

## Company Description

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>

## Information

 Deadline: 2021-03-31  
 Category: Business  
 Province: Araba / Alava

 Country: Spain  
 City: VITORIA-GASTEIZ

## Company

CIC energiGUNE



## Main functions, requisites & benefits

### Main functions

Electromobility (e-mobility) technology is making advances worldwide to ensure that eco-friendly, quiet and efficient electric vehicles will be on our roads in the near future. The e-mobility attractiveness stands and falls by the lithium-ion batteries which technology and processing are well-established but are reaching its physicochemical limits. Solid-state batteries (SSBs) have the potential to outperform conventional batteries in terms of energy density, charging and power capability, and thermal stability. Many research efforts have been done in the field of material science and electrochemistry. However, intensive research into the production of SSBs electrodes is highly required to improve the battery cell performance and reduce manufacturing costs. Recently, in our group a composite cathode for SSBs has been developed combining dry and wet dispersion processes and subsequent coating and drying. The electrochemical performance of the composite cathodes present a areal capacity of 1mAh cm<sup>-2</sup> with a stable coulombic efficiency (99%). Since a high number of process parameters affects the resulting battery cell performance and cyclability, a fundamental understanding of the governing processes occurring during electrode manufacturing and their impact on component distribution is needed to develop strategies to increase the cells energy density and decrease electronic and ionic transport resistances that also could provide higher rate capabilities and capacities which are limitations of SSB state of the art. The aim of this PhD thesis will be to investigate and understand the ionic and electronic conductivity of the composite cathodes, the pore structure distribution and the chemical composition of the carbon/active material electrolyte interphase and its location on the electrode. TECHNIQUES TO BE USED: Fabrication of slurries and coating of composite cathodes employing the recipes and methods developed by the cell prototyping group. Electrochemical Impedance Spectroscopy (EIS) and DC measurements to distinguish between electrical and ionic conductivity of the cathodes. Combination of porosimetry methods and Scanning Electron Microscopy (SEM) for quantifying the porosity and tortuosity of the cathodes. Study of the segregation of the materials due to the solvent evaporation effect occurring during drying by confocal Raman spectroscopy. Post-mortem characterization of the composite electrode by Raman spectroscopy, thermogravimetric analysis (TGA), Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD).

### Requisites

Holding a Master's degree with academic background in material science or engineering. Good speaking and writing skills in english. A good team player who can collaborate with other scientists. Highly motivated person and interested in research.

### Benefits

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 existing laboratory infrastructure and equipment, as well as to the needs identified during the project development to ensure a fruitful stay and the fulfillment of the objectives in due time. Integration in an enthusiastic and multidisciplinary young group with great projection and commitments with sustainability and research quality. CIC energiGUNE is