

Brouzgou.A.^a, Song.S.^b, Tzorbatzoglou.F.^a and Tsiakaras.P.^a^a Department of Mechanical Engineering, School of Engineering, University of Thessaly, Pedion Areos, 38834, Greece; Fax: +30-24210-74050; Tel: +30-242410-74081; E-mail: tsiak@uth.gr^b State Key Laboratory of Optoelectronic Materials and Technologies, School of Physics and Engineering, Sun Yat-Sen University, Guangzhou 510275, China; Tel/Fax: +86-20-84113369; E-mail: stsssq@mail.sysu.edu.cn**Abstract**

Platinum or Platinum-based nanomaterials are the most commonly adopted electrocatalysts for both anode and cathode reactions in *Proton Exchange Membrane Fuel Cells* (PEMFCs) with hydrogen or low molecular alcohols as the fuel. However, raw material high cost and scarce world reserves limit more the PEMFCs appeal and increases the total system cost [1]. Today, cost targets of 22€/kW that have been set, can be met only if Pt-specific power density can be reduced to < 0.2gr of Pt per kW at cell voltages >0.65 V (>55% conversion efficiency). This cost reduction can be achieved by increasing the power density to 0.3-0.9 W/cm² MEA at >0.65 V by reducing mass transport losses at higher current densities and by reducing Pt-loading in MEAs to ca. 0.15 mgPt/cm² MEA [2]. This consequently drives the researchers to identify low or non-Pt alternative materials for fuel cell applications. In light of the recent advances in this field, a review of low and non-Pt anode electrocatalysts for *direct alcohol fuel cells* (DAFCs), mainly focusing on *direct methanol fuel cells* (DMFCs) and *direct ethanol fuel cells* (DEFCs) is presented.

Keywords: low and non platinum, anode electro-catalysts, DMFCs, DEFCs

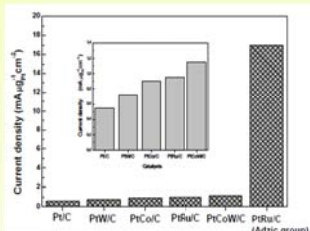


Fig. 1. Mass specific activity for low platinum based bi-metallic catalysts for the methanol oxidation reaction ca 0.7V. Index: Current density for the first five catalysts [3-5].

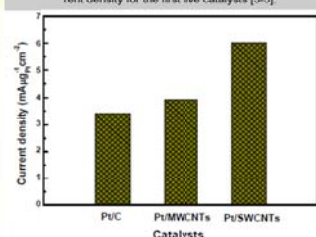


Fig. 2. Mass specific activity for low Pt catalysts supported on different carbon nanotubes measured for methanol oxidation ca 0.7V [6].

References

- [1] J. Matthey, *Platinum Today* [cited Available from: <http://www.platinum.matthey.com/pgm-prices-price-charts/>].
- [2] H.A. Gasteiger, S.S. Kocha, B. Somorjai, and F.T. Wagner, *App. Ca. B. Environ.*, 2005, vol. 56, pp. 9-35.
- [3] Y. Ando, K. Sasaki, and R. Adzic, *Electrochem. Commun.*, 2009, vol. 11, pp. 1135-1138.
- [4] Y. N. Wu, S. J. Liao, Z. X. Liang, J. J. Yang, and R. F. Wang, *J. Power Sources* 2009, vol. 194, pp. 805-810.
- [5] J. Zeng and J. Y. Lee, *Int. J. Hyd. Energy*, 2007, vol. 32, pp. 4389-4396.
- [6] Y. Chen, G. Zhang, J. Ma, Y. Zhou, Y. Tang, and T. Lu, *Int. J. Hydrogen Energy*, 2010, vol. 35, pp. 10109-10117.
- [7] H. Wang, Z. Jusys, and R. J. Behn, *J. Power Sources* 2006, vol. 164, pp. 351-359.
- [8] D. J. Guo, *J. Power Sources*, 2011, vol. 196, pp. 679-682.
- [9] H. Razmi, E. Habibi, and H. Heidari, *Electrochim. Acta* 2008, vol. 53, pp. 8178-8185.
- [10] L. Gao, G. Sun, H. Li, and Q. Xin, *Electrochem. Commun.*, 2007, vol. 9, pp. 2541-2546.
- [11] A. Serov and C. Kwak, *Appl. Catal. B. Environ.* 90 (2009) 313-320.
- [12] M. B. Zellner, J. G. Chen, *Catal. Today* 99 (2005) 299-307.
- [13] J. Datta, S. S. Gupta, S. Singh, A. Mukherjee and M. Mukherjee, *Mater. and Manufact. Processes* 26(2011) 261-271.
- [14] L. Gao, G. Sun, H. Li and Q. Xin, *Electrochem. Commun.* 9 (2007) 2541-2546.

Acknowledgements: Two of the authors (A. Brouzgou and F. Tzorbatzoglou) are grateful for the funding to the Doctoral Program of Higher Education (HRAKLITOS II) of the Operational Programme "Education and Lifelong Learning" which is co-funded by the European Union (European Social Fund) and National Resources.

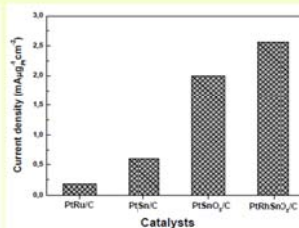


Fig. 3. Mass specific activity for low platinum based catalysts for the ethanol oxidation reaction, ca 0.7V [7].

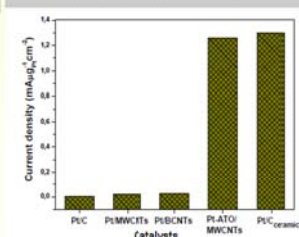


Fig. 4. Mass specific activity for low platinum based catalysts on different supports for the ethanol oxidation reaction, ca 0.6V [8-10].

Discussion**Methanol Electro-oxidation Reaction**

For methanol electro-oxidation reaction (MOR) a novel PtRu/C catalyst that was developed currently from Adzic's group performs high performance as it can be seen from Fig. 1. This comparable with the other bi-metallic platinum systems exhibits 8-fold higher performance towards methanol oxidation while the loading of the platinum reached only 0.6μg. Additionally, in recent years, many researchers suggested that *carbon nanotubes* (CNTs) are suitable for electrode materials and catalyst supports in DMFCs due to their high accessible surface areas, low resistance and high stability properties. It was found that higher Pt utilization catalysts could be obtained with the single walled CNTs (SWCNTs) as support because it could be made full use of their high surface area, conductivity, and porosity and consequently higher fuel cell performance (Fig. 2).

Concerning the non platinum electro-catalysts for the methanol electro-oxidation several works have dealt with tungsten and molybdenum materials as non-precious metal and non Pt anode electrocatalysts for DMFCs [11]. For example, Chen *et al.* [12] investigated Pt₂C for MOR which exhibited 1.2mA at 0.5V. In the recent works, it is observed that the non-Pt catalysts for MOR are investigated mostly in alkaline media with Pd-alloys are the most promising catalysts in alkaline media.

Ethanol Electro-oxidation Reaction

For ethanol electro-oxidation reaction (EOR), indicatively recently, Adzic's group reported a ternary PtRhSnO₂ electrocatalyst consisted only of 30 nmol (5.85 μg_{mol}) of Pt and 8 nmol (0.82 μg_{mol}) of Rh (Fig.3) that gave the value of current density of 15mAcm⁻². Despite the fact that Rh was in a small amount it was very important for considerably increasing the catalytic activity of PtSnO₂. Moreover recently Datta *et al.* [13] reported the role of Ru-oxide in the PtRu-alloy as very important factor which contributes significantly to the activity of the catalys. More precisely they found that under the optimum composition (Pt₈₀Ru₂₀) the onset potential was very low and the current density reached the value of 40mAcm⁻². Also in the case of DEFCs in order higher efficiency and stability of the behavior of the DEFCs' catalysts to be obtained, the research groups drew attention to well distribute the catalyst on the support (Fig.4). These kinds of materials as it can be seen from Fig.4 can exhibit superior performance in comparison with the pure carbon support.

In the search of alternative low-cost non-Pt catalysts, researchers have looked at several others, including supported platinum group metal (PGM) types such as Pd-, Ru-, and Ir-based catalysts, bi-metallic alloy catalysts, transition metal macrocycles, and transition metal macrocycles, and transition metal chalcogenides. Characteristically, Sun's group [14], developed Ir-based catalysts with a higher activity than Pt-based catalysts in the activation control region. Moreover, its performance in DEFCs was stable and comparable with Pt's one.

9th ESEE

**European Symposium
on Electrochemical Engineering
19 - 23 June
Chania, Greece**

**NOT
FOR**

Program

Organized by

**The Working Party on Electrochemical Engineering
of the European Federation of Chemical Engineering**

Under the auspices of

The Technical Chamber of Greece

Sponsored by

**The International Society of Electrochemistry
The Research Committee, University of Patras, Greece
The National Technical University of Athens, Greece
The Technical University of Crete, Greece**

9th European Symposium on Electrochemical Engineering

9th ESEE

Chania, Greece, 19- 23 June, 2011

Organizing Committee

Symeon Bebelis, University of Patras, Greece - ***Chair***

Niki Kouloumbi, National Technical University of Athens, Greece - ***Co-Chair***

Antonis Karantonis, National Technical University of Athens, Greece

Alexandros Katsaounis, Technical University of Crete, Greece

Scientific Committee

- **Prof. Antonio Aldaz**, Universidad de Alicante, Spain
- **Prof. Achille De Battisti**, Università di Ferrara, Italy
- **Dr. Alain Bergel**, Institut National Polytechnique de Toulouse, France
- **Prof. Karel Bouzek**, Institut of Chemical Technology Prague, Czech Republic
- **Prof. Christos Comninellis**, École Polytechnique Fédérale de Lausanne, Switzerland
- **Prof. Ann Cornell**, KTH Royal Institute of Technology, Sweden
- **Prof. Vladimir Fateev**, RRC "Kurchatov Institute", Russia
- **Prof. Mario Ferreira**, Universidade de Aveiro, Portugal
- **Prof. Takayuki Homma**, Waseda University, Japan
- **Dr. Arjan Hovestad**, TNO Science and Industry, The Netherlands
- **Dr. Klaus-Michael Mangold**, DECHEMA e.V., Germany
- **Prof. Geoff Kelsall**, Imperial College London, United Kingdom
- **Dr. Francois Lapicque**, CNRS - Nancy Université, France
- **Prof. Zoran Mandic**, University of Zagreb, Croatia
- **Prof. Kemal Nisancioglu**, Norwegian University of Science and Technology, Norway
- **Dr. Edward Roberts**, University of Manchester, United Kingdom
- **Prof. Manuel Rodrigo**, Universidad de Castilla-La Mancha, Spain
- **Prof. Velizar Stankovic**, University of Belgrade, Serbia
- **Prof. Théo Tzedakis**, Université Paul Sabatier, France
- **Prof. Constantinos Vayenas**, University of Patras, Greece
- **Prof. Frank Walsh**, University of Southampton, United Kingdom
- **Prof. Anthony Wragg**, University of Exeter, United Kingdom

9th European Symposium on Electrochemical Engineering
9th ESEE
Chania, Greece, 19 – 23 June, 2011

PROGRAM

Sunday, 19 June 2011

15:00 – 19:00	Registration
19:00 – 20:30	Welcome reception

Monday, 20 June 2011

8:00 – 11:15	Registration
--------------	---------------------

Morning Session M1.1

Chair: G. Kelsall, F. Lapicque

8:30 – 8:45	Opening of the 9 th ESEE (Prof. S. Bebelis)
8:45 – 9:00	Presentation of the Carl Wagner Medal of Excellence (Prof. M. A. Rodrigo)
9:00 – 9:30 Keynote lecture of the Carl Wagner Medal Award winner	M. Safari^{a,b}, C. Delacourt^a <i>^aLaboratoire de Réactivité et de Chimie des Solides, UMR CNRS 6007, Université de Picardie Jules Verne, Amiens, France; ^bRenault Research Department, Guyancourt, France</i> Mathematical modelling of a cylindrical graphite/LiFePO ₄ cell: Focus on the LiFePO ₄ electrode
9:30 – 9:45	J. Aicart, J. Deseure, O. Doche, Y. Bultel <i>LEPMI UMR 5279 CNRS-GINP-UJF-UdS, Saint Martin d' Hères, France</i> Mathematical modelling of solid oxide steam electrolyzer: effects of microstructure and current collector placement
9:45 – 10:00	M. Cruz-Díaz^a, F. Rivera^b, E. P. Rivero^c, I. González^a <i>^aDivisión de Química y Bioquímica, Tecnológico de Estudios Superiores de Ecatepec, Ecatepec, Mexico; ^bDepartamento de Química, Universidad Autónoma Metropolitana-Iztapalapa, Mexico D.F., Mexico; ^cUniversidad Nacional Autónoma de México, Facultad de Estudios, Superiores Cuautitlán, Departamento de Ingeniería y Tecnología, Cuautitlán Izcalli, Mexico</i> Modelling the FM01-LC reactor through axial dispersion model coupled to a continuous stirred tank (CST) model
10:00 – 10:20 Invited lecture	E.P.L. Roberts, D.P. Scamman <i>School of Chemical Engineering and Analytical Science, University of Manchester, U.K.</i> Techno-economic modelling of a utility scale redox flow battery system
10:20 – 10:35	O. Doche^a, F. Bauer^a, S. Tardu^b <i>^aLEPMI, Grenoble, France; ^bLEGI, BP 53X, Grenoble, France</i> Turbulence and electrochemical reactions
10:35 – 10:50	T. Méndez-Morales^a, L.M. Varela^a, J. Carrete^a, J.R. Rodríguez^a, L.J. Gallego^a, M. Turmine^b, O. Cabeza^c <i>^aNanomaterials and Soft Matter Group, Department of Condensed Matter Physics, Univ. of Santiago de Compostela, Santiago de Compostela, Spain; ^bUniversité Pierre et Marie Curie-Laboratoire Interfaces et Systèmes Electrochimiques, CNRS, UPR15-LISE, Paris, France; ^cMesturas Group, Faculty of Sciences. University of A Coruña, A Coruña, Spain</i> Computer simulation study of the thermodynamic and transport properties of mixtures of ionic liquid, molecular solvent and inorganic salts of electrochemical interest

10:50 – 11:15 – Coffee break

Monday, 20 June 2011

Morning Session M1.2

Chair: L. Fedrizzi, A. Hovestad

11:15 – 11:45 Keynote lecture	P.L. Bonora^a, A. Kròlikowska^b <i>^aDepartment of Chemical Science and Technology, University of Udine, Italy</i> <i>^bRoad and Bridges Research Institute, Warsaw, Poland</i> Evolution of the role of electrochemistry in corrosion engineering
11:45 – 12:00	R. Kodym^a, D. Snita^b, K. Bouzek^a, P. Novak^c <i>^{a,b,c}Institute of Chemical Technology Prague, Czech Republic</i> <i>^aDepartment of Inorganic Technology; ^bDepartment of Chemical Engineering; ^cDepartment of Metals and Corrosion Engineering</i> Dynamic mathematical simulation of processes occurring at cathodically protected underground installation
12:00 – 12:15	Th. Zafeiropoulou, E. Rakanta, G. Batis <i>Department of Materials Science and Engineering, School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Correlation between electrochemical measurements and physicochemical characteristics in specimens covered with organic coatings
12:15 – 12:30	G. Batis^a, A. Zacharopoulou^a, E. Zacharopoulou^a, E. Siova^a, V. Argyropoulou^b <i>^aDepartment of Materials Science and Engineering, School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> <i>^bDepartment of Conservation of Antiquities & Works of Art, Technological Educational Institution of Athens, Athens, Greece</i> A novel method of dechlorinating marine iron removed from the sea using impressed current: application on the paddle wheel from the 1868 shipwreck "Patris"
12:30 – 12:45	A. Karantonis, D. Koutsaftis, D. Marinis, N. Kouloumbi <i>School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Combined study of the electrodisolution of copper and the decarboxylation/dimerization of trifluoroacetic acid

12:45 – 15:30 – Lunch break

Monday, 20 June 2011

Afternoon Session A1.1

Chair: P.L. Bonora, K. Nisancioglu

15:30 – 16:00 Keynote lecture	M. L. Zheludkevich, M.G.S. Ferreira <i>CICECO, DECV, University of Aveiro, Portugal</i> Smart self-healing coatings for active corrosion protection
16:00 – 16:20 Invited lecture	Chr. Argirusis^a, S. Martens^b, P. Sakkas^a, G. Sourkouni^{b,c}, O. Schneider^{b,d} <i>^aNational Technical University of Athens, School of Chemical Engineering, Athens, Greece;</i> <i>^bClausthal Univ. of Technology, Institute of Metallurgy, Clausthal-Zellerfeld, Germany; ^cClausthal Univ. of Technology, Energy Research Centre Lower Saxony, Goslar, Germany; ^dTechnische Univ. München, Department of Physics, Chair for Energy Conversion and Storage, Garching, Germany</i> Sonoelectrochemistry - a versatile tool for the preparation of nanomaterials
16:20 – 16:35	M. Lekka^a, P.L. Bonora^a, A. Lanzutti^a, S. Benoni^b, P. Caoduro^c, L. Fedrizzi^a <i>^aDepartment of Chemistry, Physics and Environment, University of Udine, Udine, Italy</i> <i>^bBenoni s.n.c., S. Eufemia (BS), Italy; ^cCaoduro Impianti S.r.l., Monticello Conte Otto (VI), Italy</i> Industrialization of Ni- μ SiC electrodeposition on copper moulds for steel continuous casting
16:35 – 16:50	R. Inguanta, G. Ferrara, M.C. Mistretta, F. Vergottini, C. Sunseri, S. Piazza <i>Dipartimento di Ingegneria Industriale, Università di Palermo, Palermo, Italy</i> Nanostructures of different oxides/hydroxides grown in nanoporous templates by electrochemical methods
16:50 – 17:05	K. Kim, I. Yoon, Y. Cha, S. Kim, J. Lee, D. Kim, S. Ahn, B. Im, Y. Kim, S. Lee, L. Lee, S. Kim <i>School of Materials Science and Engineering, University of Ulsan, Ulsan, Korea</i> Synthesis of Cu-based alloy foams using polyurethane template by electrodeposition

17:05 – 17:30 – Coffee break

Monday, 20 June 2011

Afternoon Session A1.2

Chair: S. Piazza , P. Yianoulis

17:30 – 17:45	A. Hovestad, H. Rendering, A. W. Maijenburg <i>TNO, Eindhoven, The Netherlands</i> Patterned electrodeposition of interconnects using micro-contact printing
17:45 – 18:00	P. Gyftou, S. Spanou, A. Gialamopoulou, E.A. Pavlatou <i>School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Combined effect of addition of 2-bouten-1,4-diole and pulse current imposition on the production of nanostructured Ni coatings
18:00 – 18:15	M.-S. Kim, D.-S. Yang, Y.K. Kim, H.S. Choi, J.-S. Yu <i>Department of Advanced Materials Chemistry, Korea University, ChungNam, Republic of Korea</i> Ordered multimodal porous carbon with hierarchical nanostructure as a new efficient anode material in Li ion battery
18:15 – 18:30	G. Leftheriotis, G. Syrokostas, P. Yianoulis <i>Energy and Environment Laboratory, Physics Department, University of Patras, Patras, Greece</i> Electrochemical processes in photoelectrochromic devices

18:45 – 20:30 – Poster Session 1 (Beverages and snacks will be offered)

Tuesday, 21 June 2011

Morning Session M2.1

Chair: Ch. Comninellis, G. Foti

8:30 – 8:50 Invited lecture	S. Souentie^a, L. Lizarraga^a, E.I. Papaioannou^b, C.G. Vayenas^b, P. Vernoux^a <i>^aInstitut de Recherches sur la Catalyse et l'Environnement de Lyon, UMR 5256, CNRS, Université Claude Bernard Lyon 1, Villeurbanne, France ; ^bLCEP, Department of Chemical Engineering, University of Patras, Patras, Greece</i> Permanent electrochemical promotion of C ₃ H ₈ oxidation over thin sputtered Pt films
8:50 – 9:05	V. Jiménez^a, C. Jiménez- Borja^a, P. Sánchez^a, A. Romero^b, E.I. Papaioannou^c, S. Brosda^c, D. Theleritis^c, S. Souentie^c, J.L. Valverde^a, C.G. Vayenas^c <i>^aFacultad de Ciencias Químicas, Universidad de Castilla-La Mancha, Ciudad Real, Spain; ^bFacultad de Ciencias Químicas, Escuela Técnica Agrícola, Universidad de Castilla-La Mancha, Ciudad Real, Spain; ^cDepartment of Chemical Engineering, University of Patras, Patras, Greece</i> Electrochemical promotion in the CO ₂ hydrogenation reaction on composite Ni or Ru impregnated carbon nanofiber catalyst-electrodes deposited on YSZ
9:05 – 9:20	S. Brosda^a, T. Badas^a, C.G. Vayenas^{a,b} <i>^aDepartment of Chemical Engineering, University of Patras, Patras, Greece, ^bAcademy of Athens, Athens, Greece</i> Study of the mechanism of the electrochemical promotion of Rh/YSZ catalysts for C ₂ H ₄ oxidation via AC impedance spectroscopy
9:20 – 9:35	S. Souentie^a, L. Lizarraga^a, J.L. Valverde^b, P. Vernoux^a <i>^aUniversité de Lyon, Institut de Recherches sur la Catalyse et l'Environnement de Lyon, UMR 5256, CNRS, Université Claude Bernard Lyon, Villeurbanne, France ; ^bDepartamento de Ingeniería Química, Facultad de Ciencias Químicas, Universidad de Castilla-La Mancha, Ciudad Real, Spain</i> Electrochemical promotion of the water-gas shift reaction on Pt/YSZ
9:35 – 9:50	C. Jiménez-Borja^a, S. Brosda^b, F. Matei^c, M. Makri^b, B. Delgado^a, F. Sapountzi^b, F. Dorado^a, J.L. Valverde^a, C.G. Vayenas^b <i>^a Department of Chemical Engineering, University of Castilla-La Mancha, Ciudad Real, Spain; ^bDepartment of Chemical Engineering, University of Patras, Patras, Greece; ^cFaculty of Petroleum Refining and Petrochemistry, Petroleum - Gas University of Ploiesti, Ploiesti, Romania</i> Electrochemical promotion of methane oxidation on Pd catalyst-electrodes deposited on YSZ
9:50 – 10:05	A. de Lucas-Consuegra, A. Caravaca, C. Molina-Mora, J. González, J.L. Valverde, F. Dorado <i>Department of Chemical Engineering, Faculty of Chemistry, University of Castilla-La Mancha, Ciudad Real, Spain</i> The application of solid electrolyte single chamber cells reactors in the H ₂ production technology

10:05 – 10:30 – Coffee break

Tuesday, 21 June 2011

Morning Session M2.2

Chair: M.E.H. Bergmann, I. Ortiz

10:30 – 11:00 Keynote lecture	Ch. Comninellis <i>Swiss Federal Institute of Technology, EPFL-ISIC-GGEC, Lausanne Switzerland</i> Pseudo-potentiostatic electrolysis by potential buffering induced by the side reaction of O ₂ evolution
11:00 – 11:15	G. Foti^a, E. Herrera Calderon^a, A. Katsaounis^b, Ch. Comninellis^a <i>^aEcole Polytechnique Fédérale de Lausanne (EPFL), Institute of Chemical Sciences and Engineering, Lausanne, Switzerland</i> <i>^bTechnical University of Crete, Department of Environmental Engineering, Chania, Greece</i> Effectiveness factor of three-dimensional Ti/IrO ₂ anodes
11:15 – 11:30	V. Amstutz^a, A. Katsaounis^b, A. Kapalka^a, K. Udert^c, Ch. Comninellis^a <i>^aInstitute of Chemical Sciences and Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland</i> <i>^bDepartment of Chemical Engineering, University of Patras, Patras, Greece</i> <i>^cEawag, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland</i> Influence of carbonate on anodic chlorine mediated ammonia oxidation
11:30 – 11:45	M.R. Gonçalves^{a,b}, J.P. Correia^c, I.P. Marques^a <i>^aLNEG, Lisboa, Portugal</i> <i>^bIBB, University of Minho, Braga, Portugal</i> <i>^cCQB, Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal</i> Mineralisation of olive mill wastewater over DSAs
11:45 – 12:00	E. Lacasa, P. Cañizares, C. Sáez, F.J. Fernández, J. Llanos, M.A. Rodrigo <i>University of Castilla-La Mancha, Department of Chemical Engineering, Ciudad Real, Spain</i> Removal of nutrients from water by electrochemical technology
12:00 – 12:15	M. Cataldo Hernández, M.B. Dogliotti, N. Russo, D. Fino, P. Spinelli. <i>Department of Materials Science and Chemical Engineering, Politecnico di Torino, Torino, Italy</i> Removal of zinc by electrocoagulation with aluminium electrodes
12:15 – 12:30	C. Jiménez, A.M. Torrico, C. Sáez, P. Cañizares, M.A. Rodrigo <i>Department of Chemical Engineering, Facultad de Ciencias Químicas, Universidad de Castilla La Mancha, Ciudad Real, Spain</i> Study of an electrocoagulation-electroflotation process for the treatment of oil-in-water emulsions

12:30 – 13:30 – Lunch break

13:30 – 20:30 – Excursion

Wednesday, 22 June 2011

Morning Session M3.1

Chair: A. Irabien, S. Palmas

8:30 – 9:00 Keynote lecture	M. A. Rodrigo, P. Cañizares, C. Sáez, J. Lobato, J. Llanos <i>Department of Chemical Engineering, Universidad de Castilla La Mancha, Ciudad Real, Spain</i> Reuse of the effluents of municipal wastewater treatment plants. A new challenge to electrochemical engineering?
9:00 – 9:15	E.P.L. Roberts^a, S.N. Hussain^a, H.M.A. Asghar^a, F.M. Mohammed^a, M. Conti-Ramsden^a, A.K. Campen^b, N.W. Brown^b. <i>^aSchool of Chemical Engineering and Analytical Science, University of Manchester, Manchester, UK</i> <i>^bArvia Technology Ltd, Liverpool, UK</i> Water treatment and disinfection by adsorption and electrochemical regeneration
9:15 – 9:30	M.E.H. Bergmann, T. Iourtchouk <i>Anhalt University, Köthen/Anh., Germany</i> Is the formation of BrO_3^- and BrO_4^- a new problem in electrochemical drinking water disinfection?
9:30 – 9:45	G. Pérez, I. Ortiz, A.M. Urriaga <i>Dep. Ingeniería Química y Química Inorgánica, Universidad de Cantabria, Cantabria, Santander, Spain</i> Tertiary water treatment employing BDD electrodes. Electrooxidation of emerging micropollutants
9:45 – 10:00	M.J. Martín de Vidales, S. Muñoz, C. Sáez, M.A. Rodrigo, P. Cañizares <i>Department of Chemical Engineering. Faculty of Chemistry, University of Castilla-La Mancha, Ciudad Real. Spain</i> Removal of emerging pollutants with conductive-diamond electrochemical oxidation
10:00 – 10:15	Ch. Racaud^{a,b}, K. Groenen Serrano^a, A. Savall^a, Ph. Rondet^b, N. Bertrand^c <i>^aLaboratoire de Génie Chimique, INP- CNRS, Toulouse, France</i> <i>^bSGN, Equerdreville, France</i> <i>^cAREVA NC, Courbevoie, France</i> Recent advances in the electrochemical regeneration of Ag(II)
10:15 – 10:30	I. Katsounaros^a, M. Dortsiou^b, C. Polatides^b, G. Kyriacou^b <i>^aMax-Planck-Institut für Eisenforschung, Düsseldorf, Germany</i> <i>^bDepartment of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece</i> Electrochemical treatment of nitrate- and nitrite-contaminated nuclear wastes

10:30 – 10:50 – Coffee break

Wednesday, 22 June 2011

Morning Session M3.2

Chair: K. Bouzek , V. N. Fateev

10:50 - 11:20 Keynote lecture	C. Bonnet, L. Franck-Lacaze, B. T. Huang, Y. Chatillon, F. Lopicque <i>Laboratory for Reactions and Chemical Engineering, CNRS – Nancy University, Nancy, France</i> Ageing of Polymer Electrolyte Membrane fuel cells (PEMFC) – Investigation of two typical examples
11:20 – 11:40 Invited lecture	I. Katsounaros^a, J.C. Meier^a, A. Topalov^{a,b}, S.O. Klemm^a, K.J.J. Mayrhofer^a <i>^aMax-Planck-Institut für Eisenforschung, Düsseldorf, Germany</i> <i>^bCenter of Electrochemical Sciences, Ruhr-Universität Bochum, Bochum, Germany</i> Electrocatalysis of PEM fuel cell reactions - fundamental investigations for real applications
11:40 – 11:55	A. Orfanidi^{a,b}, M.K. Daletou^b, S.G. Neophytides^b <i>^aDepartment of Chemical Engineering, University of Patras, Rion Patras, Greece</i> <i>^bFoundation of Research and Technology Hellas - Institute of Chemical Engineering and High Temperature Processes, Platani Rion, Patras, Greece</i> Preparation and characterization of Pt/modified MWCNT as electrocatalysts for high temperature PEMFCs
11:55 – 12:10	M.-S. Kim, J.H. Kim, M.Y. Song, D.-S. Yang, J.-S. Yu <i>Department of Advanced Materials Chemistry, Korea University, ChungNam, Republic of Korea</i> Ordered hierarchical nanostructured carbon as a new highly efficient catalyst support in low-temperature fuel cell
12:10 – 12:25	D. Úbeda, F.J. Pinar, M.A. Rodrigo, P. Cañizares, J. Lobato <i>University of Castilla-La Mancha, Ciudad Real, Spain</i> Study of the current density distribution evolution throughout the lifetime of a high temperature PBI-based PEM fuel cell
12:25– 12:40	M. Tsampas, F. Sapountzi, S. Divane, E. Papaioannou, C.G Vayenas <i>Department of Chemical Engineering, University of Patras, Patras, Greece</i> Triode operation for enhancing the performance of CO poisoned PEMFCs
12:40– 12:55	G. M. Andreadis, V.I. Maragou, P.E. Tsiakaras <i>Laboratory of Alternative Energy Conversion Systems, Department of Mechanical Engineering, University of Thessaly, Volos, Greece</i> A mathematical model-based study of the operation of a direct ethanol polymer electrolyte membrane fuel cell

12:55 – 15:30 – Lunch break

Wednesday, 22 June 2011

Afternoon Session A3.1

Chair: S. Brosda, S. Balomenou

15:30 – 15:45	<p>M. Antoniadou^a, P. Panagiotopoulou^b, D. Kondarides^b, P. Lianos^{a,c} <i>^aUniversity of Patras, Engineering Science Dept., Rion Patras, Greece</i> <i>^bDepartment of Chemical Engineering, University of Patras, Rion Patras, Greece</i> <i>^cFORTH/ICE-HT, Platani, Rion Patras, Greece</i></p> <p>Photocatalysis and photoelectrocatalysis using nanocrystalline titania alone or combined with Pt, RuO₂ or NiO co-catalysts</p>
15:45 – 16:00	<p>D. K. Niakolas^a, M. Athanasiu^{a,b}, V. Drakopoulos^a, S.G. Neophytides^a, S. Bebelis^{a,b} <i>^aFoundation for Research and Technology, Institute of Chemical Engineering and High Temperature Chemical Processes (FORTH/ICE-HT), Platani, Rion Patras, Greece</i> <i>^bDepartment of Chemical Engineering, University of Patras, Rion Patras, Greece</i></p> <p>Characterization and carbon tolerance of new Au – Mo – Ni/GDC cermet powders for use as anode materials in methane fuelled SOFCs.</p>
16:00 – 16:15	<p>F. Sapountzi^a, S. Brosda^a, K.M. Papazisi^b, S.P. Balomenou^b, D. Tsiplakides^{b,c} <i>^aDepartment of Chemical Engineering, University of Patras, Rion Patras, Greece</i> <i>^bCPERI/CERT, Thessaloniki, Greece</i> <i>^cDepartment of Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece</i></p> <p>Electrochemical performance of La_{0.75}Sr_{0.25}Cr_{0.9}M_{0.1}O₃ perovskites as SOFC anodes in CO/CO₂ mixtures</p>
16:15 – 16:30	<p>J. Millichamp^a, E. Ali^a, N.P. Brandon^b, R.J.C. Brown^c, C. Kalyvas^d, G. Manos^a, D.J.L. Brett^a <i>^aCentre for CO₂ Technology, Department of Chemical Engineering, University College London, UK</i> <i>^bThe Energy Futures Lab, Imperial College London, UK</i> <i>^cThe National Physical Laboratory, Teddington, UK</i> <i>^dDepartment of Chemistry, Imperial College London, UK</i></p> <p>An in-situ sensor for the analysis of high temperature carbon deposition using a novel crystal microbalance</p>
16:30 – 16:50 <i>Invited lecture</i>	<p>S. Sopčić, M. Kraljić Roković, Z. Mandić <i>Faculty of Chemical Engineering and Technology, University of Zagreb, Zagreb, Croatia</i></p> <p>The importance of polymer binders in the overall behaviour of RuO₂ and RuO₂/polyaniline composite electrodes for supercapacitors</p>

16:50 – 17:15 – Coffee break

Wednesday, 22 June 2011

Afternoon Session A3.2

Chair: A. Cornell, V. Stankovic

17:15 – 17:45 Keynote lecture	G. H. Kelsall, A. Kovaleva <i>Department of Chemical Engineering, Imperial College London, London, UK</i> Electrochemical recovery of nickel from effluents and wastes
17:45 – 18:00	C. Renault^b, J. Roche^a, M.R. Ciumag^a, T. Tzedakis^a, S. Colin^c, P. Cognet^b, K. Serrano^a, O. Reynes^a <i>^aLaboratoire de Génie Chimique, Université de Toulouse, UPS, Toulouse, France,</i> <i>^bLaboratoire de Génie Chimique, Université de Toulouse, INP-ENSIACET, Toulouse, France</i> <i>^cUniversité de Toulouse, INSA, UPS, Mines Albi, ISAE, ICA (Institut Clément Ader), Toulouse, France</i> Approaches in conception, design and optimization of electrochemical microreactors for continuous electrosyntheses
18:00 – 18:15	J. Híveš^a, L. Hrnčiariková^a, K. Bouzek^b <i>^aDepartment of Inorganic Technology, Faculty of Chemical and Food Technology, Slovak University of Technology, Bratislava, Slovakia</i> <i>^bDep. of Inorganic Technology, ICT Prague, Prague, Czech Republic</i> Anodic dissolution of Fe and Fe-Si electrodes in molten hydroxides
18:15 – 18:30	J. Gustavsson, A. Cornell, G. Lindbergh <i>Applied Electrochemistry, School of Chemical Science and Engineering, Royal Institute of Technology, Stockholm, Sweden</i> Energy savings in the chlorate process by in situ additions to the electrolyte
18:30 – 18:45	C. Brussieux^a, Ph. Viers^a, M. Rakib^a, H. Roustan^b <i>^aLGPM Ecole Centrale Paris, Châtenay-Malabry, France</i> <i>^bRio-Tinto Alcan Aluval-EMRA, Voreppe, France</i> Controlled gas bubbles from a flat metal electrode

18:45 – 20:30 – Poster Session 2 (Beverages and snacks will be offered)

21:00 – Symposium Gala Dinner

Thursday, 23 June 2011

Morning Session M4.1

Chair: M. Rakib, T. Tzedakis

8:30 – 9:00 Keynote lecture	K. Bouzek, R. Kodým, P. Pánek, D. Šnita <i>Institute of Chemical Technology Prague, Prague, Czech Republic</i> Electrodialysis - from mathematical modeling on local scale to the industrial unit
9:00 – 9:15	P. Panek^a, R. Kodym^a, D. Snita^b, K. Bouzek^a <i>^aDepartment of Inorganic Technology, Institute of Chemical Technology Prague (ICTP), Prague, Czech Republic; ^bDepartment of Chemical Engineering, ICTP, Prague, Czech Republic</i> Mathematical model of a single electrodialysis cell
9:15 – 9:30	A. Kusoglu, A. Z. Weber <i>Lawrence Berkeley National Laboratory, Berkeley, USA</i> Compression and hydration effects of PFSA membranes
9:30 – 9:45	R. Kodym^a, D. Snita^b, V. Fila^a, K. Bouzek^a <i>^aDepartment of Inorganic Technology, Institute of Chemical Technology Prague (ICTP), Prague, Czech Republic; ^bDepartment of Chemical Engineering, ICTP, Prague, Czech Republic</i> Non-equilibrium mathematical model of multiple ion transport across an ion-selective membrane
9:45 – 10:00	M. Bjørnsdotter^a, C. Holme^a, R. Johnsen^b, K. Nisancioglu^a <i>^aDepartment of Materials Science and Engineering and ^bDepartment of Engineering Design and Materials, Norwegian University of Science and Technology, Trondheim, Norway</i> A simple electrochemical engineering approach for measuring very slow rates of hydrogen entrainment and diffusion in metals
10:00 – 10:15	A. Alexiadis^a, M.P. Dudukovic^b, P. Ramachandran^b, A. Cornell^a <i>^a Department of Chemical Engineering and Technology, Applied Electrochemistry, Royal Institute of Technology, KTH, Stockholm, Sweden; ^b Chemical Reaction Engineering Laboratory (CREL), Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, USA</i> The flow in multichannel electrochemical systems: mathematical modeling and stability analysis
10:15 – 10:30	E.P. Rivero^a, M.R. Cruz-Díaz^b, F.F. Rivera^c, I. González^c <i>^aUniversidad Nacional Autónoma de México, Facultad de Estudios Superiores Cuautitlán, Dept. de Ingeniería y Tecnología, Cuautitlán Izcalli, México; ^bTecnológico de Estudios Superiores de Ecatepec, División de Química y Bioquímica, Ecatepec, México; ^cUniversidad Autónoma Metropolitana-Iztapalapa, Departamento de Química, Mexico D.F., México</i> An alternative for studying the effect of hydrodynamics on the mass transport rate toward or from the solid wall of the electrodes in electrochemical reactors
10:30 – 10:50 Invited lecture	A. Karantonis, S. Koutalidi <i>School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Locomotion determined and controlled by electrochemical networks

10:50 – 11:20 – Coffee break

Thursday, 23 June 2011

Morning Session M4.2

Chair: M. Rodrigo, P. Lianos

11:20 – 11:40 Invited lecture	V. Stanković^a, Ch. Comninellis^b ^a University of Belgrade, Technical Faculty Bor, Bor, Serbia ^b FSB, EPF, Lausanne, Switzerland Rhodium recovery and recycling from spent materials
11:40 – 11:55	M. Mascia, A. Vacca, S. Palmas, A. Da Pozzo <i>Dipartimento di Ingegneria Chimica e Materiali, Cagliari, Italy</i> Electrochemical treatment of waters with three-dimensional electrodes: kinetics of anodic and cathodic reactions.
11:55 – 12:10	A.K. Seferlis, S.G. Neophytides <i>ICEHT/FORTH, Platani, Rion - Patras, Greece</i> Titanium dioxide photoelectrocatalysts: Characterization and application in waste water treatment
12:10 – 12:25	S. Palmas^a, A. Da Pozzo^a, M. Mascia^a, A. Vacca^a, R. Matarrese^b, I. Nova^b ^a Dipartimento di Ingegneria Chimica e Materiali, Cagliari, Italy ^b Dipartimento di Energia, Politecnico di Milano, Milano, Italy Characterization of TiO ₂ nanotubes obtained by electrochemical anodization
12:25 – 12:40	E. Alvarez-Guerra, A. Dominguez-Ramos, A. Irbien <i>Departamento de Ingeniería Química y Química Inorgánica, Universidad de Cantabria, Santander, Spain</i> Photovoltaic solar energy supply to electro-oxidation processes for wastewater treatment
12:40 – 13:00 Invited lecture	A. Anglada^a, D. Mantzavinos^b, E. Diamadopoulos^b, A. Urriaga^a, I. Ortiz^a ^a Department of Chemical Engineering and Inorganic Chemistry, University of Cantabria, Santander, Spain ^b Department of Environmental Engineering, Technical University of Crete, Chania, Greece Electrochemical treatment of landfill leachates: From laboratory to pilot plant scale
13:00 – 13:15	R. López-Vizcaíno, P. Cañizares, M.A. Rodrigo, C. Sáez <i>Department of Chemical Engineering, University of Castilla-La Mancha, Ciudad Real, Spain</i> Electrokinetic remediation of phenanthrene enhanced with sodium dodecyl sulphate

13:15 – 15:45 – Lunch break

Thursday, 23 June 2011

Afternoon Session A4.1

Chair: M. Paidar, A. Weber

15:45 – 16:05 Invited lecture	V. N. Fateev <i>NRC "Kurchatov Institute", Moscow, Russia</i> Development and tests of reversible fuel cell based on proton-exchange membrane
16:05 – 16:20	G. Avgouropoulos^a, J. Papavasiliou^a, T. Ioannides^a, S. Neophytides^{a,b} <i>^a FORTH/ICE-HT, Platani, Patras Greece</i> <i>^b Advent Technologies SA, Patras Science Park, Platani, Patras, Greece</i> Performance of internal reforming methanol fuel cell under various methanol/water concentrations
16:20 – 16:40 Invited lecture	D.M.F. Santos^a, P.G. Saturnino^{a,b}, A.L.N. Morais^a, R.F.M. Lobo^b, C.A.C. Sequeira^a <i>^a Materials Electrochemistry Group, ICEMS, Instituto Superior Técnico, Lisboa, Portugal</i> <i>^b Group of Nanoscale Science and Technology, ICEMS, FCT/UNL, Caparica, Portugal</i> Optimisation of NaBH ₄ /H ₂ O ₂ fuel cells using Prussian Blue cathodes
16:40 – 16:55	M. Rodrigo^a, J. Lobato^a, A. Gonzalez del Campo^b, F.J. Fernandez^b <i>^a University of Castilla-La Mancha, Chemical Engineering Department, Ciudad Real, Spain</i> <i>^b University of Castilla-La Mancha, Chemical Engineering Department, ITQUIMA, Ciudad Real, Spain</i> COD and temperature stress-tests in a micro microbial fuel cell

16:55 – 17:20 – Coffee break

Thursday, 23 June 2011

Afternoon Session A4.2

Chair: S. Neophytides, K. Mayrhofer

17:20 – 17:40 Invited lecture	R. Tunold^a, M.A. Tsykin^a, A. Marshall^b, E. Rasten^c <i>^aGroup of Electrochemistry, Department of Materials Science and Engineering, NTNU, Trondheim Norway; ^bUniversity of Canterbury, Christchurch, New Zealand; ^cIneos, Herøya Research Park, Porsgrunn, Norway</i> Electrocatalysis of oxygen evolution in PEM water electrolysis cell
17:40 – 17:55	P. Mazur, M. Paidar, K. Bouzek <i>Institute of Chemical Technology Prague, Department of Inorganic Technology, Prague, Czech Republic</i> Optimization of anode for PEM type water electrolysis
17:55 – 18:05	M. Paidar, P. Mazúr, J. Vít, K. Bouzek <i>Institute of Chemical Technology Prague, Department of Inorganic Technology, Prague, Czech Republic</i> Catalyst supports based on Ti compounds for PEM water electrolysis
18:05 – 18:20	K.M. Papazisi^{a,b}, S. Balomenou^a, D. Tsiplakides^{a,c} <i>^aCPERI/CERTH, Thessaloniki, Greece; ^bChemical Engineering Department, Aristotle University of Thessaloniki, Thessaloniki, Greece; ^cDepartment of Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece</i> Preparation and characterization of Ir _x Pt _{1-x} O ₂ anode electrocatalysts for the oxygen evolution reaction
18:20 – 18:35	A.V. Nikiforov, A.L. Tomás-García, I.M. Petrushina, E. Christensen, N.J. Bjerrum <i>¹Energy and Materials Science Group, Department of Chemistry, Technical University of Denmark, Kongens Lyngby, Denmark</i> SiC-Si as a support for oxygen evolution electrode in PEM steam electrolyzers
18:35 – 18:50	J. Hnát^a, M. Paidar^a, J. Schauer^b, J. Žitka^b, K. Bouzek^a <i>^aInstitute of Chemical Technology Prague, Prague, Czech Republic ^bInstitute of Macromolecular Chemistry AS CR v.v.i., Prague, Czech Republic</i> Influence of the polymer binder on the behaviour of gas diffusion electrode based on non-platinum electrocatalyst in process of the alkaline water electrolysis
18:50 – 19:15	Closing Ceremony

POSTER SESSION 1

Monday, 20 June 2011

Poster Number	Presentation
P 1.01	<p>A. Pikasi, P. Georgiou, J. Simitzis <i>National Technical University of Athens, School of Chemical Engineering, Department III "Materials Science and Engineering", Laboratory Unit "Advanced and Composite Materials", Athens, Greece</i></p> <p>Electrodeposition of platinum on carbon fibres by cyclic voltammetry and their application as electrodes for electro-oxidation of ethanol</p>
P 1.02	<p>P. Georgiou^a, J. Walton^b, J. Simitzis^a <i>^aNational Technical University of Athens, School of Chemical Engineering, Department III, "Materials Science and Engineering", Laboratory Unit "Advanced and Composite Materials", Athens, Greece; ^bCorrosion and Protection Centre, School of Materials, The University of Manchester, Manchester, UK</i></p> <p>Electrochemical surface treatment of commercial carbon fibres by cyclic voltammetry and their characterisation with XPS and analytical methods</p>
P 1.03	<p>D. Triantou, S. Soulis, P. Georgiou, J. Simitzis <i>National Technical University of Athens, School of Chemical Engineering, Department III "Materials Science and Engineering", Laboratory Unit "Advanced and Composite Materials", Athens, Greece</i></p> <p>Electrochemical synthesis of conducting copolymers based on biphenyl and thiophene by cyclic voltammetry</p>
P 1.04	<p>A. Eladeb, C. Bonnet, F. Lopicque <i>Laboratory for Reactions and Chemical Engineering, CNRS – Nancy University, Nancy, France</i></p> <p>PEM fuel cells and electrolyzers: combining the various electrode reactions for determination of individual reaction kinetics</p>
P 1.05	<p>P. Mazur, M. Dolezal, M. Paidar, K. Bouzek <i>Institute of Chemical Technology Prague, Prague, Czech Republic</i></p> <p>Impact of catalyst layer composition on the high temperature PEM FC performance</p>
P 1.06	<p>M. Drakselova^a, R. Kodym^a, S. Sunde^b, K. Bouzek^a <i>^aInstitute of Chemical Technology Prague, Department of Inorganic Technology, Prague, Czech Republic; ^bNorwegian University of Science and Technology, Department of Materials Science and Engineering, Trondheim, Norway</i></p> <p>Two-dimensional mathematical model of Pt catalyst degradation in the PEM type fuel cells</p>
P 1.07	<p>S. Marthosa^a, E.P.L. Roberts^a <i>^aSchool of Chemical Engineering and Analytical Science, The Mill, University of Manchester, Manchester, United Kingdom</i></p> <p>Improvement of electrocatalyst performance in hydrogen PEM fuel cells by multiscale modeling</p>

POSTER SESSION 1

Monday, 20 June 2011

Poster Number	Presentation
P 1.08	<p>A. Brouzgou^b, S. Song^a, F. Tzorbartzoglou^b, <u>G. M. Andreadis^b</u>, P. Tsiakaras^b ^aState Key Laboratory of Optoelectronic Materials and Technologies, School of Physics and Engineering, Sun Yat-Sen University, Guangzhou, China; ^bDepartment of Mechanical Engineering, School of Engineering, University of Thessaly, Volos, Greece</p> <p>Low and non-platinum electrocatalysts for PEMFC: Current status, challenges and prospects</p>
P 1.09	<p><u>G. M. Andreadis^a</u>, S. Q. Song^b, P. E. Tsiakaras^a ^aLaboratory of Alternative Energy Conversion Systems, Department of Mechanical Engineering, University of Thessaly, Volos, Greece; ^bResearch Center for Green Chemistry and Engineering, Institute of Optoelectronic and Functional Composite Materials, Sun Yat-Sen University, Guangzhou, China</p> <p>Study of the electro-oxidative activity of PtSn catalysts towards ethanol, acetaldehyde and acetic acid electrooxidation</p>
P 1.10	<p><u>J. Hnát^a</u>, M. Paidar^a, J. Schauer^b, K. Bouzek^a ^aInstitute of Chemical Technology Prague, Prague, Czech Republic ^bInstitute of Macromolecular Chemistry AS CR v.v.i., Prague, Czech Republic</p> <p>Method of the enhancement of surface skin porosity of the novel heterogeneous polymer electrolyte, for alkaline water electrolysis</p>
P 1.11	<p>M. Pérez-Page, <u>V. Pérez-Herranz</u> Group IEC, Departamento de Ingeniería Química y Nuclear, Universidad Politécnica de Valencia, Valencia, Spain</p> <p>Effect of the humidification temperature on the voltage of the individual cells in a 300 W PEM fuel cell stack</p>
P 1.12	<p>J. Carrillo-Abad, M. García-Gabaldón, E. Ortega, <u>V. Pérez-Herranz</u> Grupo IEC, Departamento de Ingeniería Química y Nuclear, Universitat Politècnica de València (UPV), Valencia, Spain</p> <p>Recovery of zinc present in the spent pickling baths using an electrochemical reactor under potentiostatic control</p>
P 1.13	<p>M.C. Martí-Calatayud, M. García-Gabaldón, E. Ortega, <u>V. Pérez-Herranz</u> Grupo IEC, Departamento de Ingeniería Química y Nuclear, Universidad Politécnica de Valencia, Valencia, Spain</p> <p>Influence of the initial NiSO₄ and CrO₃ concentration on the transport number of Ni²⁺ ions through a cation-exchange membrane</p>
P 1.14	<p>I. Herraiz-Cardona, E. Ortega, J. García-Antón, <u>V. Pérez-Herranz</u> Group IEC, Departamento de Ingeniería Química y Nuclear, Universidad Politécnica de Valencia, Valencia, Spain</p> <p>Double-template synthesis of 3D porous nickel electrodes for hydrogen evolution reaction</p>

POSTER SESSION 1

Monday, 20 June 2011

Poster Number	Presentation
P 1.15	D.M.F. Santos^a, C.A.C. Sequeira^a, D. Macciò^b, A. Saccone^b, J.L. Figueiredo^c ^a Materials Electrochemistry Group, ICEMS, Instituto Superior Técnico, Lisboa, Portugal; ^b Università degli Studi di Genova, Dipartimento di Chimica e Chimica Industriale (DCCI), Genova, Italy; ^c Laboratório de Catálise e Materiais (LCM), Laboratório Associado LSRE/LCM, Departamento de Engenharia Química, Faculdade de Engenharia, Universidade do Porto, Porto, Portugal Platinum-rare earth electrodes for hydrogen production
P 1.16	D.M.F. Santos^a, P.G. Saturnino^a, D. Macciò^b, A. Saccone^b, C.A.C. Sequeira^a ^a Materials Electrochemistry Group, ICEMS, Instituto Superior Técnico, Lisboa, Portugal ^b Università degli Studi di Genova, Dipartimento di Chimica e Chimica Industriale (DCCI), Genova, Italy Pt-based alloys for borohydride oxidation
P 1.17	C.A.C. Sequeira, L.F.F.T.G. Rodrigues, A.L.N. Morais, D.M.F. Santos Materials Electrochemistry Group, ICEMS, Instituto Superior Técnico, Lisboa, Portugal Cation diffusivity in nonstoichiometric tungsten trioxide films
P 1.18	C. Brussieux^a, Ph. Viers^a, M. Rakib^a, H. Roustan^b ^a LGPM Ecole Centrale Paris, Châtenay-Malabry, France ^b Rio-Tinto Alcan Aluval-EMRA, Voreppe, France Acoustic emission of a gas evolving electrolysis cell
P 1.19	F. Rivera^a, S. Alonso^c, M. Cruz-Díaz^b, F. Almazán^b, E.P. Rivero^c, I. González^a ^a Departamento de Química, Universidad Autónoma Metropolitana-Iztapalapa, Mexico D.F., Mexico; ^b División de Química y Bioquímica, Tecnológico de Estudios Superiores de Ecatepec Ecatepec, Mexico; ^c Universidad Nacional Autónoma de México, Facultad de Estudios Superiores Cuautitlán, Departamento de Ingeniería y Tecnología, Cuautitlán Izcalli, Mexico Effect of different flow distributors on conversion in a FM01-LC electrochemical reactor: Analysis of RTD distribution
P 1.20	P. Panek^a, R. Kodým^a, D. Snita^b, K. Bouzek^a ^a Department of Inorganic Technology, Institute of Chemical Technology Prague (ICTP), Prague, Czech Republic; ^b Department of Chemical Engineering, ICTP, Prague, Czech Republic Spatially-2D mathematical model of the flow hydrodynamics in the spacer filled channel – Effect of inertial forces
P 1.21	M. Pletnev Izhevsk State Technical University, Izhevsk, Russia Iron anodic dissolution modeling
P 1.22	V.M. Volgin^a, A.D. Davydov^b ^a Tula State University, Tula, Russia; ^b A.N. Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia The effect of oscillatory magnetic field on the ionic transfer in a channel electrochemical cell

P 1.23

R. Rihan^a, N. Al-Bakr^b, R. Shawabkeh^b

King Fahd University of Petroleum & Minerals (KFUPM)

*^aCenter for Engineering Research - Research Institute; ^bDepartment of Chemical Engineering
Dhahran, Saudi Arabia*

The effect of two amine-base corrosion inhibitors in reducing the corrosion rate of 1018 carbon steel petroleum pipelines in sea water

POSTER SESSION 2

Wednesday, 22 June 2011

Poster Number	Presentation
P 2.01	S. Slavica Matešić^a, J. Radošević^b, R. Mimica^b <i>^aSibenik-Knin County, Croatia; ^bFaculty of Electrical, Mechanical Engineering and Naval Architecture, Department of Mechanical Technology, Split, Croatia</i> Investigation of the Fe content effect and thermo-mechanical processes on oxide films of EN AW 8006 alloy with the EIS
P 2.02	R.M. Fernández-Domene, E. Blasco-Tamarit, D.M. García-García, J. García-Antón <i>Ingeniería Electroquímica y Corrosión (IEC), Departamento de Ingeniería Química y Nuclear, ETSII Industriales, Universidad Politécnica de Valencia, Valencia, Spain</i> Study of the repassivation kinetics of Ti in a LiBr solution by means of electrochemical techniques and Confocal Laser Scanning Microscopy
P 2.03	R. Leiva-García, M.J. Muñoz-Portero, J. García-Antón <i>Univ. Politécnica de Valencia, Grupo de Ingeniería Electroquímica y Corrosión, Dep. Ingeniería Química y Nuclear, E.T.S.I.I., Valencia, Spain</i> Effect of temperature on the galvanic corrosion of a highly alloyed austenitic stainless steel (Alloy 926) in its sensitized and unsensitized condition in 992 g/L aqueous LiBr solution
P 2.04	A.D. Davydov^a, K.V. Rybalka^a, L.A. Beketaeva^a, V.M. Volgin^b <i>^aA.N. Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia; ^bTula State University, Tula, Russia</i> Electrochemical determination of corrosion rate of Ni-Cr-Mo alloy in the NaCl solution
P 2.05	E. A. Matter^a, S. Kozhukharov^b, M. Machkova^b, V. Koshukharov^b <i>^aChemistry Department, Faculty of Science, Damanhour University, Damanhour, Egypt ^bUniversity of Chemical Technology and Metallurgy, Sofia, Bulgaria</i> Electrochemical studies on the corrosion inhibition of AA2024 aluminium alloy by rare earth ammonium nitrate in 3.5 % NaCl solutions
P 2.06	D. Neov^a, N. Velinov^b, V. Antonov^a, L. Dabrowski^c, M. Machkova^b, S. Neov^a, V. Kozhukharov^b <i>^aInstitute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia, Bulgaria; ^bUniversity of Chemical Technology and Metallurgy, Sofia, Bulgaria; ^cAtomic Energy Institute, Swierk, Poland</i> Electronic and crystal structure of Ruddlesden-Popper phase LaSrFeO ₄
P 2.07	M.M. Dardavila, C. Kollia <i>National Technical University of Athens, Athens, Greece</i> Composite electroplating under strong agitation
P 2.08	Z. Sompolos, P. Yianoulis <i>Energy and Environment Laboratory, Physics Department, University of Patras, Patras, Greece</i> Preparation of submicron Ytria Stabilized Zirconia films via electron beam deposition. Morphological, chemical and electrochemical examination

POSTER SESSION 2

Wednesday, 22 June 2011

Poster Number	Presentation
P 2.09	M. Giannouli, P. Yianoulis <i>Energy and Environment Laboratory, Physics Department, University of Patras, Patras, Greece</i> Development and optimisation of low-cost electrochemical solar cells
P 2.10	M. Bouroushian, D. Karoussos, E. Thoulitotis <i>General Chemistry Laboratory, School of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Mott – Schottky analysis of CdSe-sensitized porous TiO ₂ electrodes
P 2.11	T. Stergiopoulos^a, E. Rozi^a, C. S. Karagianni^b, P. Falaras^a <i>^aInstitute of Physical Chemistry, NCSR “Demokritos”, Athens, Greece</i> <i>^bSchool of Chemical Engineering, National Technical University of Athens, Athens, Greece</i> Ionic liquid-based electrolyte solidified by the PVdF-HFP polymer for dye-sensitized photoelectrochemical solar cells
P 2.12	R. Inguanta, E. Scaduto, C. Sunseri, S. Piazza <i>Dipartimento di Ingegneria Industriale, Università di Palermo, Palermo, Italy</i> Thin films of semiconductors for flexible solar cells: Electrochemical deposition and characterization.
P 2.13	J. Vila^a, M. Domínguez-Pérez^a, E. Rilo^a, S. García-Garabal^a, L. M. Varela^b, O. Cabeza^a <i>^aMesturas Group, Facultad de Ciencias, Universidade da Coruña, A Coruña, Spain</i> <i>^bNanomaterials and Soft Matter Group, Faculty of Physics, Univ. of Santiago de Compostela, Santiago de Compostela, Spain</i> Physical properties of four 1-alkyl-3-methyl imidazolium iodide based electrolytes suitable for Dye-Sensitized Solar Cells
P 2.14	J. H. Kim, J. Park, Y. S. Kun, M.Y. Song, J.-S. Yu <i>Dept. of Advanced Materials Chemistry, Korea University, ChungNam, Republic of Korea</i> Ordered multimodal porous carbon as a new highly efficient counter electrode in solar cells
P 2.15	R. Salazar^a, M. S. Ureta-Zañartu^a, E. Brillas^b <i>^aDepartamento de Ciencias del Ambiente, Facultad de Química y Biología, Universidad de Santiago de Chile USACH, Santiago, Chile</i> <i>^bDepartament de Química Física, Facultat de Química, Universitat de Barcelona, España</i> Mineralization of azo dyes in a pilot plant by solar photo electro-Fenton
P 2.16	R. Salazar^a, M. S. Ureta-Zañartu^a, E. Brillas^b <i>^aDepartamento de Ciencias del Ambiente, Facultad de Química y Biología, Universidad de Santiago de Chile USACH, Santiago, Chile</i> <i>^bDepartament de Química Física, Facultat de Química, Universitat de Barcelona, España</i> Degradation of Myclobutanil by electro-oxidation using a BDD anode

POSTER SESSION 2

Wednesday, 22 June 2011

Poster Number	Presentation
P 2.17	E.R. Henquin^a, M.E.H. Bergmann^b, T. Iourtchouk^b, J.M. Bisang^a ^a Universidad Nacional del Litoral, Santa Fe, Argentina ^b Anhalt University, Köthen/Anh., Germany Results on studying a technical reactor for drinking water disinfection
P 2.18	M. Cataldo Hernández^a, Carlos Carlesi^b, Debora Fino^a ^a Department of Materials Science and Chemical Engineering, Politecnico di Torino, Torino, Italy ^b Escuela de Ingeniería Química, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile Electrochemical reactor for simultaneous flotation and organic/inorganic remediation of oily wastewater
P 2.19	N. de las Heras^{a,b}, E.P.L. Roberts^{a,c}, A. Gaffey^b, N. Brown^c ^a School of Chemical Engineering and Analytical Science, University of Manchester, Manchester, UK ^b Gaffey Technical Services Ltd, Carrs Industrial Estate, Haslingden, Rossendale, UK ^c Arvia Technology Ltd, Liverpool Science Park Innovation Centre, Liverpool, UK Treatment of swimming pool water using the Arvia TM process
P 2.20	C. Brebou^a, Z. Frontistis^a, D. Venieri^a, N. P. Xekoukoulotakis^a, D. Mantzavinos^a, A. Katsaounis^b ^a Department of Environmental Engineering, Technical University of Crete, Chania, Greece ^b Department of Chemical Engineering, University of Patras, Rion Patras, Greece BDD anodic oxidation as tertiary wastewater treatment for estrogens and pathogens removal
P 2.21	A. Cano-Quiroz^a, C. Barrera-Díaz^a, P. Cañizares^b, C. Sáez^b, M.A. Rodrigo^b ^a Centro Conjunto de Investigación en Química Sustentable UAEM-UNAM, Toluca, México ^b University of Castilla-La Mancha, Department of Chemical Engineering, Ciudad Real, Spain Electrodisinfection of treatment urban wastewater for reuse
P 2.22	E. Chatzisyneon, S. Sofianos, N. Politi, A. Katsaounis, D. Mantzavinos, D. Venieri Department of Environmental Engineering, Technical University of Crete, Chania, Greece Photoelectrochemical disinfection of secondary treated wastewaters
P 2.23	A. Hammad, Z. Yusuf, N. Rasheedi Saudi Aramco, Dhahran, KSA Desulfurization of crude fraction by <i>in situ</i> generated hydrogen
P 2.24	P.H. Britto-Costa, L.A.M. Ruotolo Department of Chemical Engineering, Federal University of São Carlos, São Carlos-SP, Brazil Copper electrodeposition in presence and absence of EDTA using reticulated vitreous carbon electrode

