

Conférence Equipe G

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*Asymmetric catalysis with dynamic and
chirally-amplified supramolecular polymers*

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Campus CNRS 205

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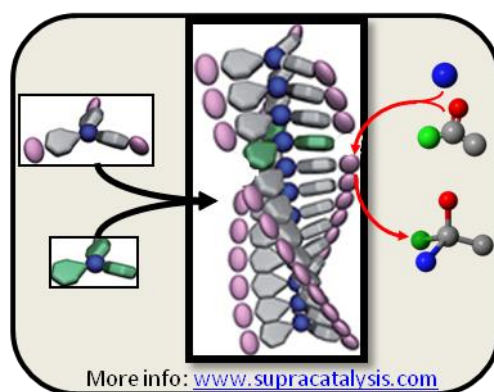
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Asymmetric catalysis with dynamic and chirally-amplified supramolecular polymers

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Asymmetric catalysis is the privileged route towards enantiopure compounds. The classical methods involve an enantiopur ligand (in metal catalysis) or organic molecule (in organocatalysis) to induce a chiral bias to the chemical reaction. In sequential transformations, such as cascade and polymerization reactions, chirality control relies solely on the catalyst or growing chain, *i.e.* chirality induction occurs in a *monodirectional and static* fashion.^[1] An obvious breakthrough would be to perform asymmetric transformations by means of a catalyst that can be switched reversibly in between different configurations, *i.e.* a *multidirectional and dynamic* catalyst. We recently located metallic centres (Rh, Cu) at the periphery of homochiral supramolecular helices in order to perform asymmetric catalytic reactions (hydrogenation, hydrosilylation). These supramolecular helices are formed by self-assembly in solution of structurally-simple monomers derived from an ubiquitous synthon: the benzene-1,3,5-tricarboxamide moiety (represented schematically in the Figure).^[2] The chirality is efficiently transferred to the intrinsically achiral metal centres and allows to reach high enantioselectivities even with as low as 20% of chiral monomers in the mixture.^[3-4] Also, switching the handedness of the helices *in situ* allows real-time control of the selectivity: the configuration of consecutively formed stereogenic centres can be selected.^[5] Our current studies concern the implementation of the dynamic and chirally-amplified properties of these supramolecular catalysts for the preparation of compounds of interest, such as molecules with contiguous stereogenic centres or multi stereoblock polymers.



[1] M. Vlaktović, B. S. L. Collins, B. L. Feringa, *Chem. Eur. J.*, **2016**, 22, 17080.

[2] S. Cantekin, T. F. A. de Greef, A. R. A. Palmans, *Chem. Soc. Rev.*, **2012**, 41, 6125.

[3] M. Raynal, F. Portier, P. W. N. M. van Leeuwen, L. Bouteiller, *J. Am. Chem. Soc.*, **2013**, 135, 17687.

[4] A. Desmarchelier, X. Caumes, M. Raynal, A. Vidal-Ferran, P. W. N. M. van Leeuwen, L. Bouteiller, *J. Am. Chem. Soc.*, **2016**, 138, 4908.

[5] J. M. Zimbron, X. Caumes, Y. Li, C. M. Thomas, M. Raynal, L. Bouteiller, *Angew. Chem. Int. Ed.*, **2017**, 56, 14016.