DE LA RECHERCHE À L'INDUSTRIE

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Researcher open position at CEA-Saclay, France
In the UMR NIMBE division
"Nanoscience and Innovation for Materials, Biomedicine and Energy"

KEYWORDS
Carbon nanotube, graphene, synthesis, growth mechanisms, CVD, characterization

CONTEXT

Within NIMBE, the Nanometric Structure Laboratory (LEDNA) is focused on the development, using a bottom-up approach, of synthesis and elaboration methods for the development of novel nano-objects dedicated to various applications in the field of energy, environment, health and functional composite materials. In particular, the laboratory has expertise in different atmospheric pressure CVD methods to synthesize nanostructures such as vertically aligned carbon nanotubes (VACNT) and graphene on various substrates. Despite an advanced understanding of the physico-chemical phenomena governing the growth of these nanostructures, several fundamental questions remain still to be answered. In this context, one of the objectives of LEDNA is to go deeper in both the developments of synthesis by CVD and characterization of innovative carbon nanostructures integrating VACNT and / or graphene. Thus, efforts are needed to better control and understand the formation of these nanostructures by performing, on one hand, instrumental developments and *in-situ* analyses during their gas phase synthesis and, on the other hand, *operandi* analyses of electrodes or energy storage devices.

The laboratory is equipped with several CVD furnaces of various sizes and configurations allowing the growth of CNT or graphene, and furnaces dedicated to *in-situ* growth analyses. Physical-chemical and structural analysis to study nanomaterials is possible through equipment available within the laboratory, namely electron microscopy (SEM, TEM), TGA, Raman spectrometry, XPS. Beyond that, analyses exhibiting higher resolution in *post-mortem*, *in-situ* or *operando* mode using high-resolution TEM, XRD, EXAFS-XANES techniques accessible through proposal submission on large research facilities within Paris-Saclay University are also possible.

In this context, the researcher will have to propose an ambitious project focused on the development of innovative carbon nanostructure (nanotubes and graphene) growth on metals, metal alloys or metal oxides in order to obtain materials or devices with controlled properties for various applications in fields such as energy (recovery and storage), environment (sensors and filters) or health (bio-sensors). It will be based, firstly, on specific experimental studies on CVD equipment to develop the growth of nanotubes or graphene on metals or metal alloys of different natures and, secondly, on a detailed understanding of growth mechanisms of these nanostructures by carrying out *in-situ* analyses to follow their formation and changes occurring in the reactive gaseous phase. Secondly, the project will focus on the implementation of various processing methods, such as dispersion in order to obtain devices (gas sensors), or stretching CNT carpets to obtain fibers or sheets for applications in the fields of environment, energy or materials.

REQUIRED PROFILE

The applicant holds a PhD in chemistry-physics or materials chemistry, and is specialized in the field of carbon nanostructures, with a strong experience in CVD techniques and a good understanding of growth processes. Experience in morphological, chemical and structural analysis techniques, implemented in laboratories and on large research facilities is highly desirable. A good knowledge of nanostructure handling and processing would be appreciated.

USEFUL INFORMATION

The position will be based at CEA / Saclay and attached to the LEDNA team of the NIMBE UMR CEA-CNRS. The application must be received before September 10, 2017 and will include: CV and list of publications as well as cover letter (1 page recto / verso maximum) justifying interest for the position and developing the different axes of the study in the research project. At the end of the application process, a pre-selection based on the three files sent by the applicants will be made, and selected applicants will be heard in September 2017.

CONTACT PERSON

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