



Period: 18 months – Financial support: ANR

Start date: **February 1, 2024**

Laboratory: CERMN, Centre d'Etudes et de Recherche sur le Médicament de Normandie, UR 4258

Post-doctoral position in Organic Chemistry at CERMN, University of CAEN (France).

Background and objectives of the project:

Cryptophanes (Crs) are cage-like molecular host known since decades to encapsulate many different entities, and particularly well suited for xenon.¹ Then, the development of Cr-based biosensors has been tremendously studied for applications in hyperpolarized xenon magnetic resonance imaging (MRI) in biological systems. Several works have demonstrated their applicability and relevance, in particular in cells assays, but to date, no application of such a bioprobe has been reported *in vivo*.² Indeed, the complex preparation of Cr-monosubstituted derivatives and the poor solubility of these molecules in biocompatible media precludes the obtention of an efficient xenon based bioprobe. Even though considerable progress has been made in the characterization of the cryptophane's structural aspects and exploration of their unique host-guest chemistry in the past four decades, the synthetic schemes to produce such derivatives have not evolved so much, leading to minor modifications of the whole backbone of cryptophanes, then narrowing their potential others applications.

The purpose of Neo-Crypto project is to extend the cryptophane chemical space by using and improving a newly described synthetic strategy developed by our group.^{3,4} The obtained new molecular hosts will be evaluated as hyperpolarized Xe-sensors for MRI.

(1) Brotin, T.; Dutasta, J.-P. *Chem. Rev.* **2009**, *109* (1), 88–130. <https://doi.org/10.1021/cr0680437>.

(2) Zemerov, S. D.; Dmochowski, I. J. *RSC Adv.* **2021**, *11* (13), 7693–7703. <https://doi.org/10.1039/D0RA10765D>.

(3) Vigier, C.; Fayolle, D.; El Siblani, H.; Sopkova - de Oliveira Santos, J.; Fabis, F.; Cailly, T.; Dubost, E. *Angew. Chemie Int. Ed.* **2022**, *61* (46). <https://doi.org/10.1002/anie.202208580>.

(4) Vigier, C.; Fossé, P.; Fabis, F.; Cailly, T.; Dubost, E. *Adv. Synth. Catal.* **2021**, *363* (15), 3756–3761. <https://doi.org/10.1002/adsc.202100547>.

Missions:

- Design & synthesis of cryptophanes and their synthetic intermediates
- Characterization of cryptophanes and their synthetic intermediates
- Writing of protocols, reagents ordering
- Preparation/ writing of publications, posters, oral communication
- Participation to shared lab tasks
- Mentoring and supervising students

Qualification requirements:

- Good knowledge and experience in organic chemistry
- Experience in classical analytic experiments, (NMR ¹H, ¹³C and 1D and 2D, MS)
- Good knowledge in Excel, Word and PowerPoint softwares
- Publication writing skills, good communication skills (oral and written) English/French

Required degree and experience:

- a PhD in organic chemistry or medicinal chemistry
- a postdoc experience in organic chemistry would be a plus
- any experience in supramolecular chemistry would be plus

Deadline for application **January 15th, 2024**

Please send a CV and the name of two references to emmanuelle.dubost@unicaen.fr