DURAMET

Improved Durability and Cost-effective Components for New Generation Solid Polymer Electrolyte Direct Methanol Fuel Cells

Duration:

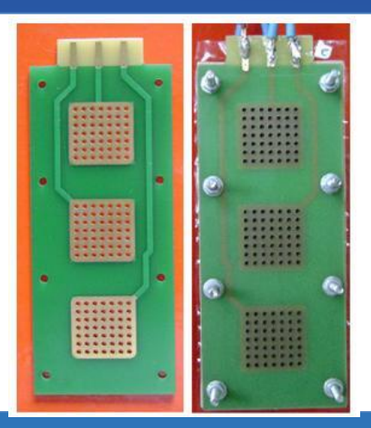
1st Dec. 2011 - 30th Nov. 2014

Application Area:

Early Markets

Budget:

Total budget € 2,956,874;
FCH contribution € 1,496,617.



Monopolar plates and DMFC ministack Operating under passive mode for portable applications

Partnership / consortium list:

Coordinator A.S. Aricò (CNR-ITAE Messina, Italy)
CNR-ITAE, CNRS, FUMA-TECH, CRF, TUM, IRD, POLITO, PRETEXO, JRC-IET.

Summary / main objectives of the project:

The clear focus of the project is on the demonstration of the enhanced performance and durability of newly developed or optimized DMFC components, i.e. catalysts, membranes and MEAs, in single cells and in appropriate short stacks under practical operation.

Technical accomplishment / progress / result:

Cost-effective membranes with improved conductivity and reduced methanol cross-over have been developed. The focus was also on the reduction of total noble metal loading. Novel materials have been assessed in MEA showing performances approaching project targets. Two types of stacks have been designed for portable and APU applications (http://www.duramet.eu).

Future Steps:

1 - Scaling-up of the newly develop components
2 - Validation of components in DMFC stacks
3 - Dissemination of the project results
4 - Exploitation of the project results.

Contribution to the Programme Objectives:

OBJECTIVES OF THE CALL	OBJECTIVES OF THE PROJECT	CURRENT STATUS
Proof-of-concept on the component level	Membrane conductivity > 50 mS/cm & MeOH cross-over lower < 5 mA cm^{-2}	Proton Conductivity ~ 50-70 $mScm^{-1}$ at 60 °C & cross-over 6-20 mA
New components for DMFCs with improved durability, efficiency	Performance > 50-250 mW cm^{-2} for LT, HT operation; Degradation: two times < benchmark MEAs	Performance > 70-210 mW cm^{-2} LT, HT operation; N/A
Integration in at least one DMFC stack solution	Validation in short stacks (150 W active, and 1 W passive mode); 500 hrs durability test	Passive mode stack operation validated; N/A
New components for DMFCs with superior cost efficiency	PGM loading < 0.5-1 mg cm^{-2}; Novel hydrocarbon membranes	PGM loading < 0.5-1 mg cm^{-2}; polysulfone, PEEK membranes

The DMFCs devices developed in the project are amenable to be integrated in auxiliary power units, for portable powers sources and in general for applications related to energy supply systems for micro-distributed and remote generation. The novel materials show promising properties in terms of cost reduction and increase of durability.

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http://www.duramet.eu/

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Methanol fuel Cells