



at the  
**Institut Parisien de Chimie Moléculaire**  
in Paris, France

*Starting date: January 2020 (flexible up to Sept. 2020)*

## DESIGN OF NEW ABSOLUTE ASYMMETRIC CATALYSTS

**Project.** ABSOLUte asymmetric CATalysis, *i.e.* the preparation of enantiopure compounds without the help of any chiral species, is a topic of considerable interest in chemical sciences given its connexion with the emergence of homochirality on Earth and its potential applications for the elaboration of synthetic methods. The AbsoluCat project relies on the design of homogenous catalysts which consist of metal complexes supported on a supramolecular polymer scaffold. Intrinsically achiral catalytic centres will be located in the chiral environment provided by extremely chirally-amplified hydrogen-bonded assemblies. Chirality transfer between the chirally-amplified assemblies and the metal catalyst will lead to asymmetric induction for the catalytic reaction (enantioselective catalysis). Achieving high level of asymmetric induction for the reaction (> 80% *e.e.*) with a tiny amount of chiral monomers (0.2 %) is the proof-of-concept to be demonstrated in the framework of this position.

**Funding.** The AbsoluCat project is funded by the French National Research Agency (ANR). Position available for 1-year. Annual gross salary *ca.* 30 k€ p.a.

**Laboratory.** The post-doctoral researcher will be supervised by Matthieu Raynal and Laurent Bouteiller (<http://www.supracatalysis.com/>). Our team has a strong expertise in the preparation and characterization of hydrogen-bonded supramolecular polymers. The monomers are structurally-simple and easily functionalizable as they contain a central aromatic ring connected to two urea<sup>[1]</sup> or three amide<sup>[2]</sup> groups. We recently located metallic centres at the periphery of a chiral supramolecular polymer. The chirality is efficiently transferred to the intrinsically achiral metal centres and to the product of the catalysis. Based on this strategy, new concepts are currently developed such as tunable, switchable and highly chirally-amplified catalysts.<sup>[3]</sup>

[1] L. Bouteiller, *Adv. Polym. Sci.*, **2007**, 207, 79. [2] S. Cantekin, T. F. A. de Greef, A. R. A. Palmans, *Chem. Soc. Rev.*, **2012**, 41, 6125. [3] (a) M. Raynal, F. Portier, P. W. N. M. van Leeuwen, L. Bouteiller, *J. Am. Chem. Soc.*, **2013**, 135, 17687. (b) A. Desmarchelier, X. Caumes, M. Raynal, A. Vidal-Ferran, P. W. N. M. van Leeuwen, L. Bouteiller, *J. Am. Chem. Soc.*, **2016**, 138, 4908. (c) J. M. Zimbron, X. Caumes, Y. Li, C. M. Thomas, M. Raynal, L. Bouteiller, *Angew. Chem. Int. Ed.*, **2017**, 56, 14016. (d) Y. Li, X. Caumes, M. Raynal, L. Bouteiller, *Chem. Commun.*, **2019**, 55, 2162. (e) Y. Li, L. Bouteiller, M. Raynal, *ChemCatChem* DOI: 10.1002/cctc.201901246.

**Candidate.** We are looking for a highly motivated candidate with a Ph.D. or prior postdoctoral positions in the domains of Organic Synthesis and Homogeneous Catalysis. Strong laboratory skills in the synthesis of small molecules, their purification and their characterization (NMR, FTIR, MS, HPLC) as well as in the design and implementation of catalytic reactions are required. Good background in supramolecular chemistry and polymers, and the related characterization techniques (FTIR, UV, CD, calorimetry), will be strongly appreciated. The communication skills will also be evaluated (fluent English is required).

For information and to apply, please send your CV, cover letter and references asap to:  
[matthieu.raynal@upmc.fr](mailto:matthieu.raynal@upmc.fr)