

MASTER DE CHIMIE DE PARIS CENTRE - M2S2

Proposition de stage 2018-2019

Internship Proposal 2018-2019

Spécialité(s) / Specialty(ies) :

- Chimie Analytique, Physique, et Théorique / *Analytical, Physical and Theoretical Chemistry* :
- Chimie Moléculaire / *Molecular Chemistry* :
- Matériaux / *Materials*:
- Ingénierie Chimique / *Chemical Engineering*:

Laboratoire d'accueil / Host Institution

Intitulés / *Name* : Institut Parisien de Chimie Moléculaire (IPCM), UMR 8232

Adresse / *Address* : Sorbonne Université, 4 place Jussieu, Paris

Directeur / *Director (legal representative)* : Louis FENSTERBANK

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E-mail : louis.fensterbank@upmc.fr

Equipe d'accueil / Hosting Team : Chimie des Polymères

Adresse / *Address* : (à partir de décembre 2015) SU, tour 43-53, 4^{ème} étage, 4 place Jussieu, Paris

Responsable équipe / *Team leader* : Laurent BOUTEILLER

Site Web / *Web site* : <http://www.ipcm.fr/article581.html>

Responsable du stage (encadrant) / *Direct Supervisor* : David KREHER

Fonction / *Position* : Associate Professor (HDR)

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Période de stage / *Internship period* : janvier-juin ou juillet 2019

Gratification / *Salary* : 554€/mois

New organic materials designed for light emitting applications

Projet Scientifique (1 page maximum) / Scientific Project (maximum 1 page):

1. Subject

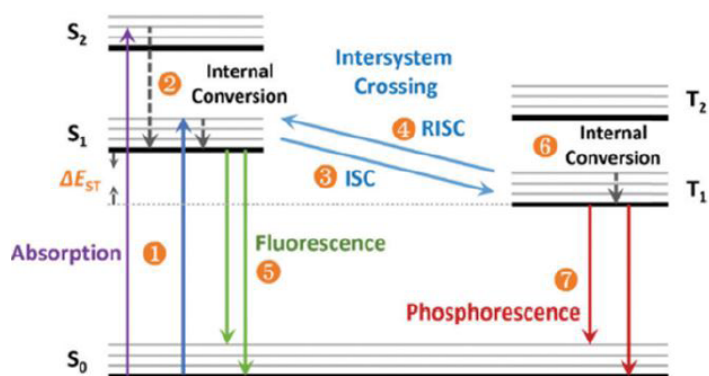
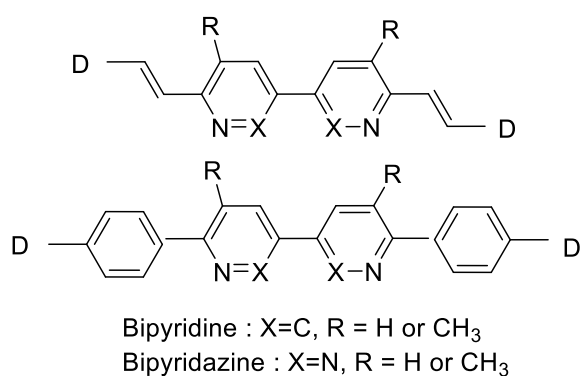
The design of highly emissive and stable emitters for organic light emitting diodes (OLEDs) is still a challenge, justifying the intense research activity of the scientific community in this field. In this context, a great deal of interest has been recently devoted to the elaboration of emitters exhibiting a thermally activated delayed fluorescence (TADF).(1) By a specific molecular design consisting into a minimal overlap between the highest occupied molecular orbital (HOMO) and the lowest unoccupied molecular orbital (LUMO) due to a spatial separation of the electron-donating (D) and the electron-releasing (A) parts, luminescent materials exhibiting small S1-T1 energy splitting could be obtained, enabling to thermally upconvert the electrons from the triplet to the singlet excited states by reverse

* 5 mois à partir du 26 janv 2018 / *5 months not earlier than January, 26th 2018.*

** Fin du premier semestre M2S1: 19/01/2018 ; Soutenances des stages M2S2, 1ere session du 29/6-3/7/2018 / End of the 1st semester M2S1: 19/01/2018. Master Defense (1st session of M2S2) from 29/06 to 3/07/2018.

intersystem crossing (RISC). By harvesting both singlet and triplet excitons for light emission, OLEDs competing and sometimes overcoming the performance of phosphorescence-based OLEDs could be fabricated, justifying the interest for this new family of materials massively popularized by Chihaya Adachi since 2012. Here we propose to focus on the synthesis and study of a new family of emitters based on (bi)pyridine and/or (bi)pyridazine.

More precisely, in the past we developed a family of compounds that showed already interesting properties.(2) Based on these precedent results and by modifying the design, here are few examples of D-A-D chemical structures we would like to target as potential new phosphorescent or TADF emitters.



2. Methods

The traineeship will contain the following tasks : (1) the synthesis and purification of a series of building blocks (NMR, Chromatography), (2) the study of their optical properties (UV-Visible and photoluminescence spectroscopy), (3) if time, the analysis of bipyridazine complexation tests.

3. Références

- (1) Yang, Ma, Xie, Zhang, Liu, Zhao, Xu, Chi, Aldred, **Chem. Soc. Rev.**, **2017**, **46**, **915** ; Bui, Goubard, Ibrahim-Ouali, Gimes, Dumur, *Beilstein J. Org. Chem.* **2018**, **14**, **282–308** ; Noda, Nakanotani, Adachi, **Sci. Adv.** **2018**;**4**: **eaao6910** ; Kim, Yun, Lee, *Adv. Optical Mater.* **2018**, **1800255**.
- (2) Lincker, Kreher, Attias, Do, Kim, Hapiot, Lemaitre, Geffroy, Ulrich, Ziessel. **Inorganic Chemistry** **(2010)**, **49(9)**, **3991-4001**. Do, Kim, Attias, Kreher, Kim, **J. Nanosci. Nanotechnol.**, **(2010)**, **10**, **6874-6878**.