Hydrogen Europe:
European Hydrogen & Fuel cell Project Database

Project SMARTCAT

Systematic, Material-oriented Approach using Rational design to develop break-Through Catalysts for commercial automotive PEMFC stacks

The present consortium will build a new concept of electrodes based on new catalyst design (ternary alloyed/core shell clusters) deposited on a new high temperature operation efficient support. In order to enhance the fundamental understanding and determine the optimal composition and geometry of the clusters, advanced computational techniques will be used in direct combination with electrochemical analysis of the prepared catalysts. The use of deposition by plasma sputtering on alternative non-carbon support materials will ensure the reproducible properties of the catalytic layers. Plasma technology is now a well established, robust, clean, and economical process for thin film technologies. Well-defined chemical synthesis methods will also be used prior for quickly defining the best catalysts. MEA preparation and testing, MEA automated fabrication in view of automotive operation will complete the new concepts of catalysts with a considerably lowered Pt content (below 0.01 mgcm-2 and less up to 0.001 mgcm-2) and supports for delivering a competitive and industrially scalable new design of PEMFC suitable for automotive applications. SMARTCat will thus address the following objectives:

- Deliver specifications/requirements for reaching the technical goals as a roadmap.
- Design an efficient new catalyst architecture
- Establish a support selection criteria based on physico-chemical characterization and modelling for defining the most suited electrode support to the defined catalytic system
- Assess the robustness regarding operation conditions and fuel cell efficiency
- Enable to automate the MEA production using state of the art (< 100°C) and high temperature membranes (120°C)
- Build efficient short-stack required for competitive automotive fuel cell operation
- Low cost process and low Pt content will dramatically reduce the fuel cell cost, and which will lead to economically suitable fuel cells for automotive application

Project Information

**Type of project**: Research

**Timing**: 01/06/2013 > 31/05/2017

**Project website**: http://smartcat.cnrs.fr/

**Project Budget**: 4.768.173 €

Funding

European Union through FCH JU: Grant agreement 325327 - CORDIS link

Project partners

https://hydrogeneurope.eu/index.php/project/smartcat
Coordinator:
CNRS - Centre National de la Recherche Scientifique
Partners:
SINTEF AS
DVGW - German Technical and Scientific Association for Gas and Water
CEA - Commissariat à l'énergie atomique et aux énergies alternatives
MXPOLYMERS BV
BASIC MEMBRANES BV

Sub project(s)

Sub project 1

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Sub project categories
Research

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