

Lucerne FUEL CELL FORUM 2004

28 June – 2 July 2004, Lucerne / Switzerland

Conference featuring SOFC science and technology:

6th European SOFC Forum

Session Schedule Overview

Day	Time	"A"	"B"	"C"
Monday June 28	10:00 -17:00		Tutorial	
	14:00 -19:00		Poster Pin-up	
	16:00 -19:00		Registration	
	18:00 -19:00		Welcome Reception	
		FCW	6th European SOFC Forum	6th European SOFC Forum
Tuesday June 29	09:00	A01	B01 = A01 Joint Session	
	11:00	A02	B02 Surveys	C02 Stack Materials
	14:00	A03	B03 New IT-SOFC B.C.H. Steele Memorial	C03 Testing 1
	16:00	A04	B04 Alternative SOFCs M. Dokiya Memorial	C04 Testing 2
Wednesday June 30	09:00	A05	B05 Design and Fabrication	C05 Electrolytes 1
	11:00	A06	B06 Component Reliability	C06 Electrolytes 2
	14:00	A07	B07 Operational Experience	C07 Cathodes
	16:00	A08	B08 Poster Session	
Thursday July 1	09:00	A09	B09 = A09 Stationary SOFC Generators (Joint Session)	
	11:00	A10	B10 Fuel Processing	C10 Cathodes and Anodes
	14:00	A11	B11 System Modeling	C11 Anodes
		A12	B12 Stack Modeling	C12 Anodes and Fuels
Friday July 2	09:00	A13	B13 General Modeling	C13 Metal Interconnects
	11:00	A14	B14 = A14 Joint Session	

FCW = THE FUEL CELL WORLD

6th EUROPEAN SOFC FORUM

Oral Presentations

Tuesday, 29 June 2004, 11:00 – 12:30

Session B02 Surveys

SOFC Research in the European Union - The Role of the European Commission

Antonio Paparella

DG Research / European Commission

Progress in SOFC Stack Development at Forschungszentrum Jülich

Robert Steinberger-Wilckens¹, Izaak C. Vinke², Ludger Blum²,
Josef Remmel³, Frank Tietz² and Willem J. Quadackers²

¹PBZ, ²IWV and ³ZAT, Forschungszentrum Jülich, Jülich / Germany

Status and Recent Advances in SOFC Development at Haldor Topsøe/Risø

Niels Christiansen¹, Steen Kristensen¹, Helge Holm-Larsen¹,
Peter Halvor Larsen², Mogens Mogensen², Peter Vang Hendriksen²
and Søren Linderøth²

¹Haldor Topsøe A/S, Lyngby / Denmark

²Risø National Laboratory, Roskilde /Denmark

Low Temperature (300 to 600°C) SOFCs R&D in China

Juncai Sun¹, Zongqiang Mao², Qizhao Lin³, Chengyang Wang⁴ and Bin Zhu⁵

¹Dalian Maritime University, Dalia / P. R. China

²China Association for Hydrogen Energy, Qinghua University, Beijing / P. R. China

³University of Science and Technology of China, Hefei, Anhui / P. R. China

⁴Tianjin University, Tianjin / P. R. China

⁵Royal Institute of Technology (KTH), Stockholm / Sweden

The State of the Art of SOFC Elaboration at the Moscow State Institute of Steel and Alloys (MISA)

Ata Myatiev

The Moscow State Institute of Steel and alloys, Moscow / Russia

U.S. DOE Solid Oxide Fuel Cell Programs

Joseph Strakey¹, Mark Williams², Wayne Surdoval¹ and Subhash C. Singhal³

¹National Energy Technology Laboratory, Pittsburgh, PA / USA

²National Energy Technology Laboratory, Morgantown, WV / USA

³Pacific Northwest National Laboratory, Richland, WA / USA

Tuesday, 29 June 2004, 11:00 – 12:30

Session C02 Stack Materials

Materials Development at Sulzer Hexis for the Provision of a Combined Heat and Power SOFC System

Emad Batawi, Cyril Voisard, Ueli Weissen, Jan Hoffmann, Yvonne Sikora and Jeannette Frei
Sulzer Hexis Ltd., Winterthur / Switzerland

Investigation of Ceramic Adhesive and Glass Composite as a Sealing Material for SOFCs

Apichart Jinnapat¹, Sirithan Jiamsirilert¹ and Sumittra Charojrochkul²

¹Department of Materials, Chulalongkorn University

²National Metal and Materials Technology Center, Pathumthani / Thailand

A Novel Method to Evaluate the Suitability of Sealing Materials for SOFC Stacks

Vincent A. C. Haanappel, Izaak C. Vinke and Hartmut Wesemeyer
IWV-3, Forschungszentrum Jülich, Jülich / Germany

Optimization of Glass Ceramic Sealant for Intermediate Temperature Solid Oxide Fuel Cells

Mette Solvang, Karsten Agersted Nielsen and Peter Halvor Larsen
Risø National Laboratory, Roskilde / Denmark

Chemical Interactions between Glass Ceramic Sealants and High-Chromium-Containing Steel

Sonja-Michaela Gross¹, Reinhard Conradt², Josef Remmel¹, Uwe Reisgen¹ and Pisit Geasee³

¹Central Department of Technology (ZAT), FZ Jülich, Jülich / Germany

²Institute for Mineral Engineering, RWTH Aachen, Aachen / Germany

³Siam Research & Development Co. Ltd., Bangkok / Thailand

Highly Efficient Nano-Porous Insulation in Solid Oxide Fuel Cell Applications

Norbert Schneider
Wacker-Chemie GmbH, Kempten / Germany

Tuesday, 29 June 2004, 14:00 - 15:30

Session B03 New IT- SOFCs
In commemoration of B.C.H. Steele

High Resolution SIMS Analysis of ^{18}O Distributions in Composite ITSOFC Cathodes

John A. Kilner¹, Audrey Esquirol², Nigel P. Brandon² and Richard J. Chater¹

¹Department of Materials, ²Department of Chemical Engineering
Imperial College, London / United Kingdom

Phase Diagrams and Thermodynamic Properties of Materials for Intermediate-Temperature Solid Oxide Fuel Cells

Matsvei Zinkevich, Sandra Geupel, Nuri Solak and Fritz Aldinger
Max-Planck-Institut für Metallforschung, Stuttgart / Germany

Co-Fired LSM Supported Thin-Film SOFCs with Infiltrated Catalysts

Keiji Yamahara, Lutgard C. De Jonghe, Craig P. Jacobson
and Steven J. Visco
Lawrence Berkeley National Laboratory, Berkeley, CA / USA

Alloy Supported Thin-Film SOFCs

Lutgard C. De Jonghe, Craig P. Jacobson and Steven J. Visco
Lawrence Berkeley National Laboratory, Berkeley, CA / USA

Intermediate Temperature Stack Operation Using Lanthanum Gallate Electrolyte System

Singaravelu Elangovan, Brian Heck, Shekar Balagopal, Insoo Bay
and Dennis Larsen
Ceramatec, Inc., Salt Lake City, UT / USA

Analysis of Methane-Fed SOFC Devices Based on Scandia-Doped Zirconia Electrolyte for Intermediate Temperature Operation

Massimiliano Lo Faro, Roberto Bonfiglio, Daniela La Rosa, Laura R. Gullo,
Vincenzo Antonucci and Antonio S. Aricò
CNR-ITAE Institute, IT-98126 Messina / Italy

Tuesday, 29 June 2004, 14:00 - 15:30

Session C03 Testing 1

SOFC Durability Test Stand Design Challenges and Processes

Joshua S. Gannon, Margaret Bailey, David White and Richard Yang
Rochester Institute of Technology, Rochester, NY / USA

Application of HIL Test Bench for SOFC System Development

Erich Ramschak, Herbert J. Thanner, Martin Schuessler and Peter Prenninger
AVL List GmbH, Fuel Cell Systems, Graz / Austria

Characterization of the Cathode-Electrolyte Interface of VPS SOFC

Andreas O. Störmer and Stephan Maier
BMW Group, Powertrain and Chassis Systems, München / Germany

Characterisation of Vacuum Plasma Sprayed Planar Solid Oxide Fuel Cells on Porous Metallic Substrates

Michael Lang, Thomas Franco, Günter Schiller and Patric Szabo
Deutsches Zentrum für Luft- und Raumfahrt (DLR), Stuttgart / Germany

Electrochemical Characteristics of $\text{Ce}_{1-x}\text{Gd}_x\text{O}_{2-\delta}$ | $\text{La}_{1-x}\text{Sr}_x\text{CoO}_{3-\delta}$ + $\text{Ce}_{1-x}\text{Gd}_x\text{O}_{2-\delta}$ Half-Cell

Gunnar Nurk, Silvar Kallip, Indrek Kivi, Priit Möller and Enn Lust
Institute of Physical Chemistry, University of Tartu, Tartu / Estonia

Oxidation Behaviour of Iron-Chromium Steels for Solid Oxide Fuel Cell Interconnect

Thomas Fich Pedersen¹, Joachim Laatsch² and Søren Linderøth¹
¹Risø National Laboratory, Roskilde / Denmark
²Forschungszentrum Jülich, Jülich / Germany

Tuesday, 29 June 2004, 16:00 - 17:30

Session B04 Alternative SOFCs
In commemoration of M. Dokiya

Direct Methane Protonic Ceramic Fuel Cells

W. Grover Coors
Protonetics/CoorsTek, Golden, CO 80401 / USA

Anode-Supported Tubular SOFC Systems: Fabrication and Properties

Yanhai Du, Brian Eberly and Nigel M. Sammes
Connecticut Global Fuel Cell Center, University of Connecticut, Storrs, CT / USA

Compact 100 W Stacks Using Thin Components of Anode-Supported Cells and Metal Interconnect Sheets

Michele Molinelli¹, Diego Larrain¹, Nordahl Autissier¹, Raphaël Ihringer², Josef Sfeir², Nicolas Badel², Olivier Bucheli² and Jan Van herle¹

¹Laboratory of Industrial Energy Systems, EPFL, Lausanne / Switzerland

²HTceramix S.A., Yverdon-les-Bains / Switzerland

Solid Oxide Fuel Cell Stack with Floating External Manifold

Athal Christie, Luis Figueroa, Jen-Jung Fan and Brett Wightman
Global Thermoelectric Inc., Calgary, Alberta / Canada

Direct Flame Fuel Cells – SOFC Operation with Combustion Flames

Michio Horiuchi, Shigeaki Suganuma, Misa Watanabe and Yasue Tokutake
Shinko Electric Industries Co., Ltd, Nagano, 381-0014 / Japan

Compact SPIROCELL[®] Stacks with Electrochemical Seals

Beat Gut, Thomas Strittmatter and Ulf Bossel
Fucellco AG, Mägenwil / Switzerland

Tuesday, 29 June 2004, 16:00 - 17:30

Session C04 Testing 2

The Determination of the Mechanical Integrity of Ceramic-to-Metal Braze-Joints in SOFC Interconnect Applications

Arunabh Basak, Ray England and Nigel Sammes
Connecticut Global Fuel Cell Center, University of Connecticut, Storrs, CT / USA

Break Down of Losses in Thin Electrolyte SOFCs

Rasmus Barfod, Anke Hagen, Severine Ramousse, Peter V. Hendriksen and Mogens Mogensen
Risø National Laboratory, Roskilde / Denmark

Set-up for Direct Manipulation of T-Distribution in an Operating SOFC-Cell

Martin Schuessler, Erich Ramschak and Peter Prenninger
AVL LIST GmbH, Graz / Austria

Resistance Distribution in Thin Solid Oxide Fuel Cells

San Ping Jiang
Nanyang Technological University, Singapore /Singapore

SOFC Cell Characteristics along the Flow Path

Patrick Metzger¹, Günter Schiller¹ and Andreas O. Störmer²
¹German Aerospace Center (DLR), DE-70569 Stuttgart / Germany
²BMW Group, Power Train and Suspension Systems, München / Germany

Electrode Activation and Passivation of Solid Oxide Fuel Cell Electrodes

Søren Koch¹, Peter Vang Hendriksen¹, Mogens Mogensen¹, Nico Dekker² and Bert Rietveld²
¹Risø National Laboratory, Roskilde / Denmark, ²Energy Research Centre of the Netherlands (ECN), Petten / The Netherlands

Wednesday, 30 June 2004, 09:00 – 10:30

Session B05 Design and Fabrication

Integrated Stack Module Development for a 20 kW System

Ludger Blum, Roland Peters, Paul David, Siu Fai Au, Robert Deja and Wilfried Tiedemann
IWV-3, Forschungszentrum Jülich, Jülich / Germany

Engineering and Manufacturing of Fuel Cell Materials such as SOFC Ceramic Tapes and Pastes in an ISO/TS Environment

Alvin H. Feingold, Michael Alan Stein, Richard L. Wahlers and Zak Topka
ESL Electro-Science, King of Prussia, PA 19406 / USA

Anode Substrate Design for RedOx Stable ASE Cells

Gilles Robert¹, Andreas Kaiser¹ and Emad Batawi²

¹Sulzer Innotec, Winterthur / Switzerland

²Sulzer Hexis, Winterthur / Switzerland

Preparation and Characterisation of Porosity-Graded SOFC Anode Substrates

Peter Holtappels¹, Carsten Sorof^{1*}, Maarten Verbraeken^{1**}, Serge Rambert² and Ulrich Vogt¹

¹Swiss Fed. Lab. f. Materials Testing & Research (EMPA), Duebendorf / Switzerland, ²Laboratory for Photonics and Ionics, EPFL, Lausanne / Switzerland, *on leave from University of Applied Sciences Koblenz / Germany, **on leave from University of Twente / The Netherlands

Powder Metallurgical High Performance Materials for

Substrate-Supported IT-SOFCs

Thomas Franco¹, Günter Schiller¹, Wolfgang Glatz² and Georg Kunschert²

¹German Aerospace Center (DLR), Stuttgart / Germany

²Technology Center, Plansee Aktiengesellschaft, Reutte-Tirol / Austria

Conceptual Design Study of a 20 MW CO₂-Separating SOFC/ECAB/GT Plant

Ludger Blum¹, Ahmet Lokurlu¹, Ernst Riensche¹, Alfred Vitale¹, Knut Bakke², Wolfgang Heidug³, Kuei-Jung Li⁴ and Joep P.P. Huijsmans⁵

¹IWV-3, Forschungszentrum Jülich, Jülich / Germany

²Shell Technology Norway AS, ³Shell International Exploration and Production B.V., The Netherlands,

⁴Shell Global Solutions International B.V., The Netherlands. ⁵Shell Hydrogen B.V., The Netherlands

Wednesday, 30 June 2004, 09:00 – 10:30

Session C05 Electrolytes 1

Novel Electrolyte Proton-Conductive Materials for Protonic Ceramic Fuel Cells (PCFCs)

Alevtina L. Smirnova and Nigel M. Sammes

Connecticut Global Fuel Cell Center, University of Connecticut, Storrs, CT / USA

Synthesis by Sol-Gel Route of the Apatite-Type Systems for Applications as Electrolytes in Solid Oxide Fuel Cells Systems

Stéphane Célérier¹, Christel Laberty-Robert¹, Florence Ansart¹ and Philippe Stevens²

¹CIRIMAT/LCMIE, Université Paul Sabatier, Toulouse / France

²EDF-EIFER, Centre de Recherches de Karlsruhe, Karlsruhe / Germany

Suitability of LAMOX Family Compounds for Solid Oxide Fuel Cell Electrolyte Applications

Alberto Tarancón¹, Truls Norby², Guilhem Dezanneau¹, Alejandro Morata¹, Francesca Peiró¹ and Joan R. Morante¹

¹ Department of Electronics, University of Barcelona, Barcelona / Spain

² Department of Chemistry, University of Oslo, Oslo / Norway

Novel Hybrid Conductors Based on Doped Ceria and BCY20 for ITSOFC Applications

Bin Zhu^{1,2}, Xiangrong Liu² and Tilman Schober³

¹Royal Institute of Technology (KTH), Stockholm / Sweden

²Goeta Technology Developer International, Solna / Sweden

³IFF, Forschungszentrum Jülich, Jülich / Germany

Electrolyte-Supported Cells: Progress through Electrolyte Development

Marco Kellner¹, Thomas Betz¹, Mihail Kuznecov² and Nikolai Trofimenko²

¹Kerafol GmbH, Eschenbach / Germany

²FhI for Ceramic Technologies and Sintered Materials, Dresden / Germany

New Method to Prepare Electrolytes for SOFC

Mercè Segarra¹, Xavier G. Capdevila¹, Jaume Folch² and Salvador Piñol³

¹Chemical Engineering and Metallurgy, University of Barcelona, Barcelona / Spain

²Engineering and Electronic Materials, University of Barcelona, Barcelona / Spain

³Ciència de Materials de Barcelona, Campus de la UAB, Barcelona / Spain

Wednesday, 30 June 2004, 11:00 – 12:30

Session B06 Component Reliability

080 Component Reliability in Solid Oxide Fuel Cell Systems for Commercial Operation (“CORE-SOFC”)

Frank Tietz

IWV-1, Forschungszentrum Jülich, Jülich / Germany

116 Solid Oxide Fuel Cell Performance under Severe Operating Conditions

Søren Koch¹, Peter Vang Hendriksen¹, Mogens Mogensen¹, Nico Dekker², Bert Rietveld², Bert de Haart³ and Frank Tietz³

¹Risø National Laboratory, Roskilde / Denmark, ²Energy research Centre of the Netherlands (ECN), ZG Petten / The Netherlands, ³Forschungszentrum Jülich, IWV-1, Jülich / Germany

054 Development and Testing of IP-SOFCs to Demonstrate Component Reliability

Robert Cunningham

Rolls-Royce Fuel Cell Systems Ltd., Derby / United Kingdom

073 Evaluation of Interconnect Alloys and Cathode Contact Coatings for SOFC Stacks

Nico Dekker¹, Bert Rietveld¹, Joachim Laatsch² and Frank Tietz²

¹Energy Research Centre of the Netherlands, Petten / The Netherlands

²Forschungszentrum Jülich GmbH, Jülich / Germany

084 Curvature of Planar Solid Oxide Fuel Cells during Assembling and Cooling of Stacks

Jürgen Malzbender, Takahashi Wakui, Robert W. Steinbrech and Lorenz Singheiser

IWV-2, Forschungszentrum Jülich, Jülich / Germany

001 Critical Cracks in the Vicinity of Sealing Joints?

Axel Müller¹, Wilfried Becker², Detlef Stolten³, L.G.J. (Bert) de Haart³ and Rolf W. Steinbrech³

¹Universität Siegen, ²Technische Universität Darmstadt and ³FZ Jülich / Germany

Wednesday, 30 June 2004, 11:00 – 12:30

Session C06 Electrolytes 2

Study of the Electrical Properties of Bismuth Oxide doped Scandia-stabilized Zirconia

Sapna Sarat¹, Nigel M. Sammes¹ and Osamu Yamamoto²

¹Connecticut Global Fuel Cell Center, University of Connecticut, Storrs, CT / USA, ²on leave from Mie University, Tsu / Japan

On the Dopant Influence on the Zirconia Ionic Conduction Using Molecular Dynamics Simulations

Alberto Tarancón, Alejandro Morata, Guilhem Dezanneau, Francesca Peiró and Joan R. Morante
Department of Electronics, University of Barcelona, Barcelona / Spain

Property-Application-Correlation between SOFC Electrolyte Materials and Wet Coating Technologies

Friederike Lange, Oliver Richter, Norbert H. Menzler and Hans Peter Buchkremer
IWV-1, Forschungszentrum Jülich, Jülich / Germany

Interface Stability Studies: $\text{La}_{0.8}\text{Sr}_{0.2}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_3$ / $\text{La}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_{3-x}$ Electrode

Elena Roda¹, Agusti Sin², Evgeny Kopnin², Yuri Dubitsky², Antonio Zaopo² and Claudio-Maria Mari³
¹CORIMAV, Milan / Italy, ²Pirelli Labs S.p.A., Material Innovation, Milan / Italy, ³Univ. Milano-Bicocca, Dipartimento di Scienza dei Materiali, Milan / Italy

Preparation and Characterization of Scandia-Stabilized Zirconia by Ultrasonic Spray Pyrolysis Method for Membranes in Solid Oxide Fuel Cell

Dong-Hyun Peck¹, Ken-Woo Park¹, Rak-Hyun Song¹, Jong-Hee Kim¹, Dong-Ryul Shin¹, Doo-Hwan Jung¹ and Klaus Hilpert²

¹Korea Institute of Energy Research (KIER),

Grain Growth and Stability of Microstructures of Nanocrystalline CGO Thin Films Prepared by Spray Pyrolysis

Jennifer L. M. Rupp and Ludwig J. Gauckler

Nonmetallic Inorganic Materials, ETH Zurich, Zurich / Switzerland

Wednesday, 30 June 2004, 14:00 – 15:30

Session B07 Operational Experience

Operation of CFCL's All-Ceramic Stack Technology

Jon Love and Raj Ratnaraj
Ceramic Fuel Cells Ltd., Noble Park / Australia

An Intermediate Report on the Way to a Near-Series Sulzer Hexis Fuel Cell System

Alexander Schuler
Sulzer Hexis Ltd, Winterthur / Switzerland

Operation of SOFCs with Nickel Cermet Anodes on Methane

Jochen Latz, Christian Mallon and Kevin Kendall
Chemical Engineering, University of Birmingham, Edgbaston / United Kingdom

Operation and Analysis of SOFCs in Steam Electrolysis Mode

Singaravelu Elangovan¹, Joseph Hartvigsen¹, James E. O'Brien², Carl M. Stoots², J. Stephen Herring²
and Paul A. Lessing²

¹Ceramatec, Inc. Salt Lake City, UT / USA

²Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID / USA

High Temperature Electrolysis of Water in a "Reversible" Solid Oxide Fuel Cell

Olga A. Marina, Andre Leonide and Larry R. Pederson
Pacific Northwest National Laboratory, Richland, WA / USA

Development of Anode-Supported Planar SOFC with Metallic Interconnectors Operated at Reduced Temperature

Kei Ogasawara, Yoshitaka Baba, Kenjiro Fujita, Harukuni Kameda, Hisataka Yakabe, Yoshio
Matsuzaki and Teruhiro Sakurai
Tokyo Gas Co., Ltd., Tokyo / Japan

Wednesday, 30 June 2004, 14:00 – 15:30

Session C07 Cathodes

Microelectrode Impedance Study of Mixed-Conducting Cathode Materials

Frank Baumann, Jürgen Fleig and Joachim Maier
Max-Planck-Institute for Solid State Research, Stuttgart / Germany

Cathode Polarisation Resistances: A Modelling Approach

Sven Schäfer, Albert Krügel, Ellen Ivers-Tiffée and Markus Haschka
Universität Karlsruhe, Karlsruhe / Germany

Performance Improvement of (La,Sr)MnO₃-Based Anode-Supported Solid Oxide Fuel Cells

Josef Mertens, Vincent A. C. Haanappel, Dirk Rutenbeck, Hans Peter Buchkremer and Detlev Stöver
IWW-1, Forschungszentrum Jülich, Jülich / Germany

Systematic Analysis of Some Medium-Temperature Half-Cells for SOFC

Enn Lust, Gunnar Nurk, Silvar Kallip, Indrek Kivi, Priit Möller, Priit Nigu and Alar Jänes
Institute of Physical Chemistry, University of Tartu, Tartu / Estonia

Ultra-Thin Membranes on Porous Ceramic Substrates for Oxygen Separation

Vincent Fauchaux, Stéphane Pignard, Jean-Luc Deschanvres and Marc Audier
Laboratoire des Matériaux et Génie Physique, St Martin d'Hères Cedex / France

Study on Sm_{0.5}Sr_{0.5}CoO₃ with Ag Addition for IT-SOFC

Zhe Lu¹, Yan Li¹, Xiqiang Hunag¹ and Wenhui Su^{1,2,3}
¹Harbin Institute of Technology, Harbin / P.R. China, ²Jilin University, Changchun / P.R. China,
³Academia Sinica, Shenyang / P.R. China

Thursday, 01 July 2004, 11:00 – 12:30

Session B10 Fuel Processing

Processing Kerosene for SOFCs

Kevin Kendall¹ and Agata Godula-Jopek²

¹Chemical Engineering, University of Birmingham, Edgbaston / United Kingdom

²Fuel Research, EADS, München /Germany

Perovskite Catalyst for Reforming Diesel Fuel

Michael Krumpelt, Di-Jia Liu and Cecile Rossignol

Argonne National Laboratory, Argonne, IL / USA

Ceria and Zirconia Based Catalysts for Integrated Internal Reforming SOFC

David Chadwick¹, Navadol Laosiripojana¹, Lim Lay Tiang¹ and Alan Atkinson²

Department of ¹Chemical Engineering and ²Department of Materials

Imperial College, London / United Kingdom

Plasma-Assisted Reforming of Some Liquid Fuels into Synthesis Gas

Albin Czernichowski¹, Piotr Czernichowski² and Krystyna Wesolowska¹

¹ECP – GlidArc Technologies, La Ferté Saint Aubin / France

²WESCO, Conroe, Texas / USA

Steam Reforming of Methane over Doped LaCrO₃- and LaFeO₃- Based Perovskites

Alan Atkinson¹, Navadol Laosiripojana² and David Chadwick²

¹Department of Materials and ²Department of Chemical Engineering

Imperial College, London / United Kingdom

Partial Oxidation of Diesel – Procedural Problems and Solutions

Lutz Hartmann, Martin Konrad, Christian Mengel, Klaus Lucka and Heinrich Köhne

Oel-Wärme-Institut gGmbH, Herzogenrath / Germany

Thursday, 01 July 2004, 11:00 – 12:30

Session C10 Cathodes and Anodes

Electrochemical Behaviour of Porous $\text{Ln}_2\text{NiO}_{4+\delta}$ Electrodes

Cécile Lalanne¹, Fabrice Mauvy¹, Jean-Marc Bassat¹, Jean-Claude Grenier¹, Patrice Dordor¹ and Philippe Stevens²

¹ICMCB – CNRS, Pessac / France

²EDF – EifER, Karlsruhe / Germany

Theoretical Calculation of the Electrical Potential at the Electrode/Electrolyte Interfaces of Solid Oxide Fuel Cells

Ismail Celik, Maria D. Salazar-Villalpando and Suryanarayana Raju Pakalapati

West Virginia University, Morgantown, WV / USA

Mathematical Model for Evaluating a Reaction Process of the SOFC - Air Electrode and Electrolyte Interface -

Seiji Yoneda and Yoshihiro Ohno

Kanagawa University, Yokohama / Japan

Analysis of the Structure-Property Correlation of SOFC Electrode

Hwa Young Jung, Joosun Kim, Hae-Weon Lee, Huesup Song and Jong-He Lee

Korea Institute of Science and Technology, Seoul / Korea

Synthesis of Nano-Structured SDC Based on Cermet Materials for SOFC Anode Using a Hybrid Organic/Inorganic Route

I-Ming Hung¹, Yeong Yoo², Isobel Davidson² and Min-Hsiung Hon¹

¹National Cheng Kung University, Tainan / Taiwan

²National Research Council of Canada, Ottawa, ON / Canada

Intermediate-Temperature Direct Electrochemical Oxidation of Methane at Oxide Based Anodes

Antonino S. Aricò¹, Laura R. Gullo¹, Daniela La Rosa¹, Vincenzo Antonucci¹, Agusti Sin² and Yuri Dubitsky²

¹CNR-ITAE Institute, Messina / Italy

²Pirelli Labs S.p.A., Material Innovation, Milan / Italy

Thursday, 01 July 2004, 14:00 – 15:30

Session B11 System Modeling

Application of Fuel Cell Systems on Board of Seagoing Ships

Janina Thormann¹, Holger Watter and Wolfgang Winkler

Fuel Cell Laboratory and ¹Institute for Ship Operation, Sea Transport and Simulation, University of Applied Sciences Hamburg, Hamburg / Germany

Design of a 5 kW SOFC-Demonstrator by Means of Dynamic Simulation

Martin Schneider, Oliver Posdziech and Knut Barthel

EBZ Entwicklungs- und Vertriebsgesellschaft Brennstoffzelle, Dresden / Germany

System Optimization for Residential SOFC 5 kW Heat and Electricity Management

Jean-Louis Lilien, Sébastien Lerson and Nicolas Pochet

University of Liege, Liege / Belgium

SOFC + Micro GTE Engine. Effect of Fuel Cell Characteristics on Gas Turbine Design Features

Anatoly V. Soudarev, Andrey A. Suryaninov and Vitaly Yu. Tikhoplav

Ceramic Heat Engine Center, St. Petersburg / Russia

Highly Efficient SOFC Systems with Indirect Gasification

Jürgen Karl and Sotiris Karellas

Technische Universität München, Garching / Germany

Techno-Economic Performance of Solid-Oxide-Fuel-Cell-Based Power Plants

Minas Diacakis, Pericles Pilidis and Richard Hales

Cranfield University, Cranfield, Bedfordshire / United Kingdom

Thursday, 01 July 2004, 14:00 – 15:30

Session C11 Anodes

Strategies for the Development of Alternative SOFC Anodes

John T.S. Irvine

School of Chemistry, University of St. Andrews, Fife / United Kingdom

Electroless Metallization of Fine-Grained Particles

Teimuraz N. Khoperia

Andronikashvili Institute of Physics, Georgian Academy of Sciences, Tbilisi / Georgia

Studies of New Electrolytes and New Anode Materials for SOFC Operated at Intermediate Temperatures (750-800°C) under Hydrogen

Anabelle Brisse, Anne-Laure Sauvet and Christelle Barthet

CEA Le Ripault, Monts / France

Influence of the Operating Conditions on the Direct Electrochemical Oxidation of Methane on Cermet-Based Anodes

Agusti Sin¹, Antonio Zaopo¹, Antonio Arico², Laura Gullo², Daniela La Rosa² and Vincenzo Antonucci²

¹Pirelli Labs S.p.A., Milan / Italy, ²CNR-ITAE, Messina / Italy

Electrochemical Performance of SOFC Anode $\text{La}_2\text{Sr}_4\text{Ti}_6\text{O}_{19.5}$ Prepared by a Sol-Gel Process

Shanwen Tao and John T.S. Irvine

School of Chemistry, University of St. Andrews, Fife / United Kingdom

The Effective Reaction Zone of a Ni-SDC Cermet Anode for SOFC

Hiroshi Fukunaga, Tomohito Ohno and Koichi Yamada

Fine Materials Engineering, Shinshu University, Ueda, Nagano / Japan

Thursday, 1 July 2004, 16:00 – 17:30

Session B12 Stack Modeling

Simulation and Experiment on Heat Transfer in a Micro-Tubular SOFC Stack

Matthew Lockett and Kevin Kendall

Chemical Engineering, University of Birmingham, Edgbaston / United Kingdom

On Mechanical Demands of a SOFC-Stack under Service

Wilfried Becker¹, Jan Wenck², Hubertus Michael Wigger² and Axel Müller²

¹Technische Universität Darmstadt and ²Universität Siegen / Germany

IT DIR-SOFC: Co-Flow vs. Counter-Flow Operation

Patricia Aguiar¹, Claire S. Adjiman^{1,2} and Nigel P. Brandon¹

¹Chemical Engineering and Chemical Technology, ²Process Systems Engineering, Imperial College London, London / United Kingdom

Efficient Modelling of an Integrated Planar SOFC

Ben Todd and John B. Young

Cambridge University Engineering Department, Cambridge / United Kingdom

Integrated Planar Solid Oxide Fuel Cell (IP-SOFC) Coupled to a Reforming Reactor: Simulation Analysis

Paola Costamagna¹, Fabio Cerutti¹, Renzo Di Felice¹, Gerry Agnew², Michele Bozzolo², Robert Collins², Robert Cunningham² and Olivier Tarnowski²

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An Efficient Computational Methodology for Electrochemical and Heat Transfer Analyses of a Planar Solid Oxide Fuel Cell

Yau-Pin Chyou¹, Tsang-Dong Chung², Jong-Sheng Chen¹ and Ri-Fong Shie¹

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Thursday, 1 July 2004, 16:00 – 17:30

Session C12 Anodes and Fuels

Ni-Based Cermet Anodes for IT-SOFC: Stability and Performance with Sulphur-Containing Gaseous Fuels

Manga Venkateswara Rao, Matvei Zinkevich and Fritz Aldinger
Max-Planck-Institut für Metallforschung and Universität Stuttgart / Germany

SOFC Performance with Biomass-Derived Gas

Purusholtman V. Aravind¹, Jan Pieter Ouweltjes², Nico Woudstra¹ and Gijbertus Rietveld²

¹Technical University Delft, Delft / The Netherlands

²Energy Research Centre of the Netherlands (ECN), Petten / The Netherlands

Highly Efficient Conversion of Ammonia in Electricity by Solid Oxide Fuel Cells

Nico Dekker and Bert Rietveld
Energy Research Centre of the Netherlands, Petten / The Netherlands

Multi-Fuel Capability of Solid Oxide Fuel Cells

Kazunari Sasaki, Masanobu Uchimura, Keisuke Shiosaki, Katsushi Susuki, Koji Watanabe, Hajime Kusaba and Yasutake Teraoka
Kyushu University, Fukuoka / Japan

Performance of a Combined Reformer/SOFC System for Aircraft Application

Bettina Lenz¹ and Nicola Bundschuh²

¹Fraunhofer Institute for Solar Energy Systems, Freiburg / Germany

²DLR TT, Stuttgart / Germany

062 Formulating Liquid Hydrocarbon Fuels for SOFCs

Kevin Kendall, John Preece and Gary J. Saunders
University of Birmingham, Edgbaston / United Kingdom

Friday, 2 July 2004, 09:00 - 10:30

Session B13 General Modeling

Simulation of the Reactive Gas Flows in the Porous Structure of an Integrated-Planar Solid Oxide Fuel Cell

Ben A. Haberman and John B. Young

Cambridge University Engineering Department, Cambridge / United Kingdom

Simulation and Investigation of Electrical Performance and Gas Pressure Distributions in a Planar SOFC

Vladimir Ruzhnikov, Vladimir Subbotin, Nikolai Khrumushin and Andrei Gulevich

State Scientific Center of the Russian Federation, Obninsk / Russia

Anode-Supported Model Centered on the Direct Internal Reforming

Bertrand Morel¹, Jérôme Laurencin¹, Yann Bultel² and Florence Lefebvre-Joud¹

¹DRT/DTEN, CEA Grenoble, Grenoble / France

²LEPMI-ENSEEG, Saint Martin d'Hères / France

Part-Load and Load Change Simulation of Tubular SOFC Systems

Bjørn Thorud, Christoph Stiller, Olav Bolland and Håvard Karoliussen

Norwegian University of Science and Technology, Trondheim / Norway

Modeling of Manifold Aerodynamics for Solid Oxide Fuel Cells

Nivat Nakayothinsakul¹, Wassachol Wattana¹, Jarruwat Charoensuk¹ and Sumittra Charojrochkul²

¹King Mongkut Institute of Technology Lad Krabang, Bangkok 10520 / Thailand

²National Metal and Material Technology Center, Pathumthani 12120 / Thailand

FE-Simulations for Optimization of the Thermal Insulation of the Sulzer Hexis SOFC

Thomas Hocker¹, Thomas Zähringer², Daniel Moos² and Alexander Schuler²

¹University of Applied Sciences Winterthur (ZHAW), Winterthur / Switzerland

²Sulzer Hexis AG, Winterthur / Switzerland

Friday, 2 July 2004, 09:00 - 10:30

Session C13 Metal Interconnects

Application of Ferritic Steels in SOFC Stacks

Michael Kuznecov, Klaus Eichler and Peter Otschik
FHI for Ceramic Technologies and Sintered Materials, Dresden / Germany

Examination of Cathode-Metallic Interconnect Interactions and New Alloys for Solid Oxide Fuel Cells

Michael Krumpelt, Tom Kaun and Terry A. Cruse
Argonne National Laboratory, Argonne, IL / USA

Growth Rates and Electrical Conductivity of Oxide Scales on Ferritic Steels Proposed as Interconnect Materials for SOFC

Pawel Huczowski¹, Niels Christiansen², Vladimir Shemet¹, Lorenz Singheiser¹ and Willem J. Quadackers¹

¹IWV-2, Forschungszentrum Jülich, Jülich / Germany

²Haldor Topsøe A/S, Lyngby, Denmark

Characterization of Commercial Ferritic Stainless Steels as Metallic Interconnects for Intermediate Temperature SOFCs Based on Oxidation Behavior of Metallic Substrates and Area Specific Resistance of Oxide Scales

Jeffrey Xie¹, Yeong Yoo¹, Isobel Davidson¹ and Dave Ghosh²

¹National Research Council of Canada, Ottawa, ON / Canada

²National Research Council of Canada, Vancouver, BC / Canada

Powder-Metallurgical Processing and Properties of High Performance Metallic SOFC Interconnect Materials

Wolfgang Glatz, Georg Kunschert and Martin Janousek
Plansee Aktiengesellschaft, Reutte / Austria

Analysis of Metallic Interconnectors for SOFC after Durability Test Operation

Harukuni Kameda¹, Kei Ogasawara¹, Yoshitaka Baba¹, Yoshio Matsuzaki¹, Teruhiro Sakurai¹, Teruhisa Horita², Natsuko Sakai², Harumi Yokokawa², Akihiro Toji³ and Toshihiko Uehara³

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