

Institut des Sciences Chimiques de Rennes

UMR 6226 CNRS - UNIVERSITE DE RENNES 1



263, avenue du Général Leclerc – Campus de Beaulieu
35042 RENNES CEDEX (FRANCE)



Laboratory : ISCR - UMR CNRS 6226 – Université de Rennes1 – team OMC- PMM

Web page : <https://iscr.univ-rennes1.fr/omc/phosphorus-molecular-materials>

Contact: Pr. M. Hissler : muriel.hissler@univ-rennes1.fr; 02 23 23 5 83, Dr. P.-A. Bouit : pierre-antoine.bouit@univ-rennes1.fr

Context

π -Conjugated oligomers and polymers based on a planar backbone of sp^2 -bonded C-atoms have attracted increasing interest in recent years owing to their potential application for electronic devices. For example, light-emitting diodes (OLEDs) for display based on polymer technology are commercialized since 2002. However, research in this field is still needed especially toward the development of optimized materials for white-LEDs. This type of devices is of tremendous interest since they can potentially replace traditional light sources generating enormous energy saving.

Project: The aim of this project is the development of highly luminescent hybrid materials which can be used for the development of light-emitting diodes (LEDs). This PhD project gathers 3 french laboratories (ISCR-Rennes, LPICM-Palaiseau, CINA-Marseille) in the frame of an ANR program (FluoHyb, <http://www.agence-nationale-recherche.fr/Projet-ANR-17-CE09-0020>).¹ In particular, the group in Rennes is internationally recognized for the development of P-containing π -conjugated oligomers and polymers and their use for opto-electronic application.²

The main task of the PhD student will be the development of synthetic methods, easy to implement, reproducible and that permits to obtain large quantities of fluorescent ligands. In particular, phospholes, siloles and tetraphenylethylene (see figure), which AIE properties have already been demonstrated on “all organic” system will be studied.² Another objective will be to prepare AIE fluorophores emitting different wavelengths in the visible range. All the compounds will be fully characterized including UV-Vis absorption, fluorescence, and cyclic voltammetry. The grafting on the nanoparticles and the preparation of the LEDs will be done in the lab of our partners. The PhD student will have the possibility to participate to these collaborations through short stays in the corresponding laboratories.

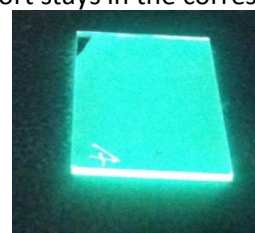
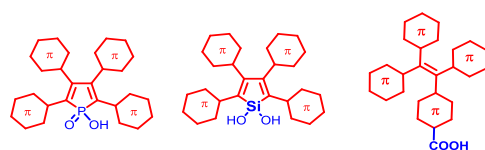


Figure: example of targeted molecules and pictures of a thin film of fluorescent hybrid material

Application : Master degree in molecular chemistry or equivalent diploma. A strong background in organic/organometallic synthesis is required. Additional skills in photophysics and nanomaterials are a plus.

Starting : sept./oct. 2018.

Salary : 1400 € /month.

Localization : Institut des Sciences Chimiques de Rennes (France) (<https://iscr.univ-rennes1.fr/>).

¹ European patent (CNRS/UR1/AMU), N°: 14 173 001.0, J. Ackermann, P. -A. Bouit, M. Hissler, O. Margeat.

² P.-A. Bouit, M. Hissler *et al.* *J. Am. Chem. Soc.* **2012**, 134, 6524; *Org. Lett.* **2013**, 15, 330; *Chem. Eur. J.* **2014**, 20, 9784; *Chem. Eur. J.* **2015**, 21, 6547; *Chem. Soc. Rev.* **2016**, 45, 5296; *Chem. Sci.* **2017**, 8, 4264.