

# PhD vacancy

**Title: Application of porous carbon materials in the electrochemical reduction of CO<sub>2</sub>/**  
**Título: Aplicaciones de materiales porosos de carbono en la electrorreducción del dióxido de carbono**

**Contact:** Prof. Jesús Iniesta Valcárcel, Instituto Universitario de Electroquímica, Universidad de Alicante, Spain

**Location:** Instituto Universitario de Electroquímica, Universidad de Alicante, Spain.

**Thesis Directors:** Prof. Jesús Iniesta Valcárcel (Alicante, Spain) and Dr. Conchi Ania (CNRS, France).

**Subject of the proposed research:** The general objective of the PhD thesis focuses on the use of free-metal catalysts nanoporous carbon materials, which act as sustainable and efficient electrocatalysts for the conversion of carbon dioxide into fuels and chemical products. Although some carbon materials have been used successfully for this purpose, important aspects such as the way in which the textural and structural properties of nanoporous carbon materials affect the conversion and selectivity of the carbonaceous source electrocatalyst are still unclear., as well as the origin of its electrocatalytic activity per se and/or the nature of the active sites, type of heteroatoms and surface chemistry capable of reacting with the carbon dioxide molecule.

The work plan presented in this thesis will be carried out within the research group Applied Electrochemistry and Electrocatalysts from the Institute of Electrochemistry at the University of Alicante. In general terms, the objectives established above must be met through five action blocks or main work tasks, namely:

Task 1- Synthesis of nanoporous carbon materials.

Task 2- Preparation of electrodes based on nanoporous carbon materials.

Task 3- Textural and physicochemical characterization of nanoporous carbon materials and electrodes (gas diffusion electrodes, membrane coated electrodes or membrane catalysts assembly electrodes.

Task 4- Electrochemical characterization of nanoporous carbon materials and electrodes.

Task 5- Preparative electroreduction of carbon dioxide by using electrochemical reactors, analysis of products, efficiency, stability, selectivity and reproducibility, and assessment of the degradation / deactivation of materials and electrodes after the electrochemical reactions.

## **The candidate should have:**

A MSc in Chemistry, Electrochemistry, Physics, Materials Science or other related areas.

Knowledge in electrochemistry.

Background in carbon-based nanostructures, adsorption, characterization techniques, analytical chemistry will be greatly appreciated.

Excellent communication skills in Spanish and English (knowledge on other language will be appreciated)

Show aptitudes for the development of experimental procedures and devices

Aptitudes of team work and good communication skills

Capacity to use software tools necessary for data treatment and equipment's use.

Capacity to participate in the writing of scientific publications, reports and other technical documents (English mostly).

Capacity to generate independent work autonomously, to interpret data and duly comply with duties.

Knowledge and capacity to apply and follow security practices at work.

*(Applicants who do not meet these conditions will not be considered)*

**Candidates with nationality from a country of the European Union cannot be considered (criteria imposed by the funding organism)**

**Monthly net salary:** ca. 1200 €/m plus two extra pays

**Application:** Submit your application package (motivation letter, full CV and the names of 2-3 references) to [jesus.iniesta@ua.es](mailto:jesus.iniesta@ua.es). Recommendation letters are not mandatory but they will be an advantage. An oral interview will be arranged for those candidates that fulfill the requirements.

**Closing date:** Please send the applications not later than **July 7<sup>th</sup> 2021**.

The duration of the PhD position is 48 months; the recruitment is foreseen to start in middle of September 2021 or **January 2022, at the latest**.