

PhD in Battery electrode materials from abundant bio-based precursors

Application closing day: 13th June 2025

The aim of the PhD project is the design and characterization of electrode materials for batteries to be processed from abundant bio-based precursors. Initially Si/graphite blends and SiOx/graphite blends will be targeted. Si and SiOx materials will be produced from nanoporous SiO₂ shells of diatom microalgae. Morphological, chemical and structural properties of the materials will be characterized using electron microscopy and Small Angle X-ray scattering amongst other techniques. The blended anodes will be electrochemically tested in special three electrode lithium cell to decouple the contribution of each component under different testing conditions. The redox mechanism of electrodes having distinctive Si/SiOx to graphite ratios will be investigated using operando techniques through proposals made at ALBA synchrotron. The results achieved should enable rationalising the design of such materials with an optimum graphite content so as to maximise performance.

The recruited PhD student will enroll in the Materials Science PhD program at Universitat Autònoma de Barcelona and be co-supervised by Dr. M. Valeria Blanco and Prof. M. Rosa Palacín.

Requirements including language skills:

Candidates with a degree and Master in Chemistry, Nanoscience or Materials Science are most suited. Additional experience in electrochemistry, structural or physical characterization techniques is not mandatory but would be appreciated.

We Offer:

Type of contract: PhD contract

Length: 4 years

Salary: Salary range follows the guidelines of the PhD fellowships offered by the Ministry (formerly named FPI).

Department where she/he will be incorporated: Solid State Chemistry Department

How to apply:

Applications have to be made through <https://www.convocatorias.csic.es/convoca/>

(Available in <https://sede.csic.gob.es/tramites/convocatorias-de-personal/convocatoria/38105> and the CSIC webpage <https://www.csic.es/es/formacion-y-empleo/formacion-de-personal-investigador/doctorado/contratos-predoctorales>)

Interested candidates can contact both Dr. M. Valeria Blanco and Prof. M. Rosa Palacín for further information: vblanco2@icmab.es, rosa.palacin@icmab.es

What ICMAB is and why working with us:

ICMAB – CSIC is a multidisciplinary global reference centre for the cutting-edge research of functional materials for electronics, energy and health which fosters knowledge transfer and it

is characterized by its internationalization and its education, inclusion and diversity policies. ICMAB-CSIC is committed to know-how transfer to productive sectors as well as to participate in educational and outreach activities. Since 2016, ICMAB -CSIC has been awarded for three consecutive periods with the Severo Ochoa Centre of Excellence distinction.

ICMAB-CSIC, with over 250 members from 47 nationalities, is a more than three decades old research institute located at the Universitat Autònoma de Barcelona (UAB) campus, surrounded by other research and technological centres and with access to many state-of-the-art equipment and scientific facilities. Moreover, ICMAB-CSIC has its own scientific services equipped with the newest scientific instrumentation and with highly specialised technical staff available to the scientific community.

ICMAB-CSIC stands out for its great training activity at the doctoral level. Training on technical, scientific and transversal skills are offered to ICMAB-CSIC personnel. Moreover, ICMAB-CSIC has coordinated 2 Marie Skłodowska-Curie COFUND doctoral training programs on advanced functional materials: DOCFAM (2017-2022) and DOCFAM+ (2023-2028). In total, 48 doctoral students have been trained (18 at the at the ICMAB).