# Internship position in molecular chemistry: Synthesis and Study of Organic Materials for Electronics

The host group, localized at the Institute of Chemical Sciences at Rennes 1 University, possesses recognized experience in the field of organic materials for organic electronics and especially for applications in the field of Phosphorescent Organic Light-Emitting Diodes (OLEDs).

**The objective of the present Master 2 internship is to synthesize and study innovative organic host materials for Phosphorescent OLEDs**. A Phosphorescent OLED is an electronic component which emits light (Fig. 1-Left). It is constituted of a light emissive layer (a phosphorescent light-emitter dispersed within an organic host matrix) deposited between two electrodes. OLEDs belong to the new generation of electronic components using organic materials, so called *Organic Electronics* or *Plastic Electronics*. This electronics displays many advantages such as the possibility to be deposit on foldable/flexible/rollable substrates (Fig. 1). In the last months, the first foldable electronic devices have become commercially available (Fig. 1), providing new directions for the future of display.


Figure 1: Left: Structure of an OLED, Middle and Right: Examples of flexible/rollable OLEDs based electronic devices.

As above mentioned, the emissive layer of a phosphorescent OLED is constituted by a phosphorescent light-emitter dispersed within an organic host matrix. **The present internship will deal with the synthesis and the characterization of these host matrixes before incorporation into electronic devices.** In order to reach high performance devices, the host material should possess precise electronic properties. **The molecular design of the host drives these properties and is hence highly important. This the heart of this project.** We will be interested by Donor/Acceptor molecules, some examples are provided in Fig. 2. The molecules are constructed on a similar design, the association of an electron-rich fragment (quinolinophenothiazine coloured in blue) and an electron-poor unit (phosphine oxide, triazole or oxadiazole, coloured in red).

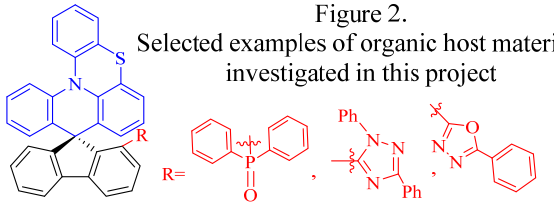


Figure 2.
Selected examples of organic host materials investigated in this project

The scientific methodology is divided in three main tasks: **Synthesis, Determination of the properties** (electrochemistry, absorption and emission spectroscopy) and **Integration in OLED devices.** This last part will be done in collaboration.

The present work is mainly based on organic chemistry and the candidate should have excellent skills in organic synthesis. Electronic characterizations (fluorescence, electrochemistry) will be acquired by internal lab training. **A strong motivation for research is mandatory**. The candidates are invited to contact C. Poriel/ C. Quinton to discuss about this project.


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Selected references.


[1] a) L. J. Sicard, H.-C. Li, X.-Y. Liu, O. Jeannin, J. Rault-Berthelot, L.-S. Liao, Z.-Q. Jiang, C. Poriel, ***Angew. Chem. Int. Ed.*** **2019**, *58*, 3848; b) C. Poriel and J. Rault - Berthelot, ***Acc. Chem. Res.*** **2018**, *51*, 1818.

[2] C. Quinton, L. Sicard, O. Jeannin, N. Vanthuyne and C. Poriel, ***Adv. Funct. Mat.*** **2018**, *28*, 180340.