

Attendance and ModVal 12

The PUMA MIND Workshop is organised in conjunction with the 12th Symposium for Fuel Cell and Battery Modeling and Experimental Validation (ModVal 12). ModVal's aims are fully aligned with PUMA MIND as its programme is designed to present and discuss recent advances related to the mathematical modeling and computational simulation of fuel cells and batteries, as well as experimental techniques for model validation. The symposium provides a forum for researchers from both academia and industry, promoting personal contacts and stimulating new collaborations.

ModVal registered delegates are entitled to free access to the PUMA MIND Workshop.

ModVal 12



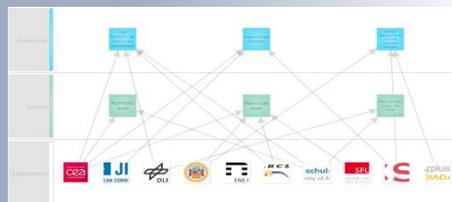
March 26th-27th, 2015
Freiburg, Germany

PUMA MIND Coordinator

- Atomic Energy and Alternative Energies Commission (CEA), France

Partners

- German Aerospace Center (DLR), Germany
- University of Salerno, Italy
- Spanish National Research Council (CSIC), Spain
- Offenburg University of Applied Sciences, Germany
- École Normale Supérieure de Lyon (ENSL), France
- Institute for Energy and Transport JRC, Belgium
- Simon Fraser University, Canada
- Vodera Ltd, UK
- IDIADA Automotive Technology SA, Spain
- CNRS/ Laboratory of Reactivity and Chemistry of Solids (LRCS), France



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PUMA MIND Workshop 2015

26 March 2015, Freiburg, Germany

In conjunction with ModVal 12

PUMA MIND is organising its Second Annual Workshop in the afternoon of 26 March 2015 in Freiburg, Germany.

The main objective of the event is to present recent advances in multiscale modeling for PEMFC and follows from the first workshop organised in 2014 in Grenoble, France.

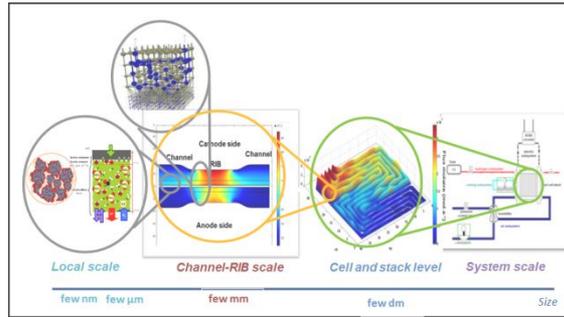


PUMA MIND 2015 Workshop Lectures

Some analytical solutions for PEM fuel cell characterization in aging studies

Dr Andrei Kulikovskiy

Research Centre Juelich, Germany



Multiscale coupling of degradation mechanisms for durability prediction

Prof Wolfgang Bessler

Hochschule Offenburg, University of Applied Sciences, Germany

Modelling Internal Currents during Fuel Cell Start-up and Shut-down

Prof Olivier Lottin

Laboratoire d'Energétique et de Mécanique Théorique et Appliquée - LEMTA, France



Coupling experiments and models to interpret and predict degradation in low temperature fuel cell

Prof Andrea Casalegno

Department of Energy, Politecnico di Milano, Italy

Novel Approach in 3D-Reconstructions of PEMFC Catalyst Layers: Infiltration aided Segmentation

Mr Severin Vierrath

Department of Microsystems Engineering – IMTEK, Germany

What PUMA MIND investigates

A predictive multi-scale modelling tool for PEMFC performance and durability as function of its components and operating conditions (for automotive applications).

In particular:

- detailed models of electrochemical phenomena;
- detailed models of transport processes;
- 1D cell-level multi-scale model describing the competitive mechanisms and calculating their relative influence on the macroscopic performance and durability under current cycled conditions;
- 2D cell-level multi-physics CFD model to predict instantaneous efficiency;

Immediate next steps

- Atomistic calculations and their integration at the meso-scale;
- Comparison between kinetic Monte Carlo and mean field approach for integration of electrochemical data;
- Sensitivity study at the 1D multiscale model level to demonstrate the relative impact of mechanisms involved, and enable further reduction of the electrochemical and transport modules;
- Integration of degradation (Pt dissolution and chemical degradation of the membrane) in the models;
- Improvements in on-board diagnostic tools and control strategies to ensure both performance and durability.

Ultimate goal

An innovative diagnostic and control-oriented physical model for online PEMFC diagnosis and real-time optimisation of operating conditions