



Hydrogen Europe: European Hydrogen & Fuel cell Project Database

Project DEMSTACK

Understanding the Degradation Mechanisms of a High Temperature PEMFC Stack and Optimization of the Individual Components

The activities of the DeMStack project will be on the stack optimization and construction based on the high temperature MEA technology of ADVENT S.A. and its long term stability testing in combination with a fuel processor. DeMStack aims to enhance the lifetime and reduce the cost of the overall HT PEMFC technology by integrating promising, already developed materials for electrodes and membranes in an existing stack design. By understanding the fundamentals of the failure mechanisms, we can improve components, and design and develop system approaches to mitigate the failures. The strategy aims at improvements based on degradation studies and materials development carried out in previous and ongoing projects (FCH JU DEMMEA 245156) so that they will lead to a reliable cost-effective product that fulfils all prerequisites for relevant field uses. These improvements cope with degradation issues related to catalyst utilization, reformate feed contaminants, uniform diffusivity and distribution of reacting gases in the catalytic layer, pinhole development due to local high current density spots, H₃PO₄ acid depletion and distribution within the MEA, startup-stop and thermal cycles. The ultimate aim of DeMStack is to deliver HT PEMFC components for operation temperatures at 180oC and up to 200oC. Mainly optimized long lasting polymer electrolytes, stable Pt based electrocatalysts with minimal Pt loads and effective architectures of flow fields on bipolar plates will be explored. DeMStack will design, manufacture and test under variable conditions a highly efficient, low-cost HT PEMFC 1 kW stack prototype constructed from the optimized components. A fuel processor will also be constructed, operating on natural gas or LPG, which will be combined and integrated with the fuel cell stack. The robustness of the stack, the simplicity of BoP, the operational stability and the user friendly operation of the integrated system into a commercially reliable product, will be demonstrated

Project Information

Type of project : Research

Timing : 01/05/2013 > 31/10/2016

Project website: <http://demstack.iceht.forth.gr/>

Project Budget : 2.576.615 €

Funding

European Union through FCH JU: Grant agreement 325368 - [CORDIS link](#)

Project partners

Coordinator :

[FORTH/ICEHT - Foundation for Research and Technology - Hellas/ Institute of Chemical Engineering Sciences](#)

Partners :

[DEMSTACK](#)

[UCT Prague \(University of Chemistry and Technology, Prague\)](#)

[Advanced Energy Technologies \('Advent'\)](#)

JRC - JOINT RESEARCH CENTRE- EUROPEAN COMMISSION

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Sub project(s)

Sub project 1

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Sub project categories

Research

Project Id: 945

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