

Welcome to the **Second International Workshop**

Durability and Degradation Issues
in PEM Electrolysis Cells and its
Components

February 16th-17th, 2016

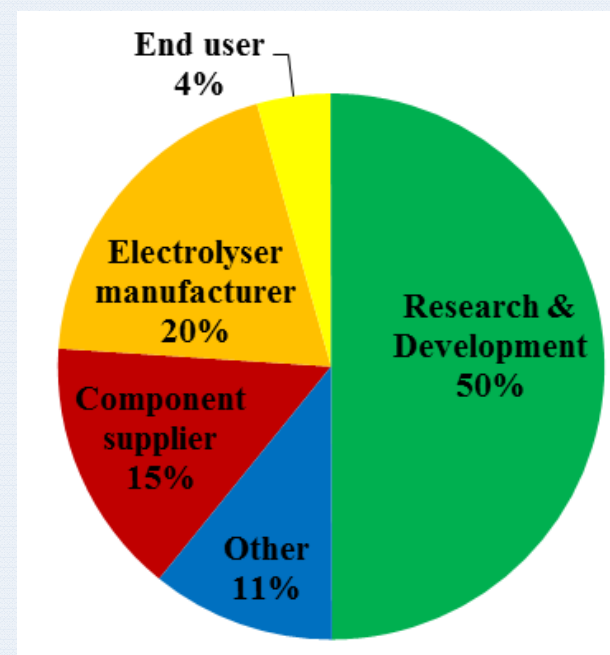
Fraunhofer ISE | Freiburg | Germany



First workshop on degradation issues in PEM electrolysis in 2013



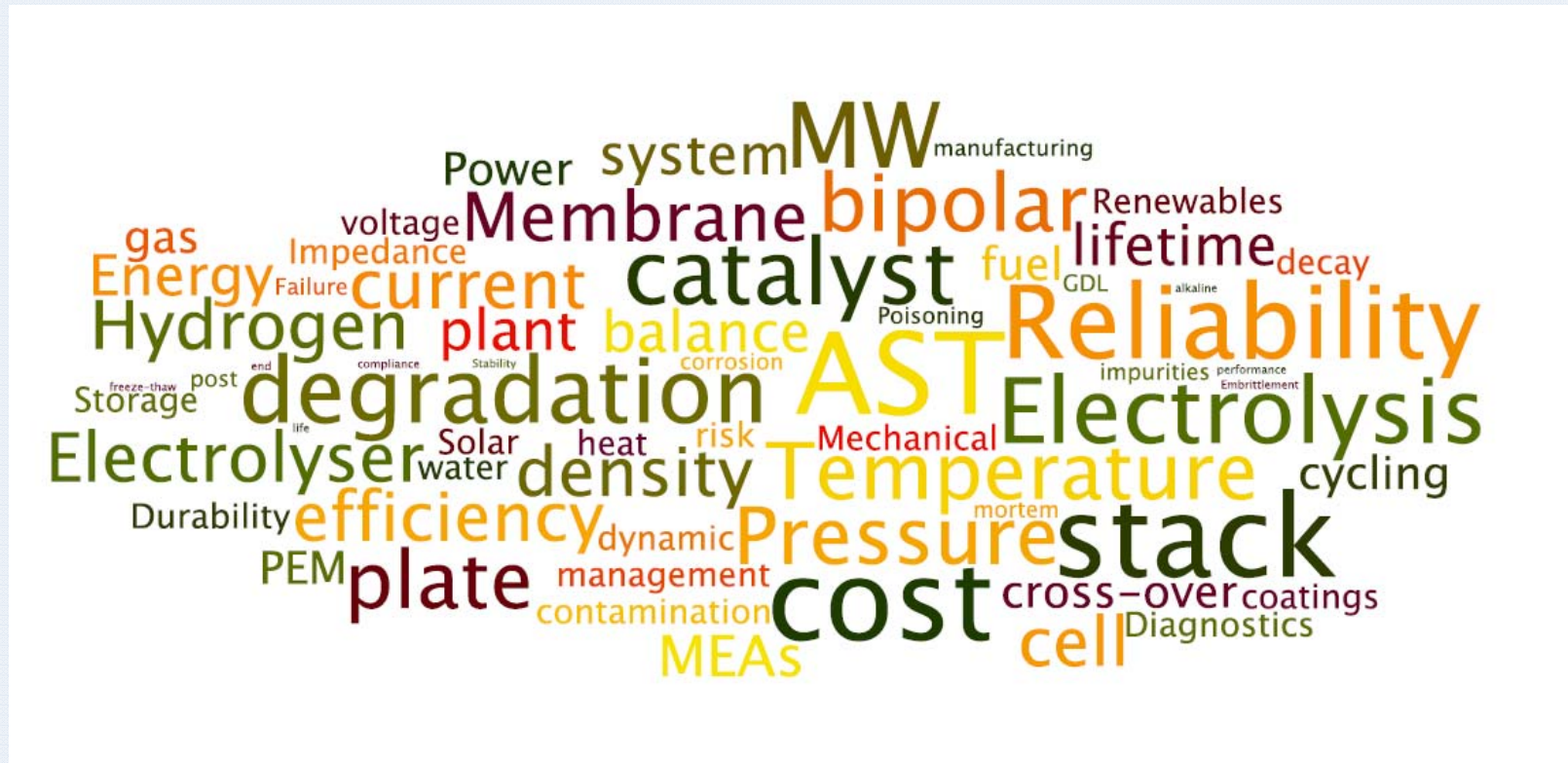
- Survey from industrial stakeholder and research side
- 110 participants from 15 countries





First workshop on degradation issues in PEM electrolysis in 2013

- Word cloud caught during the workshop

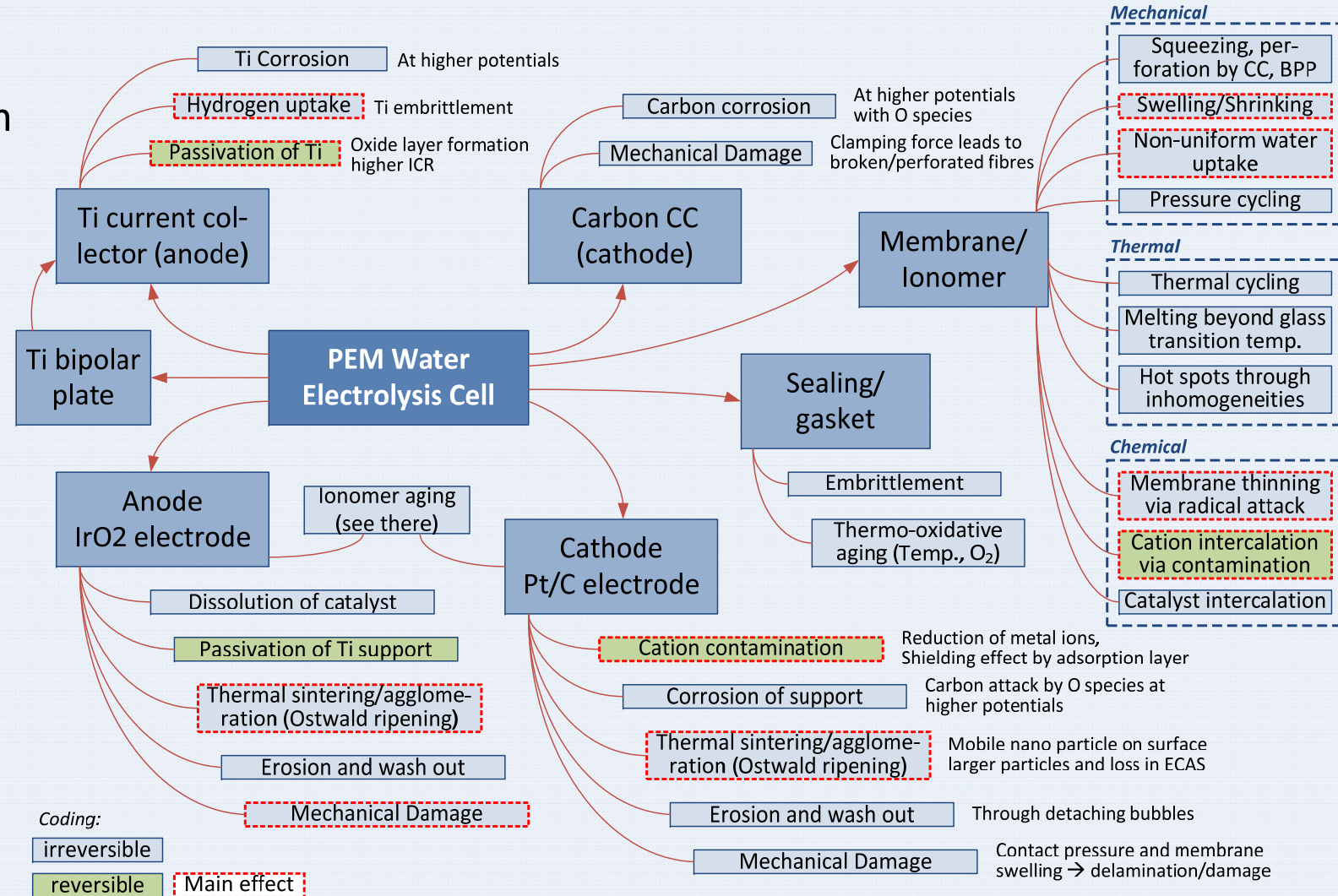


- Main results of the 1st workshop are still available on the webpage:
www.novelhydrogen.eu



Second workshop on degradation issues in PEM electrolysis in 2016

Classification of degradation mechanism





Programme: Day 1 | February 16th, 2016

Welcome and Introduction

- 08:30 **Registration**
- 09:00 **Welcome to the meeting**
Tom Smolinka | Fraunhofer ISE | Germany
- 09:10 **FCH 2 JU Funded Water Electrolysis Projects - Status and Perspectives**
Jean-Luc Deplancke | FCH JU | Belgium
- 09:30 **The Need for Large Scale Electrolyzers - Hydrogen as Part of the Energy System**
Christopher Hebling | Fraunhofer ISE | Germany
- 10:00 **Novel Materials and System Designs for Low Cost, Efficient and Durable PEM Electrolyzers - the NOVEL Project**
Magnus Thomassen | SINTEF | Norway
- 10:30 **Coffee break**



Programme: Day 1 | February 16th, 2016

Session 1: Results from the NOVEL project

Chair: Magnus Thomassen

- 11:00 **Membranes for Water Electrolysis - Target-Oriented Choice and Design of Materials**
Lorenz Gubler | Paul Scherrer Institute | Switzerland
- 11:30 **Corrosion Protective Coatings for Bipolar Plates and Current Collectors in PEM Electrolyzers**
Georg Andreas | Fraunhofer ISE | Germany
- 12:00 **AST Protocols for PEM WE: Insight on Performances and Components Degradation**
Frederic Fouda-Onana | CEA | France
- 12:30 **Q&A about the NOVEL project**
Magnus Thomassen | SINTEF | Norway
- 13:00 **Lunch break**



Programme: Day 1 | February 16th, 2016

Session 2: Scientific progress in understanding life-time and degradation mechanism

Chair: Dmitri Bessarabov

- 14:30 **Analysis of Degradation Processes in PEM Water Electrolysis Cells**
Pierre Millet | Université Paris-Sud | France
- 15:00 **Diagnosing Electrode Degradation in PEM Water Electrolysers**
Marcelo Carmo | FZJ | Germany
- 15:30 **Analysis of Voltage Losses in Polymer Electrolyte Electrolysis Cells**
Felix Büchi | Paul Scherrer Institute | Switzerland
- 16:00 **Coffee break**
- 16:30 **Degradation Mechanisms and Enhanced Stability of PEM Electrolysis Cells Using Low Catalyst Loadings and Novel Type of Membranes** | Antonino Aricò | CNR-ITAE | Italy
- 17:00 **Life-Time Prediction of PEM Water Electrolysis Stacks Coupled with RES**
Kevin Harrison | NREL | USA
- 17:30 **Discussion: Do we understand degradation in PEM electrolysis cells?**
Dmitri Bessarabov | HySA | South Africa
- 18:00 **End of day 1**
- 19:30 **Evening event - Dinner at Freiburg's restaurant "Wolfshöhle"**
Meeting point: Restaurant Wolfshöhle, Konviktstrasse 8, 79098 Freiburg



Programme: Day 2 | February 17th, 2016

Session 3a: **Industrial experience in long-term performance and degradation**

Chair: Tom Smolinka

- 09:00 **Lessons learned from the first day**
Magnus Thomassen | SINTEF | Norway
- 09:15 **Aging Effects in PFSA Membranes by Electrochemical Cycling**
Tomás Klicpera | FuMA-Tech | Germany
- 09:35 **The Impact of Non-uniform Electrodes on Performance and Gas Cross-over**
Ed Wright | Johnson Matthey Fuel Cell | Great Britain
- 10:00 **Field Test Experience with Hydrogenics' Prototype Stack and System for MW PEM Electrolysis**
Jan Vaes | Hydrogenics Europe | Belgium
- 10:30 **Coffee break**



Programme: Day 2 | February 17th, 2016

Session 3b: Industrial experience in long-term performance and degradation

Chair: Tom Smolinka

- 11:00 **PEM Electrolyzer Reliability Based on 20 years of Product Experience in Commercial Markets**
Everett Anderson | Proton OnSite | USA
- 11:30 **Field Test Experience with Areva's PEM Electrolysis Systems**
Kerstin Gemmer-Berkbilek | Areva | Germany
- 12:00 **Electrochemical Hydrogen Compression – Degradation Issues**
Peter Bouwman | HyET | The Netherlands
- 12:30 **Discussion: Towards life-time prediction and AST protocols - what do we need?**
Tom Smolinka | Fraunhofer ISE | Germany
- 13:00 **End of day 2 and lunch break**
- 14:00 **Lab tour**
Meeting point: Main entrance of Solar Info Center (bus transfer)



Please note that:

- Presentations will be provided later at the project webpage:
www.novelhydrogen.eu
(available soon, permission of the presenters is required)

- The restaurant "Wolfshöhle" is fully booked! → Please inform us, ...
 - Either you are registered and will not come
 - Or you are registered too late and would like to come (waiting list)

- The lab tour is tomorrow after the lunch break
 - Bus transfer from here to the electrolysis laboratories → limited number of places
 - Participants of the PtL workshop are kindly asked to attend the other lab tour in the evening

We wish you an interesting and prosperous workshop!