

Call reference number	(2023-13)
Call name	Pre-doctoral position: Encoding of Metal-Organic Frameworks for the precise immobilization of metal-ions
Application Deadline	2023/03/19

Introduction and main description

BCMaterials, Basque Center for Materials, Applications and Nanostructures, is an autonomous research center launched in June 2012 by Ikerbasque, the Basque Foundation for Science and the University of the Basque Country (UPV/EHU) as a research center for Materials, Applications and Nanostructures. The center is included in the BERC's (Basque Excellence Research Centers) network and its mission is to generate knowledge on the new generation of materials, turning this knowledge into (multi)functional solutions and devices for the benefit of society.

The design of materials able to immobilize metal-ions in a selective and precise manner is a challenge with deep technological implications in a variety of areas: highly selective adsorbents, single-atom bioinspired catalysts, or ionic conductors, among others. Today, Metal-Organic Framework (MOF) porous materials are placed in a forefront position to face this challenge because of their chemical and structural versatility. Starting from porous MOFs with known porosity metrics and functionalization possibilities, we will explore the possibility to encode natural and synthetic amino acids, peptides and bio-radicals like functions within their structure.

This strategy of the MOF's pore space functionalization will open the perspective not only to develop highly selective sorbents to capture specific metal ions from complex mixtures (i.e. polluted waters, acid leachates...), but to control their coordination environment, and in turn, shape the electro, optic and catalytic properties of the metal-ions installed within the porous material.

Once the fundamental understanding of the precise metal-ions immobilization has been understood, the adsorptive and catalytic properties of the materials will be tested for: (i) the selective recovery of Co and rare earth elements from complex acid leachates obtained from mining and biomining activities, and (ii) as bioinspired catalysts able to deploy the sequential transformation of alcohols in synthetic fuels.

The pre-doctoral position is framed within the research areas of Smart materials of the BCMaterials. The research topic for this project targets the development of advanced MOFs with application in environmental science and green energy generation.

Skills and Requirements

The candidate must have Master's degree or equivalent in Materials Science, Chemistry, Physics or related areas.

Proficiency in speaking and writing in English.

Capacity for teamwork in an interdisciplinary and international environment.

Self-motivation and willingness to perform excellence research.

Creativity in problem solving. Ability and eagerness to learn new skills outside own discipline.

Presentation skills and ability to meet the deadline are also required.

Work Program / Duties / Responsibilities

The main task of the project is devoted to the chemical encoding of Metal-Organic Frameworks with natural and synthetic amino acids, peptides and bioradicals, and their posterior application as sorbents and catalysts. The PhD student will face synthesis, structural characterization and then application of the MOF materials in close collaboration with the Engineering School of Bilbao.

Application Procedure

Apply by submitting a motivation letter and a CV (in English) using the "Contact" button at the corresponding offer, at the "Join Us" area on BCMaterials' portal (<https://www.bcmaterials.net/join-us>).
Your name and email address will be required for further contact too.

Other Relevant Information

Interview will be conducted soon after the deadline. The starting date to join is as soon as possible.