

SCIENTIFIC PROGRAM

Wednesday July 8, 2015

8:30 – 9:00 Registration

9:00 – 9:15

WELCOME

Dr. M. Marrony, Dr. J. Dailly, EIFER, Germany
Prof. F. Mauvy, Prof. M. Maglione, CNRS-ICMCB, France
Dr. S. Ricote, Colorado School Mines, US



SPECIAL SESSION

FUNDAMENTAL OF PCC

Chairman: Dr. M. Marrony

9:15 – 10:00

KN1 “Materials challenges toward Protonic Ceramics Cells”

Prof. O. Joubert (CNRS-IMN, France)

10:00 – 10:45

KN2 “Strategies for the development of highly conductive and stable solid oxide proton electrolytes”

Prof. P. Tsiakaras, Dr. D. Medvedev (Uni. Thessaly, UK)

10:45 – 11:00

Coffee –Break

11:00 – 11:30

KN3 “Integrated steamer for high temperature water electrolysis test mode”

Dr. R. Ihringer (Faxell, Switzerland)

11:30 – 12:15

KN4 “Proton-conducting ceramic fuel cells: fundamental aspects of carrier transport in electrolyte and cathode materials”

Dr. R. Merkle (MPI, Germany)

12:15 – 13:00

KN5 “Unusually high proton conductivity in highly defected perovskite-type oxide thin films: $Ba_{1-y}Zr_{1-x}Y_xO_{3-\delta}$ ”

Dr. Y. Zenitani (Panasonic, Japan)

13:00 – 14:00

Lunch

SESSION 1

PROTON CONDUCTING CERAMIC- BASED MATERIALS: PERFORMANCES AND INNOVATION

Grain boundary resistance studies, electrolyte doping strategies and novel structure

Chairman: Dr. S. Ricote

14:00 - 14:45

KN6 “Novel Li-based proton conductors”

Prof. S.W. Tao (Uni. Strathclyde, UK)

14:45 - 15:15

O01 “Prospective research of new electrolyte materials for PCFC”

J-M Doux (IMN, F)

15:15 – 15.45

O02 “Effect of transition metal doping on the electrical properties of alkali earth cerates and zirconates”

Y-S. Lee (Uni. Kyushu, JP)

- 15:45 – 16:15 **O03 “Unusual structural features of (La/Ba)₂MO₄ (M=Al, Ga, Si, Ge, Transition metal) Proton Conductors with the β -K₂SO₄ structure”**
P. Slater (Uni. Birmingham, UK)
- 16:15 – 16:30 *Coffee break*
- Chairman: Prof. J. Rozière**
- 16:30 – 17:00 **O04 “Composite protonic conductors based on BaCeO₃ with improved chemical stability and ionic conductivity”**
P. Pasierb (AGH, PL)
- 17:00 – 17:30 **O05 “Effect of Boron additions on the sintering and conductivities of P,Si doped Ba₂M₂O₅ (M=In, Sc)”**
P. Keenan, (Uni. Birmingham, UK)
- 17:30 – 18:00 **O06 “Effect of sintering temperature on the transport properties of ZnO-modified SZY for PCECs”**
Domingo Pérez-Coll (CSIC, SP)
- 18:00 – 18:30 **O07 “Anionic doping F⁻ → O²⁻ of perovskite-related systems as the method of improving ionic conductivity and chemical stability”**
N. Tarasova (Uni. Ural Federal, Russia)
- 18:30 – 20:00 **POSTER SESSION AND APPETIZER**
-

Thursday July 9th, 2015

SESSION 1 (SUITE)

PROTON CONDUCTING CERAMIC- BASED MATERIALS: PERFORMANCES AND INNOVATION

Bulk proton transport mechanism and electrolyte properties

Chairman: Prof. F. Mauvy

- 8:30 – 9:00 **O08 “Characterization of proton conduction in mixed and pure ionic conductors”**
P-M. Geffroy (SPTS Uni. Limoges, F)
- 9:00 – 9:30 **O09 “The influence of quantum effects on the protonic conduction in BaZrO₃”**
F. Briec (Uni. Paris-Saclay, F)
- 9:30 – 10:00 **O10 “On the nature of electronic defects in yttrium doped barium zirconate in oxidizing atmosphere”**
S. Ricote (Colorado School of Mines, US)
- 10:00- 10:30 **O11 “Mechanical properties of fully dense BaZr_{1-x}Y_xO_{3-x/2} electrolyte materials for PCFCs”**
G. Dezanneau (SPMS, F)
- 10:30 – 10:45 *Coffee break*

SESSION 2**PROTON CONDUCTING CERAMIC - BASED SYSTEM: MANUFACTURING STRATEGIES,
SCALING-UP AND INNOVATION****Chairman: Prof. M. Stoukides**

10:45 – 11:30

KN7 “Protonic Ceramic cell: Nano-structuration and tailoring processing”*Prof. E. Traversa. (KAUST, SA): Invited speaker***Novel electrodes architecture**

11:30 – 12:00

O12 “Anodes for proton ceramic fuel cells”*D.P. Fagg (Uni. Aveiro, PO)*

12:00 – 12:30

O13 “Development of oxygen electrodes with integrated current collector for Proton Ceramic Electrolyzer cells”*E. Vollestad (Uni. Oslo, NO)*

12:30 – 13:00

O14 “Development of composite steam electrodes for BCZY based high temperature protonic conducting electrolyzers”*N. Bausa (CSIC, SP)*

13:00 – 14:00

*Lunch***Cell architecture and modeling****Chairman: Dr. J. Dailly**

14:00 – 14:30

O15 “Development of metal supported protonic electrolyzer cells (MSD-PCEC)”*M. Stange (SINTEF, NO)*

14:30 – 15:00

O16 “Modelling and prediction of the deformation during co-sintering of a BCY15_based dual membrane SOFC”*A. Chesnaud (Mines-ParisTech, F)*

15:00 – 15:30

O17 “The evaluation of open-circuit potential in fuel cells and electrolyzers with mixed-conducting electrolyte membranes”*R.J. Kee (Colorado School of Mines, US)*

15:30 – 15:45

*Coffee break***SESSION 3:****PROTON CONDUCTING CERAMIC- BASED SYSTEM: APPLICATIONS AND RELIABILITY:
WHERE WE ARE!****Chairman: Prof. E. Traversa**

15:45 - 16:30

KN8 “Nanostructured Membrane reactors for methane conversion and hydrogen production”*Prof S. Liu (Uni. Curtin, AUS): invited speaker***Fuel Cell**

16:30 – 17:00

O18 “Solid Oxide Fuel Cells based on Lanthanum Tungstate electrolytes”*J.M. Porras-Vasquez (Uni. Malaga, SP)*

- 17:00 – 17:30 **O19 “Electrochemical tests of a dual membrane SOFC in a dedicated 3-chamber set-up”**
D. Masson (Mines-ParisTech, F)
- 17:30 – 18:00 **O20 “Elaboration and electrochemical characterizations of up-scaled protonic Ceramic Cells”**
J. Dailly (EIFER, D)
- 20:00 **GALA DINNER** (Hôtel Mercure Bordeaux cité mondiale)

Friday July 10th, 2015

SESSION 3 (SUITE): **PROTON CONDUCTING CERAMIC- BASED SYSTEM: APPLICATIONS AND RELIABILITY: WHERE WE ARE!**

Hydrogen pumping /Ammonia synthesis

Chairman: Prof. H. Matsumoto

- 9:00 – 9:30 **O21 “H₂- separation of dual-phase BaCe_{1-x}Eu_xO_{3-δ} :Ce_{1-y}Y_yO_{2-δ} (x=0-0.2; y=0-0.2) ceramic membranes”**
M. Balaguer (FZ Jülich, D)
- 9:30 - 10:00 **O22 “Dense composite-ceramic and ceramic_metallic membranes for hydrogen separation”**
W.A. Rosensteel (Colorado School of Mines, US)
- 10:00 – 10:30 **O23 “Hydrogen flux measurements by stoichiometric titration in galvanically driven Cu/BaCe_{0.2}Zr_{0.7}Y_{0.1}O_{2.9}/60Ni-BCZY27 closed-end tubular cells”**
A. Manerbino (CoorsTek, US)
- 10:30 – 10:45 *Coffee Break*

Chairman: Dr. G. Coors

- 10:45 – 11:15 **O24 “High hydrogen permeability and CO₂-resistance of cer-cer composite membranes based on BaCe_{0.65}Zr_{0.2}Y_{0.15}O_{3-δ} and Y_ or Gd-doped CeO₂”**
E. Rebollo (CNR-IENI, I)
- 11:15 – 11:45 **O25 “Solid state ammonia synthesis using a BaCe_{0.2}Zr_{0.7}Y_{0.1}O_{2.9} solid electrolyte and a Ni-BCZY electrode”**
M. Stoukides (CERTH Uni. Thessaloniki, GR)

Hydrogen production

- 11:45 – 12:15 **O26 “The effect of mixed-conductivity on electrolysis cells involving BaCe_xZr_{0.9-x}Y_{0.1}O_{3-δ} (x=0, 0.1, 0.2) protonic-ceramic membranes”**
N.P. Sullivan (Colorado School of Mines, US)

12:15 – 12:45

O27 “Application of $\text{BaCe}_{0.85}\text{Y}_{0.15}\text{O}_{2.925}$ for the development of Fuel Cell operated in reversed Mode”

D. Vladikova (IEES, BG)

12:45 - 14:00

Lunch

14:00 – 16:00

Highlights and discussion

Round-table:

Round-table Chairmen & Scientist Committee: main results and R&D orientations

Organizer Committee: Next steps & conclusion

POSTERS SESSION

Chairman: Prof. G. Taillades

P1: Layered Microstructures based on BaZr_{0.85}Y_{0.15}O_{3-δ} for Proton Ceramic Electrolyzer cells by Pulsed Laser deposition*E. Stefan (Uni. Oslo, NO)***P2: Insights on thermal and transport features of BaCe_{0.8-x}Zr_xY_{0.2}O_{3-δ} proton-conducting materials for electrochemical devices***P. Tskiaras (Uni. Thessaly, GR)***P3: Compensating total conductivity with stability: the transition from cerates to zirconates***P. Tskiaras (Uni. Thessaly, GR)***P4: Assorted cathode materials for BaCe_{0.8-x}Zr_xY_{0.2}O_{3-δ} electrolytes: analysis of thermal properties***P. Tskiaras (Uni. Thessaly, GR)***P5: Phase transition and modified transport numbers in BCZY27***G. Mather (CSIC, SP)***P6: Sol-gel synthesis of SrZr_{0.9}Y_{0.1}O_{3-δ} thin films for protonic ceramic electrolyser membranes***G. Mather (CSIC, SP)***P7: Thermodynamics and stoichiometry relaxation kinetics in materials with three carriers: analytic relations and numerical simulations***R. Merkle (MPI, D)***P8: Development of electrodes for methane dehydroaromatization on protonic ceramic membranes***S. Ricote (Colorado School of Mines, US)***P9: Hydrogen permeation through CO₂-stable dual phase ceramic membranes based on La_{5.5}WO_{11.25-δ}La_{0.87}Sr_{0.13}CrO₃***N. Bausa (CSIC, SP)***P10: Novel electrical conduction observed in yttrium-based strontium zirconate in dry hydrogen***T. Fujisaki (Uni. Kyushu, JP)***P11: The effect of synthesis path on electrical properties and chemical stability of BaCe_{0.9}Y_{0.1}O₃-BaWO₄***A. Lacz (AGH, PO)***P12: Proton-ceramic fuel cell (PCFC) system modelling and analysis: examining techno-economic characteristics of 10 kWe PCFC combined heat and power systems***A. Dubois (Colorado School of Mines, US)***P13: A high-performance proton conducting solid oxide fuel cell elaborated by wet chemical routes***G. Taillades (ICG AIME, FR)***P14: Elaboration of planar and tube SOFC-H⁺ by tape rolling method***P. Tskiakaras (Uni. Thessaly, GR)***P15: F--doped solid solutions based on Ba₄Ca₂Nb₂O₁₁ (synthesis, structure, electrical properties)***N. Tarasova (Institute of Natural Science, Ural Federal, Russian Federation)***P16: Challenges and available solutions for H⁺-SOFC cathode materials***F. Mauvy (ICMCB-CNRS, Bordeaux, France)*