



Postdoctoral position for advanced physico-chemical characterization of nanodiamonds: elucidating their surface chemistry with photoelectron spectroscopies

Contract : 12 months fixed term contract. Starting from september to december 2022
Employer : Institut Lavoisier de Versailles (ILV, UMR 8180)
Université de Versailles Saint-Quentin en Yvelines / CNRS
Workplace : Versailles, France – CEA Saclay, France
Skill area : Material Science, Chemistry, Physics

A **postdoctoral** Research Fellow position (supported by LabEx funding) is available in the “Electrochemistry and Interfacial Physico-chemistry” (EPI) group at the Institut Lavoisier de Versailles (www.ilv.uvsq.fr) in collaboration with the NIMBE Laboratory in CEA Saclay.

This project aims to progress in the correlation between the particular **characteristic** and spectacular **properties** of **diamond nanoparticles** with their **surface physico-chemistry**. These nano-objects show increasing applications in the field of energy, biology and photocatalysts. Nevertheless, the intimate and optimal characterization is still needed. A better understanding of the relation between their nature and their electronic properties is mandatory. Here, we propose to use the knowledge of NIMBE laboratory (Nanosaclay LabEx) in the synthesis of nanodiamonds exhibiting different diameters, shapes and surface chemistries with the capacity of advanced surface analysis at ILV laboratory (CHARMMMAT LabEx). Regular XPS, Angle Resolved XPS, UPS and REELS will be particularly adapted to get information from slightly different particles with unique properties. Surface sp^2/sp^3 ratio of particles will be particularly studied.

The position will involve research projects focusing on understanding the role of the crystalline quality, the size, the shape and the surface termination of diamond nanoparticles. Dedicated tools of CEFS2 center (<https://www.ilv.uvsq.fr/cefs2-xps-nano-auger-sem-eds-ebisd-2>) including photoemission and related techniques, as well as electron microscopy will be used to access information on the nature and the physico-chemistry of the extreme surface. In order to perform these studies, different nanoparticles will be prepared (hydrogenated, oxidized...) by various thermal annealing. Optimization of their deposition on surfaces will be performed before performing the challenging analyses.

Candidates interested in characterization of nano-objects are strongly encouraged to apply. In addition to experiments, the position will also involved working with variety of data analysis techniques.

Contact: Dr Aureau Damien (damien.aureau@uvsq.fr), Dr. Hugues Girard (hugues.girard@cea.fr)

Candidates profile:

The successful candidate should have a PhD degree in chemistry, physics or materials science and demonstrate knowledge in material science, thin films, and chemical/physical spectroscopies. A first experience with the XPS data treatment will be an advantage. A track-record of high-quality scientific publications is desirable. The initial duration of the post-doctoral fellowship is 12 months. Evaluation of submitted applications will begin in june 2022, and continue until the position is filled.

Keywords:

Surface analysis, REELS, XPS, UPS, Nanodiamonds, chemical functionalization.

This work is supported by a public grant from LabEx funding (joint call Charmmmat- Nanosaclay)