PhD offer:

Heteroatom-containing Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are of great potential for the development of efficient opto-electronic devices (solar cells, field-effect transistors…). The possibility of performing molecular engineering of PAHs using the power of organic chemistry is a key toward these applications. Indeed, PAHs’ HOMO-LUMO gap and supramolecular assembly can be easily controlled through modification of the π-system or lateral aliphatic substituents. An alternative appealing molecular engineering of PAHs involves the incorporation of heteroatoms (N, O, S, B).1

In 2012, we developed the first example of P-containing PAHs2 (see figure) that showed a tunable HOMO-LUMO gap using P-modification, coordination driven assembly and white-light-emission in an OLED device.3

In the frame of this PhD project, we want to prepare new polycyclic derivatives (perylenes, coronenes…) featuring different heteroatoms (P, Si, Ge, N…) to study their electronic properties and fully exploit their reactivity and in particular the coordination chemistry. Optical and redox properties of the compounds will be systematically studied. Preparation of opto-electronic devices as well as the theoretical studies will be performed through existing collaborations. The PhD student will have the possibility to participate to these collaborations through short stays in the corresponding laboratories.

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

Salary: 1350 €/month.
Localization: Institut des Sciences Chimiques de Rennes (France) (https://iscr.univ-rennes1.fr/).

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