

**FCH JU Grant Agreement number:** 245156

**Project acronym:** DEMMEA

**Project title:** Understanding the Degradation Mechanisms of Membrane-Electrode-Assembly for High Temperature PEMFCs and Optimization of the Individual Components

**Deliverable 7.1-7.2:** Internal dissemination and knowledge management through a secure access site / Web site dedicated to the scientific community

**Period covered:** 01/01/2010-31/12/2012

**Name, title and organization of the scientific representative of the project's coordinator:**

Stylios Neophytides

Advanced Energy Technologies AE EREUNAS & ANAPTYXIS YLIKON& PROIONTON ANANEOSIMON  
PIGON ENERGEIAS & SYNAFON SYMBOULEYTIKON YPIRESION – ADVENT  
Stadiou str., Platani, Rio-Patras, 26504, Greece

**Tel:** 0030 2610 911 583

**Fax:** 0030 2610 911 585

**E-mail:** [sneophytides@advent-energy.com](mailto:sneophytides@advent-energy.com)

**Project website address:** <http://demmea.iceht.forth.gr/index.php>

**Table of contents**

List of beneficiaries ..... 3  
Project summary ..... 4  
    Intellectual property rights management ..... 5  
    Internal and public dissemination ..... 7

**List of beneficiaries**

<b>Beneficiary No</b>	<b>Beneficiary name</b>	<b>Beneficiary short name</b>	<b>Country</b>	<b>Date enter project</b>	<b>Date exit project</b>
1	Advanced Energy Technologies	ADVENT	Greece	M 1	M36
2	Foundation for Research and Technology Hellas-Institute of Chemical Engineering & High Temperature Chemical Processes	FORTH	Greece	M 1	M36
3	Paul Scherrer Institute	PSI	Switzerland	M 1	M36
4	Centre National de la Recherche Scientifique	CNRS	France	M 1	M36
5	FUMATECH GmbH	FUMATECH	Germany	M 1	M36
6	Institute of Chemical Technology Prague	ICTP	Czech Republic	M 1	M36
7	Next Energy - EWE-Forschungszentrum für Energietechnologie e.V.	NEXT	Germany	M 1	M36
8	Technical University of Darmstadt	TUD	Germany	M 1	M36

## **Project summary**

The state of the art high temperature PEM fuel cell technology is based on  $H_3PO_4$  imbibed polymer electrolytes. The most challenging areas towards the optimization of this technology are:

- (i) the development of stable long lasting polymer structures with high ionic conductivity
- (ii) the design and development of catalytic layers with novel structures and architectures aiming to more active and stable electrochemical interfaces with minimal Pt corrosion.

In this respect the objective of the present proposal is to ***understand the functional operation and degradation mechanisms of high temperature  $H_3PO_4$  imbibed PEM and its electrochemical interface.***

The degradation mechanisms will be thoroughly studied and be focused on low loading Pt or nanostructured alloyed Pt electrocatalysts and catalytic layers, which will be supported on finely dispersed or structurally organized modified carbon supports (nanotubes, pyrolytic carbon). A stable electrocatalytic layer with full metal electrocatalyst utilization at the electrode/electrolyte interface can thus be achieved. The high temperature PEM membrane electrode assembly (MEA) will be based on a) PBI and variants as control group and b) the advanced state of the art MEAs based on aromatic polyethers bearing pyridine units. These MEAs have been developed optimized and tested at temperatures up to 200°C, where they exhibit stable and efficient operation. In the present proposal they will be studied and tested in single fuel cells with regards to their operating conditions and long term stability aiming to the development of a series of diagnostic tests that will lead in the design and development of an accelerated test and prediction tool for the MEA's performance. If we can really understand the fundamentals of the failure mechanisms, then we can use that information to guide the development of new materials or we can develop system approaches to mitigate these failures.

## *Intellectual property rights management*

Prior to arranging internal and public dissemination, partners have established rules in intellectual property.

### *Background information*

Partners have already identified in the signed consortium agreement all Background information which they are ready to grant Access Rights to, as well as the ones they wish to be excluded.

### *Foreground information*

According to the consortium agreement signed before the contract signature, knowledge shall be the property of the contractor generating it. Where several contractors have jointly carried out work generating the knowledge and where their respective share of the work cannot be ascertained, they shall have joint ownership of such knowledge and shall be entitled to use and license such knowledge without owing any financial compensation to each other. The contractors shall agree amongst themselves the allocation and terms of exercising ownership of that knowledge with a clear procedure stated in the consortium agreement (CA).

The primary means of protection will be through the use of European and global patents. The goal will be to patent and copyright the technology as early as possible in the project as commercialising under patent-pending conditions will not offer the optimal level of IPR protection. Each partner will retain any developed IPR and the consortium will enter into joint agreements to ensure all IPR can be exploited fairly. These will be laid out in the CA. The CA will also ensure that any IP developed during this product is retained for the benefit of the European companies involved.

It has been agreed by the partners that the consortium will retain ownership of any new IPR directly arising from work related to and stemming from the Project. Full recognition will be given to any existing prior art, especially where a Consortium member owns it.

The Dissemination & Exploitation Manager, will ensure that any such relevant pre-existing IPR is given maximum visibility to all members from the beginning of the Project. He will also ensure the regular searching for new patents in the subject in order to be alert in case another team is working on very similar field. Regular patent search coupled with technology watch through the Enterprise Europe Network will ensure staying ahead of any possible competition. In case of a patent arising from the work the following specific sentence (or a translation thereof) in the description referring to FP7 funding (Article 45 RfP – Article II.28.2 of GA) will be added: “The work leading to this invention has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245156.”

A list of applications for patents, trademarks, registered designs, etc that are applied for so far, is given in Table B.1:

**Table B. 1: LIST OF APPLICATIONS FOR PATENTS, TRADEMARKS, REGISTERED DESIGNS, ETC.**

LIST OF APPLICATIONS FOR PATENTS, TRADEMARKS, REGISTERED DESIGNS, ETC.			
Type of IP Rights: Patents, Trademarks, Registered designs, Utility models, etc.	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
Greek Patent Application, February 2011.	2011010000058	Crosslinked or not crosslinked aromatic copolymeric proton exchange electrolytes for use in polymer electrolyte fuel cells	Aik. Andreopoulou, Ch. Morfopoulou, A. Voege, K. D. Papadimitriou, F. Paloukis, S. G. Neophytides, J. K. Kallitsis

### *Internal and public dissemination*

The DEMMEA project has created a common database for all the project documentation (deliverables, publications, management procedures, strategies, research experimental data, regular reports and minutes, etc.) as a common tool for communication. The content of the database is regularly updated and restricted by secure access control to consortium members and EC representatives.

Advent has established and manages the access-restricted database, the public web site, and is responsible for the coherency of all restricted and public communicated data.

<http://demmea.iceht.forth.gr/index.php>

Selected information on the project is available for the wide public who visits the webpage.