

Title: **Synthesis and characterization of Pt(Cu) electrocatalysts for Polymer Electrolyte Fuel Cells (PEFC).**

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This project has been fulfilled in the research group of the Laboratory of Electrochemistry of Materials and Natural Environment (LEMMA), at the University of Barcelona. One of the main purpose of this group is the synthesis and study of the application of non-noble metals to Pt-based nanoparticles, which present interesting properties in catalysis.

These nanoparticles are synthesized on a carbon support which facilitate the dispersion of the nanoparticles obtained. As higher is the dispersion obtained, more active surface area and an improvement in the activity of the catalyst will be obtained.

In this project the synthesis of Pt(Cu) with a core-shell nanostructure on a carbon support by an electroless method have been carried out. These nanoparticles are formed in sequentially stages: firstly, copper ion reduction by borohydride on the carbon support and secondly, platinum synthesis by a galvanic exchange with copper and on different carbon supports (Carbon Black XC72 and Carbon Black XC72R). Vulcan XC72 got a higher percentage of copper in front of copper oxides and a higher percentage of platinum in a smaller crystal sizes than Vulcan XC72R.

Moreover, a study in the reactants addition order in galvanic exchange, dispersion of Cu/C before or after H_2PtCl_6 dilution, has also been done. The corresponding results prove an important effect on the product.

Keywords: Catalyst, Platinum, Copper, Core-shell, Nanoparticles, X-ray Diffraction, Cyclic Voltammetry