



Hydrogen Europe: European Hydrogen & Fuel cell Project Database

Project T-CELL

Innovative SOFC Architecture based on Triode Operation

The development of Solid Oxide Fuel Cells (SOFCs) operating on hydrocarbon fuels (natural gas, biofuel, LPG) is the key to their short to medium term broad commercialization. The development of direct HC SOFCs still meets lot of challenges and problems arising from the fact that the anode materials operate under severe conditions leading to low activity towards reforming and oxidation reactions, fast deactivation due to carbon formation and instability due to the presence of sulphur compounds. Although research on these issues is intensive, no major technological breakthroughs have been so far with respect to robust operation, sufficient lifetime and competitive cost. T-CELL proposes a novel electrochemical approach aiming at tackling these problems by a comprehensive effort to define, explore, characterize, develop and realize a radically new triode approach to SOFC technology together with a novel, advanced architecture for cell and stack design. This advance will be accomplished by means of an integrated approach based both on materials development and on the deployment of an innovative cell design that permits the effective control of electrocatalytic activity under steam or dry reforming conditions. The novelty of the proposed work lies in the pioneering effort to apply Ni-modified materials electrodes of proven advanced tolerance, as anodic electrodes in SOFCs and in the exploitation of our novel triode SOFC concept which introduces a new controllable variable into fuel cell operation. In order to provide a proof of concept of the stackability of triode cells, a triode SOFC stack consisting of at least 4 repeating units will be developed and its performance will be evaluated under methane and steam co-feed, in presence of a small concentration of sulphur compound. Success of the overall ambitious objectives of the proposed project will result in major progress beyond the current state-of-the-art and will open entirely new perspectives in cell and stack designs.

Project Information

Type of project : Research

Timing : 01/09/2012 > 29/02/2016

Project website: <http://www.tcellproject.eu>

Project Budget : 3.424.167 €

Funding

European Union through FCH JU: Grant agreement 298300 - [CORDIS link](#)

Project partners

Coordinator :

CERTH (National Centre for Research and Technology Hellas) with CPERI

Partners :

FORTH/ICEHT - Foundation for Research and Technology - Hellas/ Institute of Chemical Engineering Sciences

CNRS - Centre National de la Recherche Scientifique

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Sub project categories

Research

Project Id: 1103

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