

## CONTRATOS PREDOCTORALES 2022 SEVERO OCHOA

### PROJECT TITLE / JOB POSITION TITLE:

**Polyoxometalate-Enabled Zinc-Air Battery at Near-Neutral pH**

### JOB POSITION RESEARCH LINE:

**RL1.- Sustainable Energy Conversion and Storage Systems**

### RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:

Alternative energy storage systems based on electrochemical cells rely on the unique features of metal oxygen batteries. Among them Zn-O<sub>2</sub> are fundamental due to specific energy density and power effects, but have been restrained in the past because of the lack of reversibility and therefore recharging difficulties. The recent findings on the possibility of lowering the electrolyte pH have allowed however to use significant electrocatalysts based on metal oxide clusters in the nanosize that may offer a significant outcome. This project directs the study of those mediators in the construction of low pH Zn-Air batteries possible thanks to the new electrolyte based on polyoxometalates stable at those pH. It offers the possibility of using 51V 183W and 31P NMR for the electrolyte study along the charge discharge cycles, and the careful selection of nanoclusters and processes for that purpose. The materials to be used are alternative, and not based on strategic elements, and offer a significant evolution towards a nondependent society energy system.

### JOB POSITION DESCRIPTION:

A predoctoral position will develop pioneer catalyst materials, using state of the art synthesis methods, and electrochemical and NMR characterization. In parallel, the setting up of new electrochemical energy storage systems based on Zn-air systems, will be performed in collaboration with the ICN group in the same project. Based on those data, new engineered energy storage systems and catalysts will be developed. The work requires working in electrochemistry and nano characterization, inorganic chemistry and synthesis, as well as a team effort and training in novel aspects of materials science. Education in fundamental electrochemistry and chemistry is desired, as well as a disposition to learn about new settings and ideas. A teamwork is offered in the development of any aspects of the project, and its interdisciplinarity with physical and chemical aspects of the development.

**GROUP LEADER:**

**Prof. Nieves Casañ-Pastor**

**Email:** [nieves@icmab.es](mailto:nieves@icmab.es)

**Research project / Research Group website:** <https://icmab.es/ssc/electrochemistry-and-electroactive-materials>