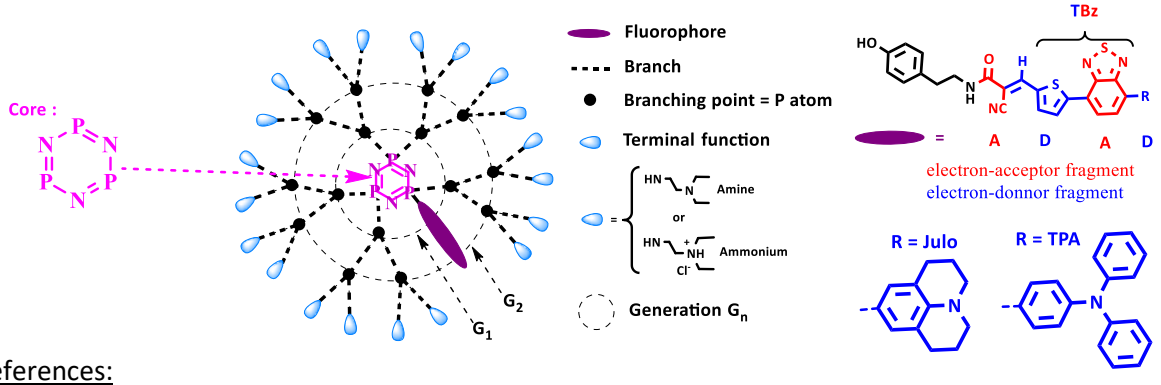
lab website

SYNTHESIS OF NEW NEAR-INFRARED FLUORESCENT ORGANIC NANOPROBES

Period	6 months beginning not later than: ☐ January ☐ February ☐ March ☐ April ☐ May ☐ June ☐ July ☒ September 2021
Internship supervisor(s)	name: K. Moineau-Chane Ching , DR-CNRS) / A. Hameau, Ass. Prof. e-mail: kathleen.chane@lcc-toulouse.fr - aurelien.hameau@lcc-toulouse.fr group: Dendrimers and Hetrochemistry; https://www.lcc-toulouse.fr/article375.html
Location	Laboratoire de Chimie de Coordination, UPR CNRS-8241 BP 44099, 205 route de Narbonne 31077 Toulouse cedex 4 ; FRANCE
This research master's degree research project could be followed by a PhD ☐ YES ☒ NO	

Project proposal: The goal is to develop a new class of dendritic nanoprobes based on the association of Poly(PhosphorHydrazone) (PPH) dendrimers and fluorophores. The synthesis of the different components is thoroughly under control in the host team. Dendrimers are hyperbranched multivalent macromolecules with a well-defined 3-D structure and nanometer-scale dimensions. Their structure consists of three parts: 1) the multifunctional core, 2) the skeleton with the branching units and 3) the surface with terminal functions (Scheme 1). The PPH dendrimers synthesized in the host team,[1] are used for applications in catalysis and materials science, but also in imaging or biology[2] which demonstrates the interest of fluorescent dendrimers.[3]

The candidate will synthetize thienylbenzothiadiazole [TBz][4] based π-conjugated fluorophores and incorporate them into a dendritic structure, as sketched below. These fluorophores exhibit an intense absorptivity (ε > 30 000 $L.mol^{-1}.cm^{-1}$) in the visible-near-infrared region (λ_{max} = 600 à 800 nm). Syntheses will be performed according to protocols developed in the laboratory. The role of the R fragment (for ex. julolidine (Julo) and triphenylamine (TPA) as shown below) on the optical properties, and of the number of generations on the physicochemical properties, will be examined. The spectroscopic studies (mainly UV-Visible absorption and fluorescence) will be performed in organic or aqueous media depending on the nature of the terminal functions, amine or ammonium, respectively.



References:

[1a] N. Launay, A.-M. Caminade, R. Lahana, J.-P. Majoral, *Angew. Chem. Int. Ed. Engl.* **1994**, *33*, 1589-1592; (2) A.-M. Caminade, A. Hameau, K. Moineau-Chane Ching and coll. *Pure Appl. Chem*. **2016**, *88*(10-11), 919–929; (3a) A. M. Caminade, A. Hameau and J. P. Majoral, *Chem. Eur. J.*, **2009**, *15*, 9270-9285; (3b) A.-M. Caminade, A. Hameau, J.-P. Majoral, *Dalton Trans*., **2016**, *45*, 1810–1822, (3c)) A.-M. Caminade, A. Hameau, K. Moineau-Chane Ching and coll. *Beilstein J. Org. Chem*. **2019**, *15*, 2287-2303.; (4a) K. Moineau-Chane Ching and coll, *ChemPhotoChem.* **2018**, *2*, 1027-1037; (4b) Kathleen Moineau-Chane Ching and coll., J. Photochem. Photobiol. A, **2018**, *356*, 403-410

Keywords, areas of expertise	Dendrimers, fluorescence, organic synthesis
Required skills for the internship	Dynamic and motivated student with strong skills in organic chemistry.