

PhD thesis position: developing a competitive solid-state battery-technology based on the development of innovative polymer, quasi-single ion conducting composites and lithium salts

DESCRIPTION OF THE INSTITUTION:

CIC energiGUNE is the research center for electrochemical and thermal energy storage, a member of the Basque Research and Technology Alliance- BRTA, and, a strategic initiative of the Basque Government. CIC energiGUNE was created in 2011 to generate excellent research in materials and systems for energy storage, maximizing the impact on results to the Basque Business Network, through collaboration with universities, research centers, and companies.

CIC energiGUNE has a dynamic research team of more than 100 researchers and is extremely well equipped with a wide range of up-to-date facilities that are fully available for all its researchers. Also, the European Commission has recently awarded CIC energiGUNE with the 'HR Excellence in Research' which reflects its commitment to achieving fair and transparent recruitment and appraisal procedures and certifies the existence of a stimulating and favorable work environment for researchers in the institution.

For more details on CIC energiGUNE's research activities please visit our website at <http://www.cicenergigune.com>

PROJECT DESCRIPTION:

This PhD project aims at developing a competitive solid-state battery-technology based on the development of innovative polymer, quasi-single ion conducting composites and lithium salts. The work will be performed in close collaboration with an industrial partner, making possible the integration of developed materials in small prototypes.

Rechargeable batteries are the key towards fossil fuel independence. Current Li-ion batteries using liquid electrolytes are unsafe due to their high flammability and instability at high temperature. On this regard, polymer-based electrolytes, which comprise a lithium salt and an elastic polymer matrix and potentially an inorganic filler, have been investigated as important candidates for enhancing the energy density and safety of the next-generation rechargeable lithium metal batteries, thanks to their high stability, low flammability, light weight, good processability and compatibility with Li metal. However, important fundamental limitations must still be addressed, such as the low ionic conductivity, lithium dendritic growth, polarization of the battery during operation at high currents related to low transport number, and overall short battery life. Thus, the search of new solid electrolyte alternatives raise as a promising strategy to solve aforementioned issues.

The selected candidate will be part of a multidisciplinary team of researchers and a secondment of 3 months in another institution is foreseen.

TECHNIQUES TO BE USED:

- Standard operating procedures for organic and polymer synthesis.
- Structural and physico-chemical characterization: nuclear magnetic resonance spectroscopy (NMR), Fourier transform infrared spectroscopy (FTIR), Raman, ICP, X-ray diffraction, elemental analysis, gel permeation chromatography (GPC), differential scanning calorimetry (DSC), thermogravimetric analysis, scanning electron microscopy (SEM).
- Electrolyte/electrode preparation, cell integration, and component characterization.
- Electrochemical testing.

WHAT WE OFFER:

We are offering a predoctoral employment contract that covers the whole period of the thesis elaboration with a competitive salary within the category.

Access to a complete set of cutting-edge infrastructures and laboratory equipment that guaranty a successful thesis and the fulfillment of the objectives in due time.

Candidates will join an integrated, enthusiastic, and multidisciplinary institute in an international environment making high quality research and impactful contributions to the energy storage field.

CIC energigUNE is located close to the city of Vitoria-Gasteiz (Spain), in the heart of the Basque Country. The Basque Country is the region with the highest R&D investment in Spain, with more than 20.000 researchers. The basque research ecosystem comprises a solid and collaborating community composed of universities, technology and cooperative research centers which leads the return per capita in the European H2020 program.

CANDIDATE PROFILE:

- Holding a Master's degree, ideally with academic background in synthetic chemistry, polymers or materials science, and/or electrochemistry.
- A good team player who can collaborate well with other scientists.
- A highly motivated person with an interest in research.
- A good level of spoken and written English

HOW TO APPLY:

All applicants are invited to submit their applications including a cover letter, a detailed curriculum vitae and their academic records at:

<https://cicenergigune.com/en/employment-opportunities/69608662>

The selection process ends once the candidate is selected.

CIC energigUNE is committed to affirmative action, equal opportunity and the diversity of its workforce.