

MAESTRO

MembrAnEs for STationary application with RObust mechanical properties

Duration:

01 January 2011 – 31 March 2014

Application Area:

Stationary

Budget:

Cost: € 2.2 million - FCH-JU funding: € 1.04 million

Partnership / consortium list:

Centre National de la Recherche Scientifique, CNRS Montpellier, France, Solvay Specialty Polymers, Bollate, Italy, Johnson Matthey Fuel Cells, United Kingdom, Università di Perugia, Italy, Pretexo, Montpellier, France

Summary / main objectives of the project:

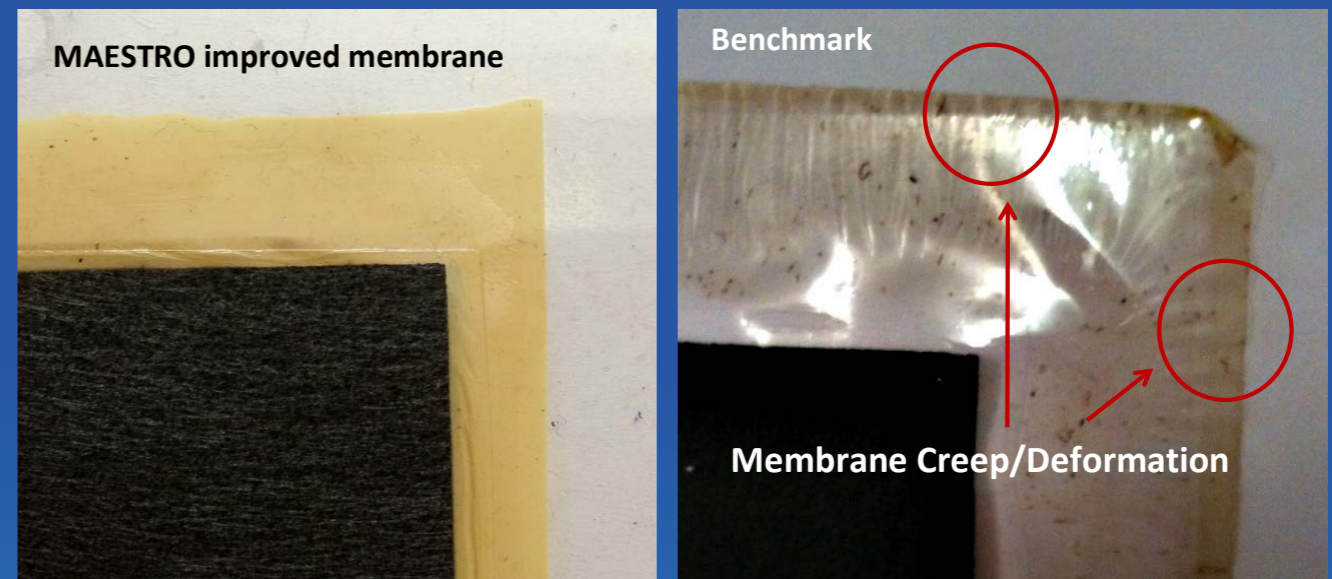
Improve the mechanical properties of the short side chain (SSC) Aquivion™ perfluorosulfonic acid (PFSA) ionomer to enable use of highly functionalised PFSA membranes at reduced thickness, for high conductivity and low area resistance, and with long lifetimes.

Technical accomplishment / progress / result:

- Membrane tensile properties improved by >50%
- MEAs integrating MAESTRO membranes show improved performance and durability
- Membranes and MEAs show high promise, justifying the investment of laboratory level membrane scale-up and in durability testing in a stack.

Future steps:

- 1 - RTD for focussed development of best membrane candidates, their applications-specific optimisation, and scale-up.
- 2 - RTD for the catalyst layer and electrode design and development in MEAs using the new membranes, for further performance and durability optimisation.



Contribution to the Programme Objectives:

AIP09 Section 3.2 Specific topic for the 2009 Call for Proposals

"SP1-JTI-FCH.2009.3.2: Materials development for cells, stacks and balance of plant"

Projects are expected to cover:

- Development and design of materials to improve performance of both cells and stack and BoP components. Mechanical, thermal and electro-chemical stability should be considered and lifetime and degradation issues relevant to production cost for single cells and stacks
- Investigation of failure mechanisms... robust low resistance membranes in PEMFCs...
- New and improved material production techniques to reduce cost, emissions and improve yields, quality and performance in industry relevant cells...
- The consortium should include academia, research institutes, material producers and cell/stack manufacturers

Conclusions, major findings and perspectives:

- The approaches developed to mechanical stabilisation do not compromise conductivity.
- Excellent perspectives for future exploitation, including by the two industrial partners.