Centre Nacional de Microelectrònica IMB

CSIC Consejo Superior de Investigaciones Científicas

Project Type: **PhD thesis**

Design, fabrication and characterization of novel energy harvesting & storage microdevices.

Short Description

The Project will take place under the supervision of the thermoelectric harvesting team, which is part of the MicroEnergy Sources and Sensors Integration Group of IMB-CNM (CSIC) in Barcelona (Spain). This team has a long record of R+D activities in the field of thermoelectric microgenerators. These devices are based on thin film and MEMS silicon technologies, thus ensuring the required miniaturization, manufacturability and cost-effectiveness, all in an environmentally friendly material.

The fabrication of the microplatforms and the characterization of the devices will take place in our own laboratories, including the use of the CNM Clean Room, which is considered one of the Singular Scientific and Technic Facilities in Spain. The research team will be in close contact with other institutions, since this work is encased in the HARVESTORE European project. This project aims to obtain enhanced all-solid state harvesting and storage devices using concepts from the emerging Nanoionics and Iontronics disciplines.

The final goal of this research is to enable the conversion of naturally occurring temperature gradients into usable chemical energy by employing two solid-state devices, namely: *a micro ThermoGalvanic device, and an ion-Gated micro ThermoElectric device,* so that they can provide autonomy to sensors in IoT scenarios.

Background & skills required

This field of work is quite transversal and multidisciplinary. It may be attractive to different studies profiles. Physics, electronic engineering, nanoscience and nanotechnology are just examples.

Since this is a PhD thesis offer, the applicant should have fulfilled Master studies.

Basic background on multiphysics simulation, thermoelectric and electrical characterization techniques and setups would be appreciated, but training will be anyway provided. The team is international so English is needed on a regular basis.

Tasks

The tasks to be performed will be related to the design, simulation, fabrication and characterization of silicon based microstructures for their integration with materials that enable their use as devices performing energy harvesting or energy storage functions. After the candidate gets acquainted with the team and with the necessary microenergy and microtechnology background, he/she will help in the successful development of the novel and highly integrated energy microdevices in the frame of the European project HARVESTORE..

Contact MicroEnergy Sources and Sensors Integration
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