Post-doctoral contract offer

Subject: Carbon materials with controlled porosity for sodium-ion batteries

General information

Workplace: Nancy
Type of contract: FTC Scientist
Contract period: 18 months
Expected date of employment: Between March and June 2023
Proportion of work: Full time
Remuneration: Minimum 2555 euros gross per month
Desired level of education: PhD
Experience required: Electrochemistry, electrode materials testing, characterization of materials

Missions / Activities

1. Elaboration of hard carbons using a novel pressurized device developed in our group.

2. Characterization of the physico-chemical properties of hard carbons through a set of multi-scale techniques: SEM, TEM, XRD, Raman spectroscopy, TGA, gas adsorption, helium pycnometry, SAXS. The influence of the precursor, temperature of pyrolysis, and especially pressure will be examined.

3. Characterization of the electrochemical behavior of hard carbons by conventional and more advanced techniques: galvanostatic cycling, cyclic voltammetry, electrochemical impedance spectroscopy, galvanostatic intermittent titration technique.

Work context

The post-doc will work within the Carbon-based Materials research group under the supervision of Dr. Lucie Speyer.

The main topic of this research group concerns the synthesis, multi-scale characterization and chemical treatments of carbon-based bulk materials and nanomaterials. A new research axis has been recently developed around the elaboration of hard carbons as negative electrode materials for sodium-ion batteries. It is supported by the expertise of our group concerning preparation and characterization of disordered carbon materials, and chemistry of intercalation.

The post-doctoral project will be carried out in this last research axis and is included in the ANR (National Research Agency) project "CARbon mAterials with controlled porosity for sodiuM-ion BAtteRies (CARAMBAR)". It aims to elaborate a range of hard carbons using a low-temperature method via a pressurized furnace, and to study their physico-chemical properties, as same as their electrochemical behavior against sodium. Special attention will be given to the porous texture of the materials. The goals are the obtaining of performant hard carbons at moderate temperatures, and a better understanding of sodium storage mechanisms which are still under debate. The post-doctoral researcher will be particularly involved in the electrochemical characterization.

Skills

The candidate should be experienced in elaboration and characterization of materials (experience in hard carbons is a plus). A strong expertise in electrochemistry and battery testing (coin cell assembly, galvanostatic cycling, cyclic voltammetry, electrochemical impedance spectroscopy…) is required.

Constraints and risks

The position you are applying for is located in a sector relating to the protection of scientific and technical potential. It therefore requires, in accordance with the regulations, that your arrival be authorized by the competent authority of the Ministry of Higher Education, Research and Innovation.

About Institut Jean Lamour

The Institut Jean Lamour (IJL) is a joint research unit of CNRS and Université de Lorraine. It is linked to the Institute of Chemistry of CNRS.
Focused on materials and processes science and engineering, it covers: materials, metallurgy, plasmas, surfaces, nanomaterials and electronics.
It regroups 183 researchers/lecturers, 91 engineers/technicians/administrative staff, 150 doctoral students and 25 post-doctoral fellows.
Partnerships exist with 150 companies and our research groups collaborate with more than 30 countries throughout the world.
Its exceptional instrumental platforms are spread over 4 sites; the main one is located on Artem campus in Nancy.

Application

Applicants are invited to send a resume and a cover letter before 1st December 2022 to:
lucie.speyer@univ-lorraine.fr