Centre National de la Recherche Scientifique (CNRS)
University of sciences and technologies of Lille, BP 60069, avenue Poincaré,
F-59652 cedex, Villeneuve d'Ascq, France

Study of optically switchable molecules by Conducting-AFM in molecular spintronic

Workplace: Institut d'Electronique, de Microélectronique et de Nanotechnologies (IEMN-CNRS), Villeneuve d'Ascq (France)
Contract Period: 12 months
Remuneration: From 2555 to 2948 euros gross salary per month
Desired level of education: PhD
Experience required: 1 to 4 years
URL to apply for this position: http://bit.ly/2AaGiuA

Missions

In the framework of spintronic (study of the spin-dependent transport for electronic), and in order to overcome the conventional inorganic spintronic, molecular spintronic exploits the unique tailoring opportunity offered by chemistry by designing a molecule which exhibits the desired function.
Our group NCM specialist in the study of electron transport in molecular junctions can access to a atomic force microscope (AFM), operating at low temperature (4K) and with an integrated magnetic field. Our group offers to study functional molecular systems for spintronics.

Activities

For this objective, we will address: (i) the grafting and the structural characterization of self-assembled monolayers (SAM) on ferromagnetic electrodes; (ii) electrical characterization of non-functional SAMs (reference measurements, alkyl chains) by Conducting-AFM at low temperature and under a magnetic field using an AFM tip covered with a ferromagnetic metal (Co, Ni or Fe) in order to measure the magnetoresistance, (iii) expand these characterizations to SAMs composed of functional molecules with two reversible states (azobenzene, diarylethene). These two optically controllable states have different conductance values

Skills

This position is destinated for a candidate with a strong interest for experimentation and good experience in scanning probe microscopy, ideally in ultra-high vacuum and electrical measurement (C-AFM, EFM or KPFM). Skills in materials science, surface characterization and electronics are clear advantages for this position.
For this multidisciplinary subject, at the interface between chemistry and physics, the candidate will have to perform electrical characterizations under vacuum and magnetic field.

Work Context

This work is in the framework of the SPINFUN project (ANR found) in partnership with the CNRS/Thalès (Palaiseau) for the device realization and characterization, the ICMMO laboratory (Orsay) for the synthesis of new switchable molecules and the University of Mons (Be) for the simulation of the electrical properties on these new molecules.

Constraints and risks

Travels to the partnership laboratories will be planned.

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