OBJECTIVES

GAIA will develop and bring together advanced PEM fuel cell components. These components will be integrated into a fuel cell that is capable of delivering on the most challenging of the performance, cost and durability targets required for large-scale automotive fuel cell commercialisation. designs, architectures and deposition methods will be used at the level of the components and at the level of their integration in the catalyst layer, where novel constructions and coating methods will be used. These components will be further advanced, optimised and integrated into next generation automotive MEAs.

GAIA will:

- Realise the potential of these components in next generation MEAs showing a step-change in performance that will largely surpass the state of the art by delivering a beginning of life power density of 1.8 W/cm^2 at 0.6 V.
- Validate the MEA performance and durability in full size cell short stacks, with automotive drive cycle testing for at least 1,000 h.
- Provide a cost assessment study that demonstrates that the MEAs can achieve the cost target of 6 €/kW for an annual production rate of 1 million square metres.

CONSORTIUM

cnrs – dépasser les frontières

Technische Universität Berlin

BMW Group

MINI

ROLLS ROYCE

elmarco

dyneon

Johnson Matthey – Inspiring science, enhancing life

FREUDENBERG – INNOVATING TOGETHER

ZSW

PRETEXO

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GAIA

*next **G**eneration **A**utomot**I**ve membrane electrode **A**ssemblies*

GAIA aims to develop a high performance automotive MEA that provides the materials and designs that satisfy the automotive cost targets by providing high power density at high efficiency, while also attaining the other essential objectives of durability, reliability and high operation temperature.

http://www.gaia-fuelcell.eu

FCH – Fuel Cells and Hydrogen Joint Undertaking

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PROJECT STRUCTURE

WP1 - Project Management

WP2 - Requirements, Test Methods and Operating Conditions, Benchmarking, Cost Assessment

WP2 defines automotive system requirements and thereby the operation conditions under which the power density targets must be achieved at stack and cell level, so providing direction to the components development work packages.

WP3 deals with the flow of component development where compositionally distinct ionomers for the catalyst layer and for the membrane will be integrated, tuned to the specific properties required of each.

WP3 - Ionomer, Reinforcement and Membrane

WP4 - Catalyst Support and Catalyst Design

WP4 develops surface modified, highly structured corrosion-resistant carbon supports, and high mass activity catalysts. The surface modifications are designed to enable strong interaction with both the catalyst and the catalyst layer ionomer.

WP5 uses the results from WP4, and builds on the best recent results on CCM development for automotive MEAs, further optimising the catalyst layer composition, and introducing catalyst layer modifiers for chemical protection and porosity tuning, using the best materials from WPs 3 and 4.

WP5 - CCM Design and Optimisation

WP6 - Component Interaction, MEA Performance and Endurance Validation

CCMs be associated initially with a baseline GDL and thereafter with GDLs having improved through-plane thermal conductivity and higher in-plane diffusivity, and optimised MPLs.

WP7 - Communication, Dissemination, and Maximising Impact