DEVELOPMENT OF A NEW NANOCOMPOSITE FOR ITS USE AS ELECTROCATALYST IN PROTON EXCHANGE MEMBRANES FUEL CELLS (PEMFC)

DESCRIPTION OF THE TECHNOLOGY

Fuel Cells (FC) are devices that directly convert the energy of a chemical reaction into electricity. Due to the numerous advantages, they show application in the energy sector, in recent years, there has been a considerable increase in the number of research for its development.

There are different types of FC that can be classified according to the temperature or type of electrolyte used. Among the FC, the Proton Exchange Membranes Fuel Cell (PEMFC) stand out for allowing a low working temperature and a quick start. In order to achieve it requires the use of electrocatalysts, however, the catalysts that have been used to date do not show the electrocatalytic activity required to achieve the desired performance. Additionally, they are made of very expensive materials.

Therefore, there is a great demand in the development of new electrocatalysts for those applications in the market. Despite the multiple efforts made to advance in the development of these materials, the desired results have not been achieved.

Researchers at the Universitat de València have developed a method to obtain a new catalyst for the electrolysis used by the PEMFC, replacing the current platinum materials, which are much more expensive and scarce.

Consequently, this new nanocomposite solves the existing problems until now, with the formation of a material with a great electrocatalytic activity. Furthermore, the reduction of production costs responds to the demands of the market.

MARKET APPLICATION SECTORS

The invention applies to the energy sector market, mainly to companies that can use the nanocomposite in PEMFC that can be integrated into cars, portable equipment, etc.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The developed nanocomposite material has the following advantages:

- **Improvement of electrocatalytic activity**. The structural characteristics of the nanocomposite causes an electrocatalytic activity much higher than those reported up to now.
- **A considerable reduction in costs**, due to the convergence several factors:
    - Obtain the precursor with economical materials and in a solvent-free process.
    - Obtain the nanocomposite in a relative short time and at relatively low temperature.
    - Calcination of the nanocomposite is done using nitrogen, which is much cheaper and safer than other gases used in other processes, such as a mixture of argon and hydrogen

CURRENT STATE OF DEVELOPMENT

The technology has been validated at the level of laboratory, and in the present the research group is working on its development and scaling.

INTELLECTUAL PROPERTY RIGHTS

The technology is protected through the following Patent application P201731106 entitled “Marco imidazolato zeolítico de hierro, proceso para su obtención y nanocomposite derivado del mismo”.

COLABORATION SOUGHT

- License agreement of use.
- R & D project to complete development or apply to other sectors
- Subcontracting agreement with another company

DEVELOPMENT OF A NEW NANOCOMPOSITE FOR ITS USE AS ELECTROCATALYST IN PROTON EXCHANGE MEMBRANES FUEL CELLS (PEMFC)

RELATED IMAGES

Image 1: Image of the electrochemical cell with the Nanocomposite (NC) oxygen catalyst at 1,5V.

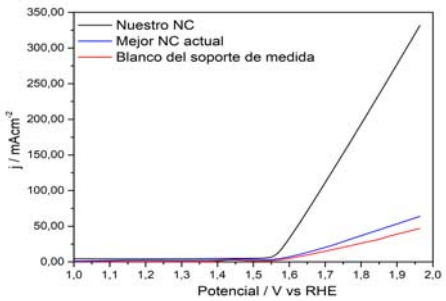

Image 2 Comparative graph of the catalytic power of the developed NC with the best catalyst of the same family developed up to the moment.

CONTACT

Research and Innovation Service
Universitat de València
Avda. Blasco Ibáñez, 13, level 2
46010, Valencia
Tel: 96 386 40 44
Email: otri@uv.es
Web: http://www.uv.es/serinves