



## Putting Fuel Cells to the Test Fuel Cell Power Chain Integration

Fuel Cells are often described as a continuously operating battery; they produce electricity via an electrochemical process by combining hydrogen from a hydrogen containing fuel, with oxygen. Because of their advantages in terms of high conversion efficiency, reduced pollution and low noise, fuel cells are expected to play a major role in future energy conversion and to partly substitute current power generation technologies in many end use sectors in the long-term.

For fuel cell technologies to realise their full potential related to climate change, security of energy supply, sustainable development, economic growth, and competitiveness, technical and economical challenges must still be resolved. Among these, the development and establishment of globally accepted Regulations, Codes, and Standards (RCS) are key. The Fuel Cell Power Chain Integration (FCPoint) project focuses on the harmonisation and validation of RCS by performing pre-normative and underpinning research in networking mode with research and industrial partners. In addition, the project directly contributes to the formulation of international standards under ISO and IEC and acts as a future reference on fuel cell performance in the European Joint Technology Initiative on Fuel Cells and Hydrogen. These activities are supplemented by the development and application of numerical models for evaluating and assessing the complex physical and chemical phenomena occurring in fuel cells.



### EU policy related to fuel cell technologies

The integrated Energy and Climate Change Package endorsed by the March 2007 Spring Council constitutes the starting point of a European Energy Technology policy reflected in the Strategic Energy Technology (SET) Plan. In the Plan, fuel cell and hydrogen technologies are earmarked critical for enabling the EU to reach its ambitious goals of 20% renewable, 20% reduction in greenhouse gas emissions and 20% energy efficiency increase by 2020.

In May 2008, the European Council adopted a Regulation setting up the Fuel Cell & Hydrogen Joint Technology Initiative (FCH JTI) to facilitate the commercial deployment of fuel cell technologies in a strong public private partnership. The JTI, with a budget of one billion Euros during its 2008-2017 life span, is the first of the set of European Industrial Initiatives identified in the SET-Plan.

International collaborative R&D activities are performed within the International Partnership for the Hydrogen Economy (IPHE) and the Advanced Fuel Cell Implementing Agreement of the International Energy Agency (IEA). The FCPoint project directly participates to and leads a number of activities within these international forums. In particular, it scientifically coordinates international projects on the establishment and dissemination of fuel cell RCS under IPHE.

## Main action lines

### •Pre-normative and underpinning research for development and improvement of performance characterisation methodologies for fuel cells, systems, and power chains:

Testing focuses on validation & benchmarking of test procedures and measurement methodologies for transport and stationary applications, and on the execution of commitments for competitive projects. Underpinning research aims at enhancing understanding of the operation of fuel cell components, single cells, and systems by means of mathematical modelling and simulations, experimental model validation, and investigation of newly developed non-noble metal catalysts for low temperature fuel cells.

### •S&T support to Community standardisation and regulatory strategies:

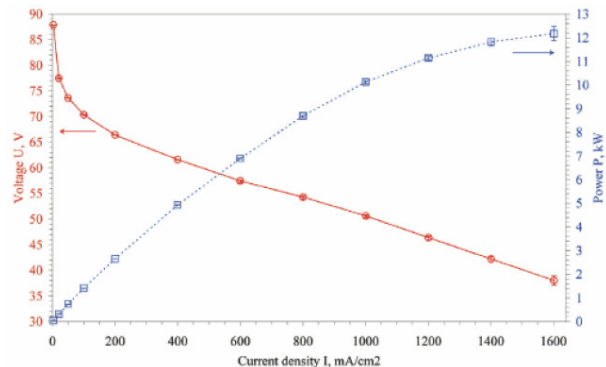
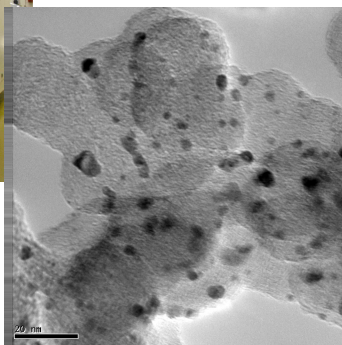
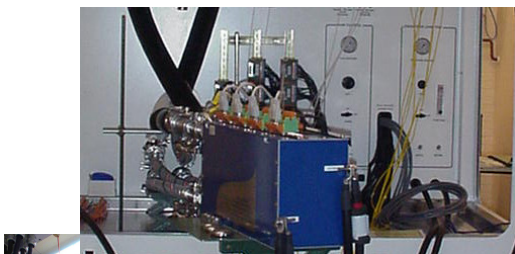
involvement in international standardisation activities of the IEC Technical Committee (TC) 105 and ISO TC 197 through contributing to standards drafting and convening of working groups.

### •reference function on fuel cell related activities in the FCH JTI:

provision of expert opinion on R&D needs and priorities and operation of facilities to quantify and verify S&T progress within JTI funded projects.

### •support to the *JRC Enlargement Action*:

The action organizes training for early stage researchers and senior scientists from Candidate, Potential Candidate countries, and European Neighbourhood Policy partner countries. It contributes to the implementation of the European Research Area for energy through organization of Summer Schools and by providing European partners access to its test facilities.



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