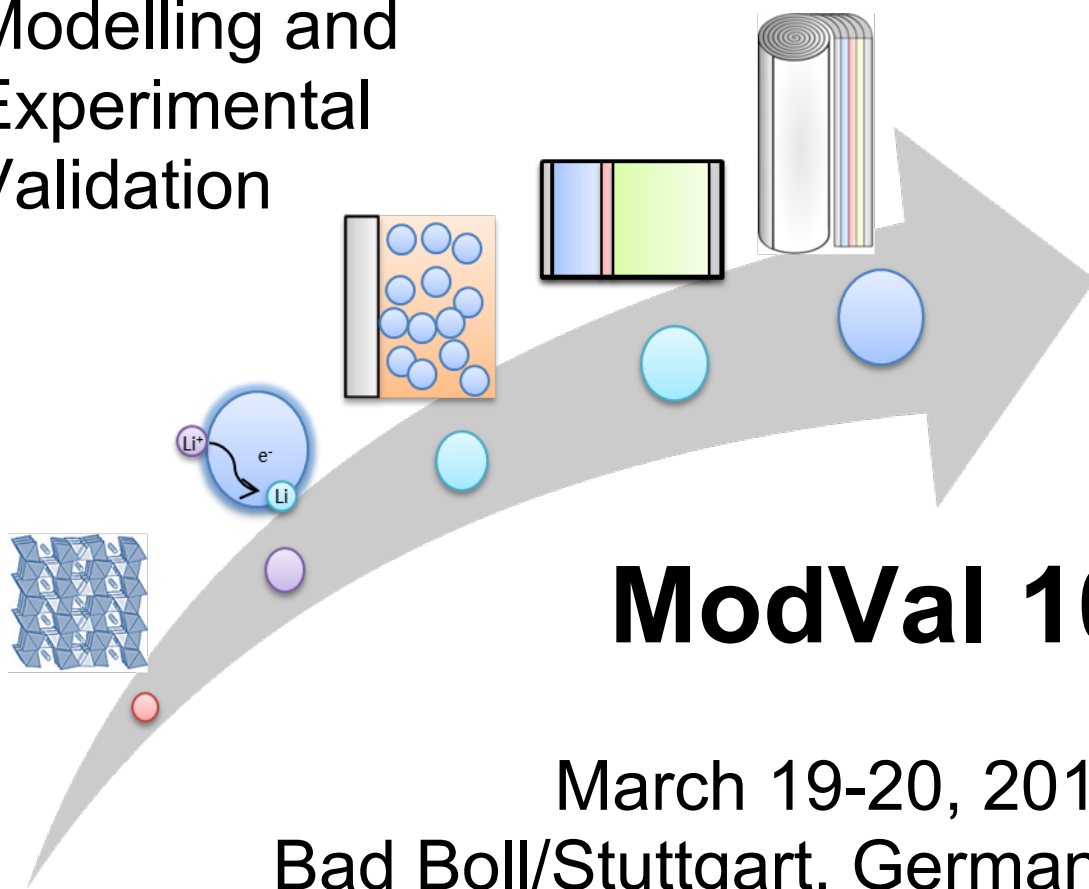


10th Symposium on Fuel Cell and Battery Modelling and Experimental Validation



ModVal 10

March 19-20, 2013
Bad Boll/Stuttgart, Germany

Symposium Program

<http://modval10.hs-offenburg.de>



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Monday, March 18, 2013

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| From 15:00 | Hotel rooms available |
| From 18:00 | Light dinner buffet and get-together |

Tuesday, March 19, 2013

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| 08:30-08:40 | Welcome from the organizers W. Bessler, T. Jacob, A. Groß | |
| 08:40-09:30 | Plenary lecture Measurement and modelling of solid oxide fuel cell and lithium battery electrode microstructure in three dimensions N. Brandon , F. Tariq, K. Rhazaoui, V. Yufit, R. Clague, S. Cooper, F. Marquis, C. Adjiman, P. Shearing, Q. Cai, D. Eastwood, P. Withers, R. Bradley, P. Lee, J. Gelb Dept. Earth Science and Engineering, Imperial College London, UK; Dept. Chemical Engineering, UCL, UK; Dept. Chemical Engineering, Surrey University, UK; School of Materials, University of Manchester, UK; Xradia Inc, Pleasanton, CA, USA | |
| | Microstructure of fuel cells and batteries | PEM fuel cell degradation |
| 09:40-10:00 | Microstructure degradation in SOFC anodes: Relationship between topological parameters and transport properties L. Holzer , L. Keller, T. Hocker, O. Pecho, B. Münch, P. Gasser, B. Iwanschitz, M. Neumann, G. Gaiselmann, V. Schmidt Zurich University of Applied Sciences, Winterthur, Switzerland; Empa Dübendorf, Switzerland; ETH Zurich, Switzerland; Hexis SA, Winterthur, Switzerland; Ulm University, Germany | Validation of membrane degradation mechanisms at defects by synchrotron based methods S. Kreitmeier , A. Wokaun, F. N. Büchi Electrochemistry Laboratory, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland |
| 10:00-10:20 | Microstructural modelling for prediction of effective properties in porous SOFC electrodes A. Bertei , C. Nicoletta University of Pisa, Department of Civil and Industrial Engineering, Pisa, Italy | Dead spot in a PEM fuel cell anode A. Kulikovskiy Research Centre Juelich, IEK-3, 52425 Juelich, Germany |
| 10:20-10:40 | Solid oxide fuel cell effective conductivity modelling K. Rhazaoui , Q. Cai, C. S. Adjiman, N. P. Brandon Imperial College of Science, London, UK; University of Surrey, Guilford, UK; Ulm University, Institute of Electrochemistry, Ulm, Germany | Long-term test of PEM fuel cells with a dry cathode supply and daily EIS analyses S. Gößling , P. Beckhaus, A. Heinzl ZBT GmbH, Duisburg, Germany |
| 10:40-11:10 | Coffee break | |
| | Microstructure of fuel cells and batteries | PEM fuel cell degradation |
| 11:10-11:30 | Modeling of electrical and ionic transport properties in granular electrodes considering composition and mechanical loading J. Ott , B. Voelker, Y. Gan, R. McMeeking, M. Kamlah Institute for Applied Materials (IAM-WBM), Karlsruhe Institute of Technology (KIT); Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, USA; School of Civil Engineering, The University of Sydney, Australia | PEMFC predictive modelling function of the operating mode and local conditions M. Gerard , P. Schott, C. Robin CEA, DRT/LITEN, 17 rue des Martyrs, 38000 Grenoble, France |
| 11:30-11:50 | Thermodynamically derived model and simulation of intercalation currents and overpotentials in Li Ion batteries A. Latz , J. Zausch Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany; Institute for Technical Thermodynamics, DLR, Stuttgart; Fraunhofer Institute for Industrial Mathematics, Kaiserslautern, Germany | Elementary kinetic modeling for the investigation of direct-methanol fuel cell degradation T. Jahnke , W. G. Bessler German Aerospace Center (DLR), Institute of Technical Thermodynamics, Stuttgart, Germany; Offenburg University of Applied Sciences, Offenburg, Germany |

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| 11:50-12:10 | <p>Graph-based simulated annealing: A hybrid approach to stochastic modeling of uncompressed graphite electrodes used in Li-ion batteries O. Stenzel, D. Westhoff, I. Manke, M. Kasper, D. P. Kroese, V. Schmidt</p> <p>Ulm University, Institute of Stochastics, Ulm, Germany; Helmholtz Center Berlin, Institute of Applied Materials, Berlin, Germany; Centre for Solar and Hydrogen Research Baden-Württemberg (ZSW), Ulm, Germany; University of Queensland, Department of Mathematics, Brisbane, Australia</p> | <p>Determination of catalyst layer resistance in alkaline fuel cell P. S. Khadke, U. Krewer</p> <p>Max Planck Institute for Dynamics of Complex Technical Systems, Sandtorstraße 1, 39106 Magdeburg, Germany; Technische Universität Braunschweig, Institut für Energie- und Systemverfahrenstechnik, Franz-Liszt-Straße 35, D-38106 Braunschweig</p> |
| 12:10-12:30 | <p>Phase-field model for the interplay of diffusion and stresses in electrode particles of lithium ion batteries M. Huttin, M. Kamlah</p> <p>Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany</p> | <p>A quasi 2D AC model for analysis of degradation of a high temperature proton exchange fuel cell A. Baricci, G. Vendrami, S. Galbiati, A. Casalegno</p> <p>Politecnico di Milano, Department of Energy, Milano, Italy</p> |
| 12:30-13:40 | Lunch | |
| | Microstructure of fuel cells and batteries | Solid oxide fuel and electrolyzer cells |
| 13:40-14:00 | <p>Modeling and simulation of fracture in active electrode particles of Li-Ion batteries using a phase field approach M. Klinsmann, C. Miehe, M. Kamlah</p> <p>Robert Bosch GmbH, CR/ARM, Gerlingen-Schillerhöhe, Germany; KIT Karlsruhe, Institute for Applied Materials (IAM), Karlsruhe, Germany; Stuttgart University, Institute of Applied Mechanics, Stuttgart, Germany</p> | <p>Oxygen exchange mechanism on mixed-conducting perovskites: Insight from experiment and theory R. Merkle, L. Wang, Y. A. Mastrikov, E. A. Kotomin, M. M. Kuklja, J. Maier</p> <p>Max Planck Institute for Solid State Research, Stuttgart, Germany; Institute for Solid State Physics, University of Latvia, Riga, Latvia; Materials Science and Engineering Dept., University of Maryland, College Park, USA</p> |
| 14:00-14:20 | <p>Synchrotron tomographic study on the inhomogeneous compression of gas diffusion layers in fuel cells C. Tötze, G. Gaiselmann, I. Manke, A. Hilger, T. Arlt, H. Markötter, F. Wieder, M. Osenberg, J. Bohner, W. Lehnert, V. Schmidt, A. Kupsch, B.R. Müller, J. Banhart</p> <p>Technische Universität Berlin, Department of Materials Science and Technology, Germany; Helmholtz-Zentrum Berlin für Materialien und Energie, Institute of Applied Materials, Germany; Ulm University, Institute of Stochastics, Germany; Forschungszentrum Jülich, Institute of Energy and Climate Research, Germany; BAM Federal Institute for Materials Research and Testing, Germany; RWTH Aachen University, Germany</p> | <p>Current-voltage behaviour of SOFCs considering anode degradation V. Yurkiv, J. Neidhardt, W. G. Bessler</p> <p>German Aerospace Center (DLR), 70569 Stuttgart, Germany; University of Stuttgart, 70550 Stuttgart, Germany; Offenburg University of Applied Sciences, 77652 Offenburg, Germany</p> |
| 14:20-14:40 | <p>Stochastic modeling of fiber-based materials for varying degrees of compression G. Gaiselmann, C. Tötze, I. Manke, W. Lehnert, V. Schmidt</p> <p>Ulm University, Institute of Stochastics, Germany; Helmholtz Centre Berlin for Materials and Energy, Institute of Applied Materials, Germany; Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, IEK-3, Germany; RWTH Aachen University, Germany</p> | <p>Computational modelling and simulation of a single micro tubular solid oxide fuel cell and stack for unmanned aerial vehicles B. Hari, A. Dhir, W. Bujalski, R. Steinberger-Wilckens</p> <p>The University of Birmingham, School of Chemical Engineering, Edgbaston, Birmingham, United Kingdom</p> |
| 14:40-15:00 | <p>Predicting effective transport properties in PEM fuel cells using pore-network simulations E. Medici, V. Konduru, J. S. Allen</p> <p>Michigan Technological University, Houghton, Michigan, USA</p> | <p>Electrochemical impedance modeling of gas transport and reforming kinetics in Ni/YSZ anodes for SOFCs A. Kromp, H. Geisler, A. Weber, E. Ivers-Tiffée</p> <p>Institut für Werkstoffe der Elektrotechnik (IWE), Karlsruher Institut für Technologie (KIT), Adenauerring 20b, D-76131 Karlsruhe / Germany; DFG Center for Functional Nanostructures (CFN), Karlsruher Institut für Technologie (KIT), D-76131 Karlsruhe / Germany</p> |
| 15:00-15:20 | <p>Refinement on post-processing of 3D transport simulations in fibrous microstructure, using the lattice boltzmann method D. Froning, J. Hofmockel, J. Brinkmann, G. Gaiselmann, U. Reimer, V. Schmidt, W. Lehnert</p> <p>Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, IEK-3, Jülich, Germany; Ulm University, Institute of Stochastics, Ulm, Germany; Modeling in Electrochemical Process Engineering, RWTH Aachen University, Germany</p> | <p>Modeling and experimental validation of solid oxide electrolysis cells for hydrogen production V. Menon, V. M. Janardhanan, S. Tischer, O. Deutschmann</p> <p>Institute for Chemical Technology and Polymer Chemistry; Helmholtz Research School, Energy-Related Catalysis; Institute for Catalysis Research and Technology; Karlsruhe Institute of Technology, 76131 Karlsruhe, Germany; Department of Chemical Engineering, IIT Hyderabad, Andhra Pradesh 502 205, India</p> |
| 15:20-15:40 | <p>Numerical Determination of Transport Properties of Catalyst Layer, Microporous Layer and Gas Diffusion Layer Jürgen Becker</p> <p>Math2Market GmbH, Kaiserslautern, Germany</p> | <p>Hybrid CFD and EIS model for SOFC and SOEC cell simulations V. Novaresio, C. Graves, H. L. Frandsen, M. Santarelli</p> <p>Politecnico di Torino, Energy department, Turin, Italy; Riso DTU, Energy conversion and storage department, Roskilde, Denmark</p> |

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| 15:40-17:10 | Poster session with coffee break |
| | Computer aided material engineering of porous transport layers with GeoDict J. Becker, E. Glatt, A. Wiegmann Math2Market GmbH, Kaiserslautern, Germany; Fraunhofer ITWM, Kaiserslautern, Germany |
| | Opportunities for the validation of fuel cell modeling studies through the H2FC transnational access activities P. Boillat, P. Oberholzer, E. H. Lehmann Electrochemistry Laboratory, Paul Scherrer Institut (PSI), 5232 Villigen PSI, Switzerland; Neutron Imaging and Activation Group (NIAG), Paul Scherrer Institut (PSI), 5232 Villigen PSI, Switzerland |
| | Modelling for fault diagnosis and prognosis in polymer electrolyte membrane fuel cells for automotives D. Bourlis, R. Thring Loughborough University, Loughborough, United Kingdom |
| | Mass transport in gas diffusion electrodes with aqueous electrolytes for Li-O₂ batteries: Modeling and experiments T. Danner, B. Horstmann, D. Wittmaier, N. Wagner, W. G. Bessler German Aerospace Center, Institute of Technical Thermodynamics, Stuttgart, Germany; University of Stuttgart, Institute for Thermodynamics and Thermal Engineering, Stuttgart, Germany; Offenburg University of Applied Sciences, Offenburg, Germany; Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany |
| | Analysis of starvation and degradation effects in PEFCs under dynamic operating conditions S. Enz, M. Messerschmidt, J. Scholta Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW), Helmholtzstraße 8, Ulm, Germany |
| | Electrochemical impedance modeling of gas transport in Ni/YSZ anodes and associated gas channel for SOFCs H. Geisler, A. Kromp, S. Hirn, A. Weber, E. I. Tiffée Institut für Werkstoffe der Elektrotechnik (IWE), Karlsruher Institut für Technologie (KIT), Adenauerring 20b, D-76131 Karlsruhe / Germany; DFG Center for Functional Nanostructures (CFN), Karlsruher Institut für Technologie (KIT), D-76131 Karlsruhe / Germany |
| | Time-dependent 3D impedance simulation for mixed conducting SOFC cathodes A. Häffelin, J. Joos, M. Ender, A. Weber, E. I. Tiffée Institut für Werkstoffe der Elektrotechnik (IWE), Karlsruher Institut für Technologie (KIT), Adenauerring 20b, D-76131 Karlsruhe / Germany; DFG Center for Functional Nanostructures (CFN), Karlsruher Institut für Technologie (KIT), D-76131 Karlsruhe / Germany |
| | Understanding the effects of the polysulfide shuttle in Li/S batteries: A one-dimensional continuum model A. F. Hofmann, A. Latz, W. G. Bessler German Aerospace Center (DLR), Institute of Technical Thermodynamics, Pfaffenwaldring 38-40, 70579 Stuttgart, Germany; Helmholtz Institute Ulm (HIU) Electrochemical Energy Storage, 89081 Ulm, Germany; Karlsruhe Institute of Technology (KIT), P.O. Box 3640, 76021 Karlsruhe, Germany; Offenburg University of Applied Sciences, 77652 Offenburg, Germany |
| | Accurate calculation of tortuosity from velocity fields of transport simulations in porous media J. Hofmoeckel, D. Froning, J. Brinkmann, U. Reimer, W. Lehnert Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, IEK-3, Jülich, Germany; RWTH Aachen University, Germany |
| | Ab-initio study of processes on Li₂FeSiO₄ surfaces N. Hörmann, A. Groß Helmholtz-Institute Ulm (HIU) Electrochemical Energy Storage, Albert-Einstein-Allee 11, 89069 Ulm, Germany; Ulm University, Institute of Theoretical Chemistry, Albert-Einstein-Allee 11, 89069 Ulm, Germany |
| | Investigation of the influence of membrane parameters on PEMFC performance using the CFD code AVL FIRE L. Karpenko-Jereb, C. Sternig, A. Theiler, C. Fink, R. Tatschl, P. Prenninger Graz University of Technology, Institute of Physical & Theoretical Chemistry, Graz, Austria; AVL List GmbH, Advanced Simulation Technology, Graz, Austria |
| | Case-specific adaptations of the DIRECTT algorithm to neutron and electron tomography of fuel cell components A. Kupsch, M. P. Hentschel, A. Lange, B.R. Müller, T. Arlt, C. Tötze, H. Markötter, R. Grothausmann, I. Manke, S. Lück, V. Schmidt BAM Federal Institute for Materials Research and Testing, Berlin, Germany; Helmholtz Centre Berlin, Berlin, Germany; Ulm University, Institute of Stochastics, Ulm, Germany |
| | Microstructure influence on effective transport properties investigated by means of a stochastic simulation model M. Neumann, G. Gaiselmann, O. Pecho, L. Holzer, V. Schmidt Ulm University, Institute of Stochastics, Ulm, Germany; Zurich University of Applied Sciences, Institute of Computational Physics, Winterthur, Switzerland |
| | Mathematical modelling of direct ethanol fuel cells including free and adsorbed intermediate species J. Sánchez-Monreal, P. A. García-Salaberri, M. Vera Dept. de Ingeniería Térmica y de Fluidos, Universidad Carlos III de Madrid |
| | Structural and dynamical properties of Li-Ion batteries studied by various NMR techniques M. Scheuermann, R. Heinzmann, S. Indris Karlsruhe Institute of Technology, Karlsruhe, Germany; Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany |
| | A simplified model for O₂ transport and reduction kinetics in porous cathodes of Li-O cells T. Schied, F. Scheiba, H. Ehrenberg Technische Universität Dresden, Fakultät Maschinenwesen 01062 Dresden, Germany; Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden e. V., Helmholtzstraße 20, 01069 Dresden; Karlsruhe Institute of Technology (KIT), Institute for Applied Materials (IAM), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany; Helmholtz Institute Ulm (HIU) Electrochemical Energy Storage 3, Albert-Einstein-Allee 11, 89081 Ulm, Germany |
| | Simulation and modelling in a SOFC/GT hybrid power plant M. Steilen, M. Henke, C. Willich, J. Kallo, K. A. Friedrich German Aerospace Center, Institute of Technical Thermodynamics, Germany |

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| | <p>Numerical simulation and experimental validation for thermal runaway on lithium-ion cells N. Tanaka, J. Mehne, W. Nowak, M. A. Danzer, H. Döring, W. G. Bessler</p> <p>German Aerospace Center (DLR), Institute of Technical Thermodynamics, Stuttgart, Germany; University of Stuttgart, Institute for Modeling Hydraulic and Environmental Systems, Stuttgart, Germany; Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg (ZSW), Ulm, Germany; Offenburg University of Applied Sciences, Offenburg, Germany</p> |
| | <p>Preliminary physical model of DMFC anode impedance M. Zago, A. Baricci, F. Bresciani, A. Casalegno</p> <p>Politecnico di Milano, Department of Energy, Italy</p> |
| | <p>Simulation and parametric analysis of a power system equipped with a SOFC stack B. Zakrzewska, P. Pianko-Oprych, Z. Jaworski</p> <p>West Pomeranian University of Technology, Szczecin, Faculty of Chemical Technology and Engineering, Institute of Chemical Engineering and Environmental Protection Processes, al. Piastow 42, 71-065 Szczecin, Poland</p> |
| 17:10-18:00 | <p>Plenary lecture</p> <p>Mathematical modeling of lithium-ion batteries R. E. White</p> <p>University of South Carolina, Dept. of Chem. Engineering, Columbia, SC 29206</p> |
| 19:00 | <p>Conference dinner</p> |

Wednesday, March 20, 2013

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| | | <p>Lithium-ion and post-Li-ion batteries</p> |
| 08:30-08:50 | <p><i>Invited lecture</i> Model validation for model development in electrochemistry A. Badinski, T. J. Schmidt, R. Lee, S. Bräuninger</p> <p>BASF SE, Scientific Computing, Carl Bosch Straße, Ludwigshafen, Germany; Paul Scherrer Institut, Electrochemistry Laboratory, Villigen, Switzerland</p> | <p>From conventional vanadium redox flow batteries to vanadium oxygen fuel cells – modeling and simulation F. Wandschneider, P. Fischer, J. Tübke, H. Nirschl</p> <p>Fraunhofer Institute for Chemical Technology, Department of Applied Electrochemistry, Karlsruhe, Germany; Karlsruhe Institute of Technology, Institute for Mechanical Process Engineering and Mechanics, Karlsruhe, Germany</p> |
| | <p>Microstructure of fuel cells and batteries</p> | |
| 08:50-09:10 | <p>Influence of feed gas humidity and current density on the 3D water distribution in PEFC J. Eller, J. Roth, R. Gaudenzi, S. Irvine, F. Marone, M. Stanpanoni, A. Wokaun, F.N. Büchi</p> <p>Electrochemistry Laboratory, Paul Scherrer Institut, Villigen, Switzerland; Swiss Light Source, Paul Scherrer Institut, Villigen, Switzerland; Swiss Federal Institute of Technology, Zürich, Switzerland</p> | <p>Modeling crystallization in lithium-oxygen batteries B. Horstmann, T. Danner, W. G. Bessler</p> <p>German Aerospace Center, Institute of Technical Thermodynamics, Stuttgart, Germany; University of Stuttgart, Institute for Thermodynamics and Thermal Engineering, Stuttgart, Germany; Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany; Offenburg University of Applied Sciences, Offenburg, Germany</p> |
| 09:10-09:30 | <p>2-Phase fuel cell model based on discrete water path network model R. Alink, D. Gerteisen</p> <p>Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany</p> | <p>3D CFD simulation of lithium-air batteries based on electrochemical models C. Fink, T. Traußnig</p> <p>AVL List GmbH, Graz, Austria</p> |
| 09:30-09:50 | <p>Distinction of liquid water and ice based on dual spectrum neutron imaging J. Biesdorf, P. Boillat, P. Oberholzer, F. Bernauer, A. Kästner, P. Vontobel, E. Lehmann, T. J. Schmidt</p> <p>Electrochemistry Laboratory, Paul Scherrer Institut (PSI), 5232 Villigen PSI, Switzerland; Neutron Imaging and Activation Group (NIAG), Paul Scherrer Institut (PSI), 5232 Villigen PSI, Switzerland</p> | <p>Low-temperature charging of lithium-ion cells part I: Electrochemical modeling and experimental investigation on degradation behavior S. Tippmann, D. Walper, B. Spier, W. G. Bessler</p> <p>Deutsche ACCUotive GmbH, Neue Str. 95, D-73230 Kirchheim/Teck; Offenburg University of Applied Sciences, Offenburg, Germany</p> |
| 09:50-10:10 | <p>Modified PNP-Stokes equations for electro-kinetic flow in PEM nanopores P. Berg, B. E. Benjaminsen</p> <p>NTNU, Department of Physics, Trondheim, Norway</p> | <p>Low-temperature charging of lithium-ion cells part II: Model reduction and application J. Remmlinger, S. Tippmann, M. Buchholz, K. Dietmayer</p> <p>Ulm University, Institute of Measurement, Control, and Microtechnology, Ulm, Germany; Deutsche ACCUotive GmbH & Co. KG, Kirchheim/Teck, Germany</p> |

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| 10:10-10:40 | Coffee break | |
| | Fuel cell stacks and systems | Lithium-ion batteries |
| 10:40-11:00 | 3D model of a SOFC stack using porous media approach G. Ganzer, J. Schöne, A. Pönicke, W. Beckert Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany | From micro to macro – modeling and simulation of lithium ion batteries on multiple scales J. Zausch, V. Taralova, M. Taralov, O. Iliev, A. Latz Fraunhofer Institute for Industrial Mathematics, Kaiserslautern, Germany; Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany; DLR, Institut für Technische Thermodynamik, Stuttgart, Germany |
| 11:00-11:20 | Cr₂O₃ scale growth rates on metallic interconnectors derived from 40'000 hours solid oxide fuel cell stack operation M. Linder, T. Hocker, L. Holzer, B. Iwanschitz, A. Mai, J. A. Schuler Zurich University of Applied Sciences, Winterthur, Switzerland; Hexis AG, Winterthur, Switzerland | Critical review of parameterisation methods for equivalent circuit based, spatially resolved models of lithium-ion cells S. Stumpp, L. Kostetzer, C. Günther, E. Rudnyi, M. A. Danzer Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW) Baden-Württemberg, Ulm, Germany; CADFEM GmbH, Grafing bei München, Germany |
| 11:20-11:40 | One dimensional modeling of an SOFC system with discretisation in flow direction S. Wahl, A. G. Segarra, P. Horstmann, M. Carré, W. G. Bessler, A. K. Friedrich, F. Lapique Robert Bosch GmbH, Schwieberdingen, Germany; Offenburg University of Applied Sciences, Offenburg, Germany; German Aerospace Center (DLR), Institute of Technical Thermodynamics, Stuttgart, Germany; LRGP, CNRS – Université de Lorraine, Nancy, France | Electrochemical impedance spectroscopy on complete Li-ion-battery cells: Internal interfaces and influence of state-of-charge and cycle number S. Indris, N. Schweikert Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany; Helmholtz-Institute Ulm for Electrochemical Energy Storage, Ulm, Germany |
| 11:40-12:00 | Development of HT-PEFC stacks supported by modelling and simulation W. Lehnert, L. Lüke, M. Kvesić, D. Froning, U. Reimer, H. Janßen Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, IEK-3: Electrochemical Process Engineering, D-52425 Jülich, Germany; Modeling in Electrochemical Process Engineering, RWTH Aachen University, Germany | Towards a computational method for advanced battery systems supported by experimentally determined parameters A. Ehrl, J. Lee, N. Tsiouvaras, H. A. Gasteiger, V. Gravemeier, W. A. Wall Technische Universität München, Institute for Computational Mechanics, Munich, Germany; Technische Universität München, Chair of Technical Electrochemistry, Munich, Germany |
| 12:00-13:10 | Lunch | |
| 13:10-14:00 | Plenary lecture Modeling and diagnostics of low Pt loading polymer electrolyte fuel cells C.-Y. Wang Electrochemical Engine Center, The Pennsylvania State University, USA | |
| | PEM fuel cells | Lithium-ion battery thermal behavior |
| 14:10-14:30 | Water transport through an anion exchange membrane used in alkaline direct methanol fuel cells C. Weinzierl, U. Krewer Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany; TU Braunschweig, Institute of Energy and Process Systems Engineering, Braunschweig, Germany | Measuring entropy profiles of commercial Li-ion batteries – separating influences of time and temperature P. J. Osswald, S. Schlueter, H. E. Hoster Technische Universität München, TUM CREATE, Singapore |
| 14:30-14:50 | Investigating bistability in the polarization curve of a segmented PEM fuel cell N. Zamel, A. Bhattarai, D. Gerteisen, C. Hebling Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany | Modelling and measurement of uneven heat generation in lithium-ion battery packs B. Wu, V. Yufit, M. Marinescu, D. A. Howey, G. J. Offer, R. F. M. Botas, N. P. Brandon Department of Earth Sciences and Engineering, Imperial College London, UK; Department of Mechanical Engineering, Imperial College London, UK; Department of Engineering, University of Oxford, UK |
| 14:50-15:10 | Characterization of O₂ diffusive losses in the gas diffusion layer (GDL) of the PEFC by means of simplified flow field patterns P. Oberholzer, P. Boillat, A. Kaestner, E. H. Lehmann, T. J. Schmidt, A. A. Wokaun Paul Scherrer Institut, Electrochemistry Laboratory, Villigen, Switzerland; Paul Scherrer Institut, Neutron Imaging and Activation Group, Villigen, Switzerland | 3D Thermal-Electric Li-Ion battery model W. Beckert, C. Freytag, T. Frölich, M. Schneider Fraunhofer Institute for Ceramic Technologies and Systems, Dresden, Germany |

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| 15:10-15:30 | Multiphase multicomponent flow through multilayers of thin porous mediums: Conservation equations C. Qin, S.M. Hassanizadeh Department of Earth Sciences, University of Utrecht, Utrecht, The Netherlands | Effect of temperature spatial non-uniformity on electrochemical impedance in lithium-ion cells R. R. Richardson, D. A. Howey, P. Ireland Department of Engineering Science, University of Oxford, Oxford, UK |
| 15:30-15:50 | Local EIS studies in PEM fuel cells - distinguishing between through-plane mass transport limitations and convective in-plane oxygen effects D. Gerteisen, A. Bhattarai, N. Zamel, C. Hebling Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany | The effect of temperature gradients on the performance of Li-ion batteries M. Marinescu, Y. Troxler, Y. Patel, B. Wu, V. Yufit, A. J. Marquis, N. P. Brandon, G. J. Offer Imperial College London, Department of Earth Science and Engineering, London, UK; Imperial College London, Department of Mechanical Engineering, London, UK |
| 15:50 | Closing and announcement of ModVal 11 | |
| 16:00 | End of symposium | |

For more information see the symposium website at <http://modval10.hs-offenburg.de>