



Post-doctoral Position

Design, fabrication and characterization of nanohybrid LEDs based on AIE organic ligands grafted to inorganic nanoparticles

A postdoc position is open in ORGASACLAY team at CEA/NIMBE at Paris-Saclay university, France. ORGASACLAY is a common research team between LICSEN/NIMBE at CEA Saclay and LPICM at Ecole Polytechnique dedicated to Organic and Hybrid Optoelectronics.

Duration: 18 months

Competences: PhD in Physical-Chemistry, Chemistry or Material Science. Experience in organic thin film deposition is highly desirable as well as good understanding of organic light-emitting devices.

Location : LICSEN, NIMBE, CEA Saclay, 91191 Gif sur Yvette.

Application deadline: September 30, 2019.

Context: This position is part of a collaborative project funded by Agence National de la Recherche (ANR-17-CE09-0020, FLUOHYB) implying three teams – ISCR, University of Rennes, Muriel Hissler – CINaM, University of Aix-Marseille, Jorg Ackermann – NIMBE, University of Paris-Saclay, Bernard Geffroy.

Subject: The aim of this project is the development of highly luminescent hybrid nanomaterials which can be used for the development of optoelectronic devices like light-emitting diodes (LEDs). To develop these new materials, we will graft Aggregation-Induced Emission organic fluorophores (AIE) on inorganic nanoparticles like ZnO, ZrO₂. The grafting, via an anchoring group part of the pi-system, will concentrate a large number of chromophores at the surface and particularly freeze the motion of the molecules to reduce non-radiative deactivations. One of our objectives concerns the development of a synthetic method, easy to implement, reproducible and permits to obtain large quantities of modified nanoparticles. In particular, phospholes, siloles and tetraphenylethylene, which AIE properties have already been demonstrated on “all organic” system will be studied. One objective will be to prepare AIE fluorophores emitting different wavelengths in the visible range. Furthermore, we will study in detail the interactions between the organic fluorophore and the nanoparticle by varying different parameters (nature and position of the grafting function, shape of the nanoparticle (sphere, rod...), and introduction of different substituents on the fluorophore). Finally, introduction of these new hybrid materials with tunable emission into specific LEDs structures using wet techniques to simplify the manufacturing processes of these devices is the main target of the project to develop white LEDs for lighting.

Role of the candidate: The candidate will fabricate and optimize the nanohybrid LEDs based on AIE organic fluorophores grafted to inorganic nanoparticles.

The research work will be carried out at Ecole Polytechnique in ORGASACLAY team (common research team with LICSEN and LPICM). The team has a long-standing experience in various thin films deposition techniques and solar cells characterization.

Application: Up-to-date CV with publication list, short description of background and research interest + 2 reference contacts to be sent to bernard.geffroy@cea.fr.