Hydrogen Europe:
European Hydrogen & Fuel cell Project Database

Project MCFC-CONTEX

MCFC catalyst and stack component degradation and lifetime: Fuel Gas CONTaminant effects and EXtraction strategies

High-T fuel cells like the MCFC are the best candidate for exploiting cleanly & efficiently non-conventional fuels of organic or waste-derived origin that are one of the keys to a sustainable energy infrastructure & have very strong potential, but the degradation caused by the contaminants in these fuels must be addressed. MCFC-CONTEX aims to tackle this problem from 2 sides: 1) investigating poisoning mechanisms caused by alternative fuels & determining precisely MCFC tolerance limits for long-term endurance; 2) optimizing fuel cleaning to achieve tailored degrees of purification according to MCFC operating conditions & tolerance. The 1st line of activity requires extensive & long-term cell testing, so in parallel methods will be sought to increase experimental effectiveness: a numerical model will be set up to simulate & predict the effects of contaminants, and as knowledge is gained of the poisoning mechanisms through the experimental & simulation campaigns, accelerated testing procedures will be conceived & validated. The 2nd line of investigation entails characterization & development of clean-up materials & processes, focusing on the most promising options to be selected at the start of the project. To carry out this research, real-time & highly accurate contaminant detection methods are necessary which have to be implemented in the fuel-clean-up-MCFC chain to monitor the fate of the harmful species & thus deduce their effects. This will be the 3rd line of activity. Outcome of the project will be: increased understanding of poisoning mechanisms & a set of operating conditions-dependent tolerance limits for the MCFC; a numerical model for prediction of contaminant-induced degradation effects; validated accelerated testing procedures; a prototypal clean-up system optimized for upgrading selected non-conventional fuel gases to established MCFC requirements; a reliable trace species detection system for monitoring of fuel quality & process control.

Project Information

Type of project : Research
Timing : 01/01/2010 > 30/06/2014
Project Budget : 4.132.858 €

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Project partners

Coordinator :

ENEA - Agenzia per le Nuove Tecnologie, l'Energia e lo sviluppo economico sostenibile

Partners :

University of Birmingham

KTH - Royal Institute of Technology

MCFC-CONTEX

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JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION

CETAQUA, CENTRO TECNOLOGICO DEL AGUA, FUNDACION PRIVADA

Sub project(s)

Sub project 1

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Sub project categories

Research

Project Id: 1043

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