

IDEAL-cell

Innovative Dual
mEmbrAne fuel-Cell



Scientific leaders

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COLLABORATIVE PROJECT-SMALL OF MEDIUM-SCALE FOCUSED RESEARCH PROJECT
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ABSTRACT

IDEAL-Cell proposes to develop a **new innovative and competitive concept** of a high temperature fuel cell, operated in the range 600-700°C, based on the junction between a PCFC anode/ electrolyte part and a SOFC electrolyte/cathode, through a mixed H⁺ and O²⁻ conducting porous ceramic membrane.

Protons created at the anode progress towards the central membrane to meet with oxygen ions created at the cathode, to form water, which is evacuated through the interconnected porosity network. Therefore, in our concept, hydrogen, oxygen and water are located in **3 independent chambers**, which allows avoiding all the detrimental consequences linked to the presence of water at electrodes (low fuel and electrical efficiency, interconnect corrosion, need for a gas counter-flow...).

The IDEAL-Cell concept brings a considerable enhancement of the overall system efficiency (fine-tuning of the catalytic properties of the electrode, possibility of applying a pressure on both the electrode sides, more simple and compact stack-design with less sophisticated interconnects, more efficient pre-heating of gas, simplified heat exchange system for co-generation, availability of high quality pure water for vaporeforming...).

This 4-year project, divided in 2 parts, is organized so that the risk is minimized at each step. The first 2 years will focus on the proof of the concept with routine materials; the last 2 years will be dedicated to the development of an optimized short-stack with **advanced materials** and architecture.

The project work programme is based on extensive **theory and modelling**, material development, testing techniques development, benchmarking and dissemination of the knowledge acquired during the duration of the project.

The best European teams have been carefully selected according to their complementary expertises and skills, and so that the type of activities involved (academic research, applied research, materials supply) ensures the success of the IDEAL-Cell project.

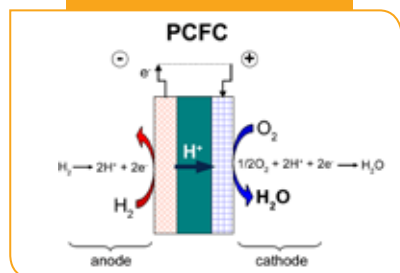


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PARTNERS

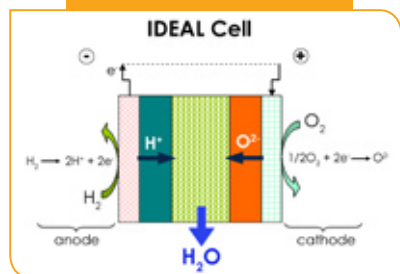
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Life seldom gives a researcher the opportunity to coalesce an abstract idea that was doodled one day in the corner of a blackboard, to see it growing little by little, and to realise that this idea inspires sufficient confidence so that 30 researchers of 5 European countries adopt it fully and decide to spend four years of their lives to develop it and bring it to fruition.

To coordinate IDEAL-Cell is a privilege, requiring commitment, obligations and the responsibility for sometimes making difficult decisions. But this also is an enormously rewarding endeavour, scientifically, when one sees the project advancing, but also humanly, when foreign colleagues with their own cultures and characters become friends, and as such are willing to give their very best to the collaboration.

Alain Thorel, PhD, scientific coordinator of the project

According to Scott Adams, the foremost objectives of a project manager does not aim at providing motivation inside the consortium but getting round any difficulties which hinder for project progress. This is exactly the rule I play as scientific and technical manager of the IDEAL-Cell European project. Being primarily a scientist with experimental activities, research gave me at first all basis tools useful for project achievement. However, working on scientific aspects of a project does not entail to know how to monitor it. At the Ecole des Mines de Paris, the IDEAL-Cell project management teaches me complementary skills with respect to my initial background. In my opinion, project manager is a key function to get a daily overview of research activities performed on the project while checking if actions, which will produce results, have been carried out on time. On the occasion of IDEAL-Cell project, an efficient monitoring is performed by inquiring about work methodology at the international scale adapting each other for an agreement inside the consortium.

Anthony Chesnaud, PhD, scientific manager of the project