

Thesis offer starting october 2022

Title : Electro and/or photoactive metallosupramolecular architectures for optoelectronic applications.

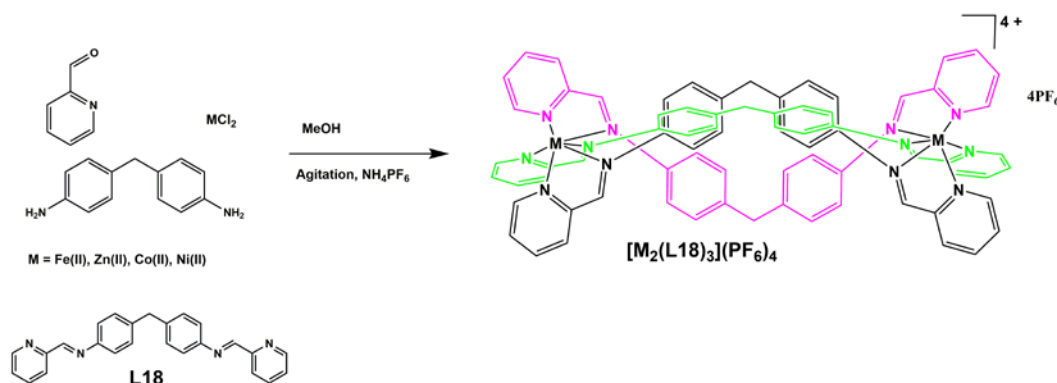
Team : MOLTECH-Anjou laboratory, Angers, France.

Supervision : Dr. Abdelkrim EL-GHAYOURY (abdelkrim.elghayoury@univ-angers.fr)

Funding : University of Angers doctoral fund : 100%

PhD thesis subject :

Currently, one of the research axes actively followed is the elaboration of multifunctional molecular materials. These materials are generally obtained by the (self)-organization of molecules with specific properties: electronic, optical, magnetic... One of the promising approaches for the preparation of these materials consists in associating, for example, an electro or photoactive unit with a function likely to complex metal cations. These multifunctional ligands react with metal cations to produce new metal complexes in which several properties are combined.^{1,2} Recently, we have extended the association of these functional organic ligands to the supramolecular domain by the preparation of double and triple metallohelicates (scheme). The objective is to take advantage of the supramolecular organization specific to these systems for their use in nonlinear optics. We have thus shown for the first time the possibility of using these metallohelicates as active units in second and third order nonlinear optics.³



Scheme : One pot synthesis of metallohelicates.

The adequate functionalization of these polyimine ligands by electro and/or photoactive groups will allow us to access new functional metallosupramolecular architectures whose optical and electronic properties will be improved. Emphasis will be placed on the chiral separation of the M and P helices in order to study and compare their respective physicochemical properties as well as those of the racemic mixture.

Expected skills : The candidate motivated by research must have a solid background in organic synthesis, supramolecular chemistry and possibly in coordination chemistry.

How to apply : All applications must be made via Université Bretagne Loire (UBL).

website: <https://theses.u-bretagne-loire.fr/3m/>

References :

1. B. Kulyk, D. Guichaoua, A. Ayadi, A. El-Ghayoury, B. Sahraoui. *Dyes & Pigm.*, **2017**, *145*, 256.
2. M.-A. Benmensour, A. Ayadi, H. Akdas-Kilig, A. Boucekkine, J.-L. Fillaut, A. El-Ghayoury. *J. Photochem. & Photobiol. A : Chemistry*, **2019**, *368*, 78.
3. K. Waszkowska, Y. Cheret, A. Zawadzka, A. Korcala, J. Strzelecki, A. El-Ghayoury, A. Migalska-Zalas, B. Sahraoui. *Dyes & Pigm.*, **2021**, *177*, 109036.