PhD. Position

(Starting: Autumn 2024, Duration: 3 years)

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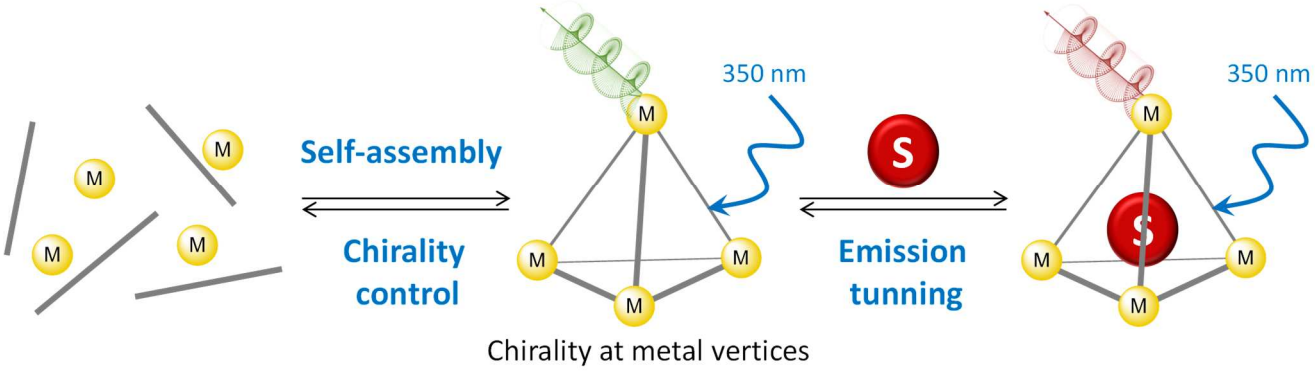
Luminescent chiral molecular cages for probing and imaging

Key words: Coordination chemistry, Supramolecular chemistry, Molecular cages, Luminescence, Chirality, Chiroptic.

Context.
The development of molecular systems emitting in the Near-Infra-Red remains an important challenge for bio-imaging. The combination of luminescence and chirality offers new routes to increase contrast and perform deeper tissue penetration of light. Supramolecular chemistry provides a promising strategy to control the chirality of NIR-emitting coordination complexes in molecular cages. The emission properties of the latter supramolecular self-assemblies should be tuned by recognition of small molecules in particular chiral ones that will allow developing applications in probing. Our aim is to synthetize tetrahedral molecular cages holding NIR emitting coordination complexes at vertices and study (i) the effect of the chirality of the assembly and (ii) the effect of encapsulation of molecule guests on emissive features and associated circularly polarized luminescence. A special focus will be put on controlling the chirality of assemblies.



Objectives.
The objectives of this thesis will be to synthetize NIR luminescent chiral metallo-cages and to study the effects of (i) the assembly, (ii) the counter anion, (iii) the ligand structure and (iv) the guest, on the photophysical and chiroptic properties. The latter properties should raise applications in innovative bio-imaging methods harnessing CP-light.

Work plan.
The student will first conduct organic synthesis of ligands before synthetizing the molecular cages by self-assembly. The effect of different chiral biases (counter anion, chiral ligand, guest) on the chirality induction will be then investigated. Then, the student will focus on analyzing the emission and chiroptic properties of cages, upon modification of ligand, counter anion and encapsulated guest.

Funding.
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Application.
To apply, send to benjamin.doistau@u-paris.fr your **CV**, the **name of two former advisors** and the **transcript of the marks** of your Master degree (1st and 2nd years).