

CONTENTS

Preface (K. Bouzek)	13
General information	14
Part I	
FINAL PROGRAMME	
Final Programme	17
Part II	
PLENARY LECTURES	
Electrochemical Engineering Time-Travel	
A. A. Wragg	30
Electrokinetic separations to increase the percent solids of the effluent from a phosphate mine	
M. E. Orazem	31
Electrochemical nano/micro fabrication and processing for functional structures, devices and materials – process development and mechanistic understanding	
T. Homma	32
Gas diffusion electrodes in electrolysis – from chlorine manufacturing today to production of other chemicals tomorrow	
J. Kintrup	33
Integrated microbial fuel cell – supercapacitor systems	
C. Santoro, F. Soavi, C. Arbizzani, A. Serov, P. Atanassov	34
Immobilizing active species in functional coatings: challenges and opportunities	
J. Tedim	35
Part III	
KEYNOTE LECTURES	
Selectivity between oxygen and chlorine formation in the chlorate process	
A. Cornell, B. Endrődi, R. Karlsson, S. Sandin	38
The electrochemical generation of hydrogen – How did it start-a historical overview	
M. E. H. Bergmann	39
Gas purity in PEM and alkaline water electrolysis	
P. Haug, M. Koj, B. Kreitz, P. Trinke, B. Bensmann, R. Hanke-Rauschenbach, T. Turek	40
Solar photoelectro-Fenton treatment of a mixture of parabens spiked into secondary treated wastewater effluent using low input current	
J. R. Steter, E. Brillas, I. Sirés	41
Interpretation of CPE parameters in terms of physically meaningful system properties	
M. E. Orazem, B. Tribollet, V. Vivier, M. Musiani, N. Pébère	42

Immobilization of active molecules in nanostructured materials for multifunctional coatings	
J. Tedim, M. G. S. Ferreira	43
Part IV	
LECTURES	
Design and fabrication of a low-cost anode for electrolytic water disinfection	
S. González, M. Colet-Lagrange	46
Titanium supported manganese containing electrodes for environmental applications	
G. Sotgiu, M. Orsini, D. Montanaro, E. Petrucci	47
Effect of titanium hydride as interlayer on the stability of Ti/Sn-Sb-Ni oxide anodes prepared by spin coating	
M. Abbasi, S. Sandin, J. Bäckström, A. Cornell	48
The effect of Ti metal surface modification on its passivation and surface contact resistance	
T. Bystron, M. Vesely, M. Paidar, K. Bouzek	49
Pd-Zn/C bimetallic electrocatalysts for oxygen reduction reaction	
G. Bampos, D. I. Kondarides, S. Bebelis	50
Reversible electrokinetic adsorption barriers for the removal of organochlorine herbicide from spiked soils	
S. Rodrigo, C. Sáez, P. Cañizares, M. A. Rodrigo	51
Graphite felt electrodes for vanadium redox flow battery – optimization of thermal treatment with respect to performance and durability	
P. Mazúr, J. Mrlík, J. Povedič, J. Vrána, J. Dundálek, J. Kosek	52
Study of new electrode materials for the vanadium redox flow batteries	
N. K. Hernandez-Sanchez, C. Ponce de Leon	53
Platinum coated porous electrodes for redox flow batteries: X-Ray tomography, mass transfer and pressure drop studies	
L. F. Arenas, C. Ponce de León, F. C. Walsh	54
Strategies to suppress shunt currents in redox flow batteries	
J. Povedič, J. Dundálek, M. Solík, J. Vrána, P. Mazúr, J. Kosek	55
Effect of membrane properties on performance of vanadium redox flow battery	
J. Vrána, J. Charvát, P. Mazúr, J. Povedič, J. Dundálek, J. Kosek	56
Capacity balancing methods for vanadium redox-flow batteries	
K. Schafner, T. Turek	57
In situ increased cathode selectivity in the hydrogen evolution reaction by addition of multivalent transitional metal compounds to the solution	
B. Endrődi, N. Simic, M. Wildlock, A. Cornell	58
In situ monitoring the phenomenon of electrochemical promotion of catalysis by synchrotron analysis	
A. de Lucas-Consuegra, J. Gonzalez-Cobos, J. P. Espinós, V. Rico, J. R. Sánchez-Valencia, A. R. González-Elípe, V. Perez-Dieste, C. Escudero	59

Electrochemical oxidation of hydroxymethylfurfural to 2,5-furandicarboxylic acid R. Latsuzbaia, R. J. M. Bisselink, M. Crockatt, C. P. M. Roelands, E. L. V. Goetheer	60
Development of new electrolyzers for hydrogen production from alcohols A. B. Calcerrada, A. R. de la Osa, J. Llanos, F. Dorado, J. L. Valverde, A. de Lucas-Consuegra	61
Effect of the MEA manufacturing process on the performance of PEM water electrolysis single cells with different sizes M. Paidar, T. Bystroň, K. Bouzek, G. Papakonstantinou, T. Vidakovic-Koch, K. Sundmacher, C. Immerz, B. Bensmann, R. Hanke-Rauschenbach	62
Experimental analysis of a 50 cm single-channel PEM water electrolysis cell C. Immerz, M. Schweins, T. Bystroň, M. Paidar, B. Bensmann, K. Bouzek, R. Hanke-Rauschenbach	63
Feasibility of electro-assisted leaching of cathodes from spent lithium batteries – comparison with acid leaching P. Minois, A. Chagnes, L. Svecova, M.-O. Lupsea, P.-X. Thivel	64
Electrochemical ion pumping for desalination and lithium recovery D. Brogioli, M. S. Palagonia, C. Erinmwingbovo, F. La Mantia	65
Study of the hydrodynamic of electrochemical ion pumping for lithium recovery M. S. Palagonia, D. Brogioli, F. La Mantia	66
Numerical analysis of the effect of diaphragm length, position and porosity on the electric field and mass transport inside a lithium electrolysis cell E. Oliaii, M. Désilets, G. Lantagneb	67
Polymedicated patients: does electrolysis remove traces of different medicines from urine? S. Cotillas, E. Lacasa, C. Sáez, P. Cañizares, M. A. Rodrigo	68
Innovative approach for the aeration of electrochemical reactors to produce hydrogen peroxide J. F. Pérez, J. Llanos, C. Sáez, I. Moraleda, C. López, P. Cañizares, M. A. Rodrigo	69
Commercial development of the direct carbon fuel cell for low emission coal J. A. Allen, S. W. Donne	70
Impact of operational voltage on the Pt surface area deterioration in high temperature PEM fuel cell M. Prokop, R. Kodým, T. Bystron, P. Belsky, M. Paidar, K. Bouzek	71
A 3D dynamic mathematical model of Pt-based catalyst degradation in an industrial scale HT PEM fuel cell stack M. Drakselová, R. Kodým, D. Šnita, K. Bouzek	72
Development of power management and air treatment system for PEM fuel cell based mobile APU J. Mališ, M. Paidar, K. Bouzek	73
Effect of number of supercapacitors directly hybridized with PEMFC on the component contribution and the performance of the system D. Arora, K. Gérardin, S. Raël, C. Bonnet, F. Lapique	74

High-efficiency in reverse electrodialysis – water electrolysis energy system R. A. Tufa, J. Hnat, J. Veerman, W. van Baak, E. Curcio, K. Bouzek	75
Endogenous hormones degradation under visible light on nanotubular oxide layer grown on TiW alloys using a photocatalytic cell V. M. Kaminagakura, M. E. Oliveira, R. Bertazzoli, C. Ponce de León, C. A. Rodrigues	76
Electro-peroxone: a novel advanced oxidation process for the degradation of organic pollutants E. Petrucci, I. Bavasso, L. Di Palma, D. Montanaro	77
A novel eletron-Fenton system based on the highly efficient hydrogen peroxide generation reactor G. B. Ren, M. H. Zhou	78
Efficiency of DMSO as hydroxyl radical probe and study of the influence of current density by reactive oxygen species monitoring in an Electrochemical Advanced Oxidation Process A. Abou Dalle, L. Domergue, F. Fourcade, A. A. Assadi, H. Djelal, T. Lendormi, S. Taha, A. Amrane	79
Electrochemical treatment of poly- and perfluoroalkyl substances (PFASs) from industrial effluents A. Urtiaga, B. Gómez-Ruiz, S. Gómez-Lavín, N. Diban, A. Colin, V. Boiteux, X. Dauchy	80
Voltammetric study of 6:2 FTSA oxidation using BDD electrodes J. Carrillo-Abad, V. Pérez-Herranz, A. Urtiaga	81
Electrochemical energy storage for renewable energy integration: zinc-air flow batteries B. Amunátegui, M. Sierra, A. Ibáñez	82
Bifunctional air electrodes for zinc-air flow batteries B. Pichler, L. Rešćec, V. Hacker	83
Iron air battery: design, construction and characterisation H. Figueredo-Rodríguez, R. McKerracher, C. Ponce-de-León	84
Development of aluminium-ion battery with novel intercalation materials R. D. McKerracher, A. W. Holland, R. G. A. Wills, A. J. Cruden	85
A semi-empirical aging model for lithium iron phosphate electrode B. Rajabloo, W. Wakem, A. Jokar, M. Désilets, G. Briard	86
Prediction of photo-anode current densities for modelling scaled-up photo-electrochemical reactors F. E. Bedoya Lora, A. Hankin, I. Gentle, G. H. Kelsall	87
Doped hematite photoanodes for light assisted water electrolysis J. Krýsa, T. Kotrla, Š. Paušová, M. Zlámal, M. Neumann-Spallart	88
Porous silicon electrochemically modified with polyaniline: effect of the preparation conditions on the photocurrent properties S. Corgiolu, A. Vacca, M. Mascia, S. Palmas, E. Sechi, L. Mais, M. V. Tiddia, G. Mula	89
Integration of electrochemical oxidation and nanofiltration for a more efficient treatment of perfluorohexanoic acid A. Soriano, D. Gorri, A. Urtiaga	90

Visualisation of pH distribution in an electrocoagulation cell using laser scanning confocal microscopy	
B. Fuladpanjeh-Hojaghan, M. Trifkovic, E. P. L. Roberts	91
Treatment of phosphate-containing waters: electrocoagulation or chemical coagulation?	
B. Lassoued, M. Le Page Mostefa, A. Attour, F. Zaghrouba, F. Lapique	92
Elimination of iron by electrocoagulation with Al electrodes: fundamental investigation of the lumped phenomena involved	
A. Doggaz, M. Le Page Mostefa, A. Attour, M. Tlili, F. Lapique	93
Model-based assessment of the influence of electrode and spacer channel design on desalination in a membrane capacitive deionisation cell	
F. Kubanek, U. Krewer	94
Modelling the transport of ions and water dissociation in an electrodeionization process for As(V) removal	
E. P. Rivero, A. Ortega, M. R. Cruz-Díaz, F. A. Rodríguez, I. González	95
In-situ determination of thickness and electrochemical properties of oxide film on aluminium in aqueous solution	
N.-H. Giskeødegård, O. Hunderi, K. Nisancioglu	96
Hydrogen embrittlement susceptibility test using weak alkaline solution for rebar in pre-stressed concrete	
Y. Takeuchi, T. Kamisho, M. Watanabe, T. Sawada	97
Nickel hexacyanoferrate electrodes for cation intercalation desalination	
S. Porada, P. Bukowska, A. Shrivastava, P. M. Biesheuvel, K. C. Smith	98
Overcoming mass transfer limitations by the simultaneous electro dialysis and electro-oxidation of 2,4-D	
A. Raschitor, J. Llanos, M. A. Rodrigo, P. Cañizares	99
Boron doped diamond electrodes for degradation of pollutants and recovery of metals	
C. Weidlich, S. Hild, J. Schuster, K.-M. Mangold	100
Improving the efficiency of electrolytic remediation processes through novel strategies for the preconcentration of pollutants	
M. Muñoz, J. Llanos, C. Sáez, P. Cañizares, M. A. Rodrigo	101
Ferrates (VI)	
J. Híveš, K. Kerkeš, E. Kubiňáková	102
Kinetic modeling of the high temperature H₂O-CO₂ co-electrolysis	
R. Kodým, P. Vágner, M. Paidar, K. Bouzek	103
An electrochemical reactor to reduce CO₂ to valuable chemicals	
C. I. Müller, K. Ehelebe, B. Kieback, L. Röntzsch	104
Electrochemical reduction of CO₂ in aqueous media catalysed by copper-tin electrodes	
S. Palmas, L. Mais, A. Vacca, M. Mascia, E. Sechi, S. Corgioli, F. Ferrara, A. Pettinau	105
Electrochemical reduction of CO₂ using Boron doped diamond electrodes in aqueous electrolytes	
N. S. Romero, K. Wiesner, W. Eisenreich, O. Hinrichsen, Y. Einaga, K. Nakata	106

Production of organics compounds from CO₂ photo-electroreduction using TiO₂ nanotubes decorated with copper oxides nanoparticles	
J. Almeida, J. F. Brito, C. A. Rodrigues	107
Step potential electrochemical spectroscopy (SPECS): A novel way of examining the electrochemical characteristics of materials	
M. Hughes, J. Allen, S. Donne	108
The role of electrodeposited Cu/In/Ga precursors film morphology and interdiffusion in thin film Cu(In,Ga)Se₂ solar cell production	
A. Hovestad, H. Rendering, É. S. F. Le Calvé	109
Anion selective polymer electrolytes with DABCO functional groups for advanced alkaline water electrolysis	
J. Hnat, M. Plevova, J. Zitka, M. Paidar, K. Bouzek	110
Electrical conductivity of low temperature multicomponent cryolite based electrolytes	
E. Kubiňáková, J. Híveš, V. Danielik	111
Removal of organochlorinated species from soil by combined biological and electrochemical processes	
S. Barba, B. Carboneras, J. Villaseñor, F. J. Fernández, P. Cañizares, M. A. Rodrigo	112
Investigation of metabolic pathways in a microbial fuel cell via process engineering methods	
F. Kubanek, U. Krewer	113
Bioelectrode performance based on formate dehydrogenase immobilization onto mesoporous carbons for CO₂ electrochemical reduction	
N. Hernández-Ibáñez, A. Gomis-Berenguer, C. O. Ania, V. Montiel, J. Iniesta	114
Optimization of the cell for capacitive deionization	
A. Giurg, M. Paidar, O. Škorvan	115

Part V

POSTER PRESENTATIONS

PEM water electrolysis: analysis of transport processes in the anodic porous transport layer	
A. Zinser, G. Papakonstantinou, K. Sundmacher	118
Electrocatalytic hydrogenation of Cinnamaldehyde in a polymeric electrolyte membrane reactor	
M. J. Torres, A. R. De La Osa, A. De Lucas-Consuegra, J. L. Valverde, P. Sánchez	119
Electrochemical behavior of fission products in pyro-electrochemical reduction process	
S. M. Jeong, M. W. Lee, B. H. Park	120
Fabrication of SnO₂ nanoparticle film and its application in photoelectrochemical anticorrosion for stainless steel	
J. Hu, Z. Guan, Y. Liang, H. Wang, R. Du	121

Electro-chemical generation of hydrogen peroxide under pressure using carbon felt electrodes	
J. F. Pérez, O. Scialdone, B. Schiavo, S. Sabatino, C. Sáez, J. Llanos, C. López, P. Cañizares, M. A. Rodrigo	122
The effect of bone char on electrokinetic removal of pyrene from polluted soil	
A. Rezaee, S. E. Hashemi	123
Study of ceramic electrodes for the removal of antibiotics in wastewater	
J. Mora, M. García-Gabaldón, T. Droguett, E. Ortega, V. Pérez-Herranz, S. Mestre	124
Degradation of the Reactive Black 5 by electrochemical oxidation using ceramic electrode	
T. Droguett, M. García-Gabaldón, J. Mora, E. Ortega, S. Mestre, V. Pérez-Herranz	125
Degradation of levofloxacin in a solar photoelectro-Fenton flow plant in sulfate medium	
I. Sirés, E. Brillas, G. Coria, J. L. Nava	126
Synthesys of WO₃-modified TiO₂ nanotubes for photoelectrocatalytic oxidation of Methyl Orange	
L. Mais, S. Palmas, A. Vacca, M. Mascia, S.Corgiolu, E. Sechi	127
On the discontinuous electrochemical chlorine formation for drinking water disinfection at low Re numbers	
M. E. H. Bergmann	128
Electrochemical ammonia removal by chlorination and air stripping	
M. Paidar, M. Roubalík, O. Škorvan	129
Analysis of fluid flow uniformity in the pilot-scale electrolysers as a representative of the electromembrane process unit with plate-&-frame configuration	
R. Kodým, M. Němeček, D. Šnita, K. Bouzek	130
New reactor design for electrocoagulation using 3D electrodes: The Cartridge Type Electrocoagulation Reactor (CTECR)	
D. Valero, V. García-García, E. Expósito, V. Montiel	131
Mass-transfer measurements of 3D Pt-Ir/Ti electrodes in a direct borohydride fuel cell by an electrochemical technique	
A. Abahussain, C. Ponce de León, F. C. Walsh	132
Study of electrolytes based on alkaline hydroxides for use in zinc-air fuel cells	
O. Libánský, J. Dundálek, J. Pcedič, J. Vrána, P. Mazúr, J. Kosek	133
Electrolytes for vanadium redox flow battery – production, characterization and stability	
J. Charvát, P. Mazúr, J. Pcedič, J. Vrána, J. Dundálek, J. Kosek	134
Monitoring the state of charge of all-vanadium redox-flow batteries	
C. Weidlich, L. Holtz, K.-M. Mangold	135
Effect of pore size of porous glass membranes on the performance of vanadium redox flow batteries	
H. Mögelin, A. Barascu, S. Krenkel, S. Wassersleben, D. Enke, U. Kunz	136

Ultra-low Pt catalyst and its application to ORR reaction	
G. Park, M. Choun, J. Lee	137
Evaluation of microbial fuel cells with graphite plus Co_3O_4 paints as oxygen reduction cathode catalyst by using different producing methods and supports	
B. Jiang, T. Muddemann, U. Kunz	138
Controlled amino-functionalization of gold surfaces by electrochemical deposition of diazonium salts	
S. Corgiolu, A. Vacca, M. Mascia, S. Palmas, E. Sechi, L. Mais, C. Napoli, M. Barbaro	139
Tin electrodeposition on gold polycrystalline	
D. Aranzales, M. Koper, J. Wijenberg	140
Surfactant film voltammetry of bacterial and mammalian cytochromes P450 suggests tunable, film-dependent properties	
A. K. Udit	141
CO_2-conversion to acids and alcohols by microbial electrosynthesis	
M. Haberbauer, C. Hemmelmair, S. Thallner, W. Schnitzhofer	142
Electrodeposited Cu-alloy films as catalysts for CO_2 electroreduction	
A. Hovestad, R. Latsuzbaia, R. M. Meertens, E. L. V. Goetheer	143
Electrochemical reduction of CO_2 to liquid fuels on a different metal-incorporated bi-phasic Cu_2O-Cu electrode	
S. Lee, J. Lee	144
Thermodynamic simulation of the H_2O-CO_2 co-electrolysis in solid oxides electrolysis cell at high temperatures	
V. Miloš, R. Kodym, P. Vágner, M. Paidar, K. Bouzek	145
The influence of deposition variables on the physical and electrochemical characteristics of carbons synthesised through the electrolytic reduction of molten carbonate salts	
M. Hughes, J. Allen, S. Donne	146
Electrochemical synthesis of ammonia from water and nitrogen under atmospheric pressure	
H. Ch. Yoon, Ch.-Y. Yoo, J. N. Kim, E. Y. Jung, H. Ch. Hee	147
Relevant aspects in the stability performance of different anodic alumina (AAO) films in aqueous sulfate solutions	
F. El-Taib Heakal	148
Part VI	
LIST OF PARTICIPANTS	
List of participants	149
Part VII	
AUTHOR INDEX	
Author index	154