AGENDA

FURTHER-FC Workshop Agenda								
09:00	Welcome Coffee							
General Talks								
09:15	Welcome and Introduction to the workshop	Jens Mitzel	DLR					
09:30	General challenges in PEMFC	Ludwig Jörissen	ZSW					
10:00	Importance of strategic research challenges	Laurent Antoni	Hydrogen Europe Research					
10:20	Overview of FURTHER-FC	Joël Pauchet	CEA					
10:40	Introduction of Project Partners							
11:10	Main Progress	Arnaud Morin	CEA					
11:30	Importance of the Project from Industry Point of View	Stephane Cotte	Toyota Motor Europe					
12:00	Lunch break							
	Scientific highlights from FURTHER-FC							
13:00	lonomer Thin Films	Kunal Karan	University of Calgary					
13:20	Characterization of the CCL structure – spatial distribution of the materials	Laure Guetaz Tobias Morawietz	CEA UES					
13:40	Characterisation of CCL materials - local transport properties	Anthony Kucernak	ICL					
14:00	Quantification of local conditions in MEA	Pierre Boillat	PSI					
14:20	Electrochemical characterization	Jens Mitzel	DLR					
14:40	Coffee Break							
15:00	Electrochemical modelling	Michael Eikerling	RWTH Aachen					
15:30	Multiscale Modelling	Thomas Jahnke	DLR					
16:00	High Oxygen Permeable Ionomers for Durable, High Power Density Cathodes	Andrew Park	Chemours US					
16:20	Discussion with the audience	Joël Pauchet Arnaud Morin	CEA					
16:45	Closing Remarks	Joël Pauchet	CEA					
17:00	DLR Lab Tour	Jens Mitzel	DLR					

CONTACT AND REGISTRATION

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FURTHER-FC Workshop 06.07.2022 DLR Stuttgart, Germany

FURTHER UNDERSTANDING RELATED TO TRANSPORT LIMITATIONS AT HIGH CURRENT DENSITY TOWARDS FUTURE ELECTRODES FOR FUEL CELLS.



Face to Face meeting / online Free of charge









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Registration dlr.expert/further-fc **More information** further-fc.eu

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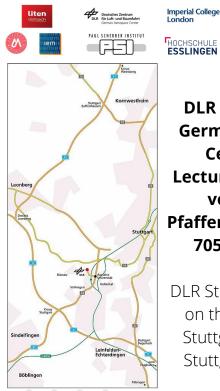
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PARTNERS

FURTHER-FC will benefit from the active role of renowned partners gathering significant experience on membrane electrode assembly manufacturing and testing [Toyota Europe (TME), French Alternative Energies and Atomic Energy Commission (CEA), German Aersospace Center (DLR)], state-of-the Art experimental techniques [CEA, DLR, Paul Scherrer Institut (PSI), University of Montpellier (IEM), Univ. of Applied Sciences Esslingen (UES), Imperial College London (ICL)] and modelling tools [CEA, DLR, National Polytechnic Institute of Toulouse (INPT)] supported by international entities [The Chemours Company (CC), University of Calgary(UCA)].



DLR site Stuttgart German Aerospace Center (DLR) Lecture Haal "Gräfin von Linden" Pfaffenwaldring 38-40 70569 Stuttgart

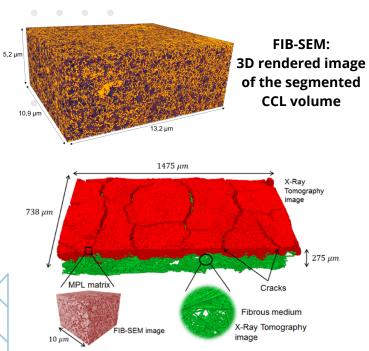
ΤΟΥΟΤΑ

Chemours⁻

DLR Stuttgart is located on the University of Stuttgart Campus at Stuttgart-Vaihingen.

RESULTS 3D rendered image showing the interior (blue) and exterior (yellow) Pt NPs

AFM: 3D height-image with superposed stiffness values

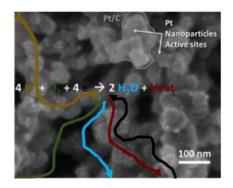


3D digital image of gas diffusion layer combining Xray Tomography (fibrous medium, cracks) and FIB-SEM (MPL matrix)

AMBITION

FURTHER-FC will bring new knowledge on the catalyst coated layer (CCL):

- Microstructure
- Correlation between transport properties, performance and components (Platinum, Carbon, lonomer) and their structure
- local conditions during operation
- limitations induced by transport phenomena
- modelling of transport phenomena
- Propose and validate structure and composition of CCL with improved catalyst efficiency and durability



METHODOLOGY

FURTHER TOOLBOX									
CCL (TME, CHEM, ICL, CEA) Reference (TME, CC) Customized (TME, CC) Composition	Molecular Dynamic -MD (UCA) Ionomer structure & properties	Lattice- Boltzmann -LB (DLR) Transport Sub µmeter scale	Direct Numerical Simulation - DNS (CEA) Transport Sub µmeter scale	Electrokinetic Model - EM (ICL) Electrochemistry Exchange current density depending on activitities	Pore Network Modeling - PNM (INPT) Two phase flow CCL thickness scale + MPL + GDM	Continuous Performance Model – CPM (DLR) Transport and Electrochemistry Cell scale			
<u>New</u> ionomer – I (CC) <u>Original</u> Catalyst – Pt/C (TME) Formulation I/C Ratio	MODELLING								
Pt & C density in CCL	7/	EXPERIMENTS							
Design Pt loading Thickness Model (ICL, CEA) Ultrathin (ICL) Ionomer &Pt free (CEA)	Components & CCL properties (UES, UCA, ICL, CEA) lonomer, C H ⁺ , e ⁻ , Heat, Hydrophilicity	Microstructure (CEA, UES) 3D Pt, C, lonomer, pore distributions	Operando Local conditions (PSI, IEM, CEA) T, RH, H ₂ O H ⁺ & O ₂ Activities	Electrochemical measurements Free of transport (ICL) Electrokinetic data	Mass transfer limitations in differencial cell (PSI, CEA, DLR) O ₂ , H+ overvoltages	Performance and durability tests in real conditions (DLR, CEA) I-V, μ V/h			