



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project ELECTROHYPEM

Enhanced performance and cost-effective materials for long-term operation of PEM water electrolyzers coupled to renewable power sources

The overall objective of the ELECTROHYPEM project is to develop cost-effective components for proton conducting membrane electrolyzers with enhanced activity and stability in order to reduce stack and system costs and to improve efficiency, performance and durability. The focus of the project is concerning mainly with low-cost electrocatalysts and membrane development. The project is addressing the validation of these materials in a PEM electrolyser (1 Nm<sup>3</sup> H<sub>2</sub>/h) for residential applications in the presence of renewable power sources. The aim is to contribute to the road-map addressing the achievement of a wide scale decentralised hydrogen production infrastructure. Polymer electrolytes developed in the project concern with novel chemically stabilised ionomers and sulphonated PBI or polysulfone hydrocarbon membranes, as well as their composites with inorganic fillers, characterised by high conductivity and better resistance than conventional Nafion membranes to H<sub>2</sub>-O<sub>2</sub> cross-over and mechanical degradation under high pressure operation. Low noble-metal loading nanosized mixed-oxides (IrRuMOx) oxygen evolution electrocatalysts, highly dispersed on high surface area conductive doped-oxide (TiNbOx, TiTaOx, SnSbOx) or sub-oxides (Ti<sub>4</sub>O<sub>7</sub>-like ) will be developed together with novel supported non-precious oxygen evolution electrocatalysts prepared by electrospinning. After appropriate screening of active materials (supports, catalyst, membranes, ionomers) and non-active stack hardware (bipolar plates, coatings) in single cell and short stack, these components will be validated in a PEM electrolyser prototype operating at high pressure in a wide temperature range. The stack will be integrated in a system and assessed in terms of durability under steady-state operating conditions as well as in the presence of current profiles simulating intermittent conditions.

## Project Information

**Type of project :** Research

**Timing :** 01/07/2012 > 30/06/2015

**Project website:** <http://www.electrohypem.eu/>

**Project Budget :** 2.842.312 €

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## Funding

European Union through FCH JU: Grant agreement 300081 - [CORDIS link](#)

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## Project partners

**Coordinator :**

**CNR - Consiglio Nazionale delle Ricerche**

**Partners :**

**CNRS - Centre National de la Recherche Scientifique**

JRC - JOINT RESEARCH CENTRE - EUROPEAN COMMISSION

SOLVAY SPECIALTY POLYMERS ITALY S.P.A.

ITM POWER (TRADING) LIMITED

TOZZI GREEN SPA

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**Sub project(s)**

**Sub project 1**

**Country:** Italy

**Address:**

PIAZZALE ALDO MORO 7 00185 ROMA

**Sub project categories**

Research

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Project Id: 955

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