup>3</sup>, Miguel Avalos<sup>4, 1</sup> *Instituto Tecnológico de Cancún, Mexico,*<sup>2</sup> *CIMAV, Mexico,*<sup>3</sup> *CIE-UNAM, Mexico,*<sup>4</sup> *Centro de Ciencias de la Materia Condensada-UNAM, Mexico.*

**POS#25** “Cold-Plasma Modification of Carbon Black Used as a Catalyst for Oxygen Reduction in PEMFCs”. Salvador Borrós, Núria Tricás, Juan Herranz, *Institut Químic de Sarrià-Universitat Ramon LLull, Spain.*

**POS#26** “Preparation of Highly Stable Ion Exchange Membranes by Radiation-Induced Graft Copolymerization of Styrene and Bis(vinyl phenyl)ethane into Crosslinked Polytetrafluoroethylene Films”. Tetsuya Yamaki<sup>1</sup>, Masaru Yoshida<sup>1</sup>, Masaharu Asano<sup>1</sup>, Jun-ichi Tsukada<sup>2</sup>, Ryo-ichi Katakai<sup>2, 1</sup> *Japan Atomic Energy Research Institute, Japan,*<sup>2</sup> *Gunma University, Japan*

**POS#27** “Plasma Surface Modification of Carbon Electrodes for Polymer Electrolyte Fuel Cells”. K.-F. Chiu, *Feng Chia University, Taiwan.*

**POS#28** “Electrodeposition and Sputter Deposition of Platinum Nanoparticles on Gas Diffusion Layers”. Leonardo Giorgi<sup>1</sup>, Luciano Pilloni<sup>1</sup>, Rossella Giorgi<sup>1</sup>, Emanuele Serra<sup>1</sup>, Marco Alvisi<sup>2</sup>, Giovanna Galtieri<sup>2</sup>, Alessia Cemmi<sup>3</sup>, Claudia Paletti<sup>4</sup> Mauro Pasquali<sup>4</sup>.<sup>1</sup> *ENEA Casaccia Research Center, Italy*,<sup>2</sup> *ENEA Brindisi Research Center, Italy*,<sup>3</sup> *ENEA Casaccia Research Center, IDROCOB, Italy*,<sup>4</sup> *University of Rome “La Sapienza”, Italy*

**POS#29** “Evaluation of Catalytic Activity of PEMFC Catalysts Using Rotating Disk Electrode”. Alevtina Smirnova, *University of Connecticut, USA*.

**POS#30** “Composite Proton Conducting Membranes for Medium and Low Temperature Fuel Cells”. Patrizia Bocchetta, Francesca Conciauro, Francesco Di Quarto, *Università di Palermo, Italy*.

**POS#31** “Self-Assembly of Pt-PDDA Nanoparticle/Nafion Membrane for Direct Methanol fuel Cells”. San Ping Jiang, *Nanyang Technological University, Singapore*.

**POS#32** “Preparation and Characterization of Pt/SFMCMB Electrocatalysts”. Rong-Li Jia<sup>1</sup>, Cheng-Yang Wang<sup>1</sup>, Bin Zhu<sup>2</sup>,<sup>1</sup> *Tianjin University, China*,<sup>2</sup> *Royal Institute of Technology (KTH), Sweden*.

**POS#33** “Catalysts and Performances for Direct Methanol Low Temperature (300 to 600 °C) Ceramic Fuel Cells”. Bo Feng<sup>1</sup>, Cheng-Yang Wang<sup>1</sup>, Bin Zhu<sup>2</sup>,<sup>1</sup> *Tianjin University, China*,<sup>2</sup> *Royal Institute of Technology (KTH), Sweden*

**POS#34** “Polyaniline as Catalyst Support in Fuel Cell Technology”. Rimbu Gimi Aurelian<sup>1</sup>, Stamin Ioan<sup>2</sup>, Jackson Cristopher<sup>3</sup>, Scott Keith<sup>3</sup>,<sup>1</sup> *National Research Institute for Electrical Engineering*,<sup>2</sup> *University of Bucharest, Romania*,<sup>3</sup> *University of Newcastle upon Tyne, UK*.

**POS#35** “A Novel Acid/Base Multi-Layer Proton Conducting Membranes for Direct Methanol Fuel Cell Application”. H.D. Son, M. S. Cho, Y. Lee, *Sungkyunkwan University, South Korea*.

**POS#36** “Surface Conductivity and Stability of Metallic Bipolar Plate Materials for PEMFC”. Alfonso Pozio, Rodrigo Ferreira Silva, *ENEA CR Casaccia, Italy*.

### **Manufacturing**

**POS#37** “Novel Deposition of Pt/C Nanocatalysts and Nafion Solution on Carbon-based Electrodes via Electrophoretic Process for PEM Fuel Cell”. Rong-Fuh Louh, Hansen Huang, Felix Tsai, *Feng Chia University, Taiwan*.

**POS#38** “Micro-fabrication Techniques for Fuel Cell Manufacturing”. K. P. RAJURKAR, *University of Nebraska, USA*.

**POS#39** “Micro-ElectroChemical Machining (μECM) for Metallic Flow Channels of Fuel Cells”. Shuo-Jen Lee, Chen-De Hsu, Feng-Hui Guan, Shih-Wei Chung, *Department of Mechanical Engineering, Yuan Ze University, Taiwan*.

**POS#40** “Modeling of a Casting System for Power Law Materials used for PEM Fuel Cell Membranes”. Tequila A.L. Harris, Daniel Walczyk, *Rensselaer Polytechnic Institute, USA*.

### **Experimental Activities and Testing**

**POS#41** “Development of Testing Facilities for PEM Fuel Cells up to 25 kW”. Belén Sarmiento, Covadonga García, Inmaculada González, Enrique Moreno, *Hynergreen, Hynergreen Technologies, S.A., Spain*.

**POS#42** “Laboratory Stack Testing of Tubular Solid Oxide Fuel Cells”. William Holden, Nigel Sammes, Jakub Pusz, *CT Global Fuel Cell Center/University of Connecticut, USA*.

**POS#43** “Inhomogeneous Compression of Gas Diffusion Backing under Flow-Field Plates”. Tero T. Hottinen, Mikko S. Mikkola, Olli P. Himanen, Iwao Nitta, *Helsinki University of Technology, Finland*.

**POS#44** “Characterisation of Fuel Cells and Fuel Cell Systems Using 3D X-Ray Tomography”. Stefan Griesser, Gerhard Buchinger, Thomas Raab, Dieter Meissner, *Upper Austrian University of Applied Science: Eco Energy, Austria*.

**POS#45** “IT-SOFC Operated with Catalytically Processed Methane Fuels”. Baofeng Tu, Aiyu Yan, Yonglai Dong, Mojie Cheng, Qin Xin, *Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China*.

**POS#46** “Measurement of SOFC System Flow Rate by Tracer Gas Method”. Masatsugu Amano, Ken Kato, Ken Nozaki, Akira Negishi, Tohru Kato, Akihiko Momma, Takeo Honda, Kiyonami Takano, Toshinori Kashihara, Yoko Imura, Miwako Kobayashi, Miki Yoshihara, *National Institute of Advanced Industrial Science and Technology(AIST), Japan*.

**POS#47** “Design and Testing of Ejectors for Hybrid Systems”. Mario Ferrari, Davide Bernardi, Aristide Massardo, *University of Genoa, Italy*.

**POS#48** “Experimental Test Facility for the Analysis of Transient Behaviour of the Air Compression System in Fuel Cell/Gas Turbine Hybrid Plants”. Rodolfo Taccani, Diego Micheli, *University of Trieste, Italy*.

**POS#49** “Hydrogen Sulphide poisoning on Pt in PEMFC”. María José Escudero <sup>1</sup>, Silvia Jiménez <sup>2</sup>, Loreto Daza <sup>2, 1</sup>, *CIEMAT, Spain, <sup>2</sup> Instituto de Catálisis y Petroleoquímica (CSIC), Spain*

**POS#50** “Ethanol/Water Mixture Permeation Behavior through Membrane Electrode Assembly (MEA) in PEMFC”. Sotiria Kontou, Ioanna Koutla, Nikolaos Kaklidis, Shuqin Song, Panagiotis Tsiakaras, *University of Thessaly, Greece*

**POS#51** “In Situ Study of Electrochemical Instabilities of a Pt/C Electrode by Means of Membrane Inlet Mass Spectrometry”. Antonio Chaparro <sup>1</sup>, Norbert Mueller <sup>2</sup>, César Atienza <sup>3</sup>, Loreto Daza <sup>4, 1</sup>, *CIEMAT, Spain, <sup>2</sup> Pfeiffer Vacuum, UK, <sup>3</sup> Tecnovac SL, Spain, <sup>4</sup> Instituto de Catálisis y Petroleoquímica (CSIC), Spain*.

**POS#52** “Proton Exchange Membrane Fuel Cell Improvement via Membrane-Electrode Assembly (MEA) Optimization: the Gas Diffusion Layer”. Ione Cendoya, Francisco Alcaide, Larraitz Ganborena, Hans Jurgen Grande, Oscar Miguel, *CIDETEC, Spain*.

**POS#53** “Power Exchanges of Fuel Cell-Ultracapacitor Power Sources Feeding Pulse Loads”. Mario Pagano, Giovanni Velotto, Diego Asprino, Luca Conte, *Department of Electrical Engineering - University of Naples, Italy*.

**POS#54** “High Efficient Thin Metallic Fuel Cell Stacks”. Shuo-Jen Lee, Yu-Pang Chen, Yu-Ming Lee, *Department of Mechanical Engineering, Yuan Ze University, Taiwan*.

**POS#55** “Recent Advances in Direct Alcohol PEMFCs”. Shuqin Song, Panagiotis Tsiakaras, *University of Thessaly, Greece*.