CATAPULT

novel CATAlyst structures employing Pt at Ultra Low and zero loadings for auTomotive MEAs

Duration:

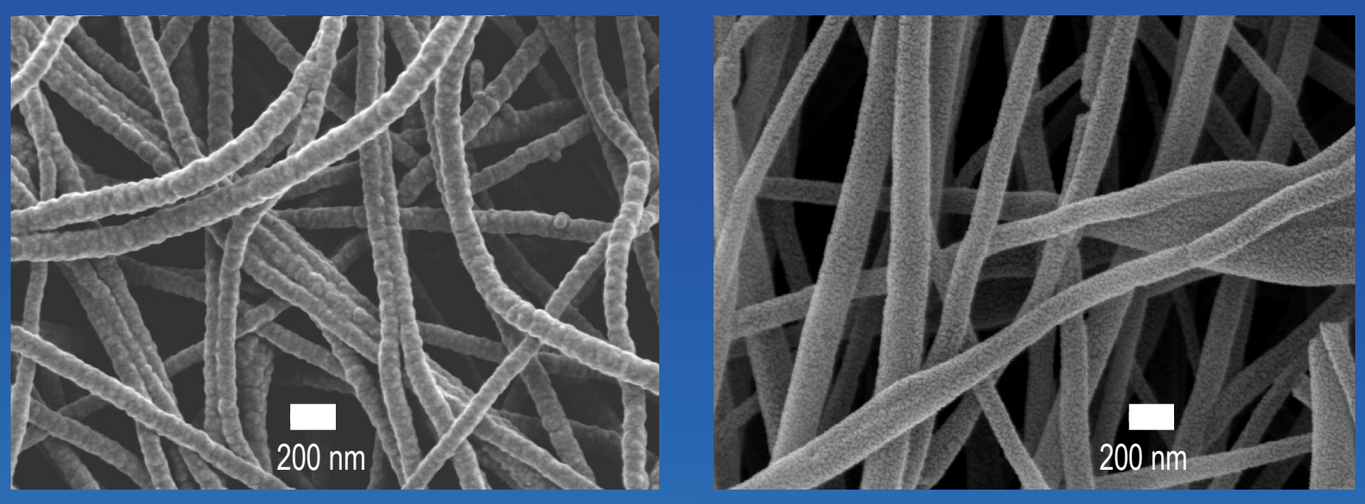
01/06/2013-31/05/2016

Application Area:

Automotive

Budget:

Cost €4.68 millon
FCH-JU funding €2.26 million



Continuous Pt films (left) and non-continuous, connected rafts (right) on thin, fibrous supports

Partnership / consortium list:

Université Montpellier 2, France, Johnson Matthey Fuel Cells Ltd, United Kingdom, Volkswagen, Germany, Beneq, Finland, Technical University of Munich, Germany, VTT, Finland, University of Ulm, Germany, Pretexo, France

Summary / main objectives of the project:

To develop ultra-low Pt loading MEAs using ultra-thin extended film coatings on novel nanostructured supports, and non-PGM catalysts and catalyst layers, to achieve a platinum specific power density of ≤ 0.1 g/kW Pt, providing ≥ 2 kW/l in a short stack, demonstrated for complete MEAs on representative power train profiles.

Technical accomplishment / progress / result

- Technical work in all work packages has commenced, in particular on novel nanofibrous support materials in WP3, novel low Pt deposition studies in WP4 and non-Pt precursor materials in WP5.
- CATAPULT has contributed to the "Harmonisation of Automotive Test Protocols".

Future steps:

- CATAPULT is in an early stage (M3) and the immediate future steps are to pursue the project plans

Contribution to the Programme Objectives:

2012 Call for Proposals
Topic SP1 JTI FCH.2012.1.5: "New catalyst structures and concepts for automotive PEMFCs".

Expected scope of project activities:

The objective … new catalyst structures and concepts … reaching the long term cost and durability targets for PEMFCs in automotive applications. Proposals can include…highly novel catalyst structures having high mass activity and durability, platinum saving approaches or non precious metal catalysts. Research leading to corrosion resistant catalyst supports should be included. Increase in the temperature of operation should be addressed….Supporting theoretical modelling efforts to develop of a fundamental understanding of catalytic processes and catalyst support interactions…. …catalyst mass activity of 0.44 A/mg Pt (at 900 mVIR-free) contributing to an MEA power density of ≥ 1.0 W/cm2 at 0.67 V (1.5 A/cm2, single cell) at beginning of life, and ≥ 0.9 W/cm2 at 0.64 V (1.4 A/cm2, single cell) at end of life, key enabling metrics for the platinum specific power density of ≤ 0.1 g/kW Pt, providing ≥ 2kW/l in a short stack, demonstrated for complete MEAs on representative power train profiles including temperature excursions to 120 °C.

Conclusions, major findings and perspectives

- CATAPULT only kicked-off in June 2013. If the project reaches its objectives, the potential for commercial exploitation is very high, and it is expected that results will be integrated rapidly into commercial product offerings.

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