Chasing cyanohexatriyne on Earth and Synthesizing boron rotaxanes

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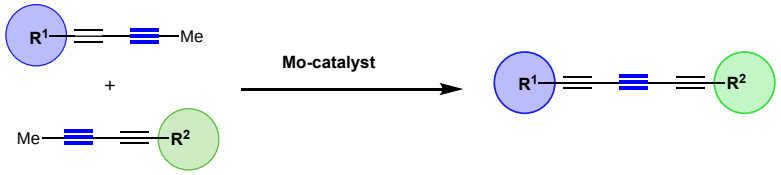
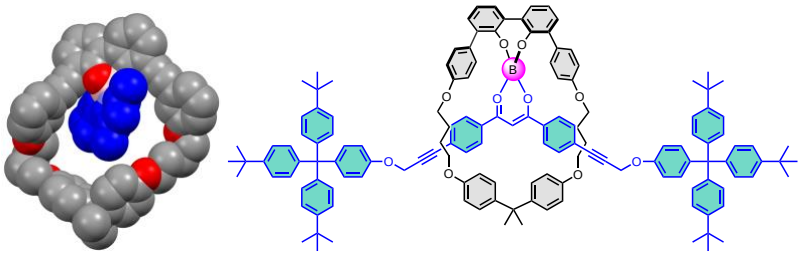
The presentation will be divided into two distinct parts.

The first part will deal with conjugated polyynes, a family of molecules present in nature, in space and in functional materials. However, their synthesis is sometimes very challenging. In particular, we will discuss the example of cyanohexatriyne H-C≡C-C≡C-C≡C-CN, a compound detected in the interstellar medium, that has represented a target molecule for years in the laboratory. Various methods were explored. A particular focus will be made on the synthesis of conjugated triynes by alkyne metathesis that had never been successful before our work in 2020.

The second part will deal with boron assemblies. While boron has extensively been used to build complex assemblies like macrocycles, cages and helicates, it had never been used to thread a linear molecule through a macrocycle until very recently. We will show it is in fact possible to use boron to thread BODIPYs and other species through macrocycles designed on purpose. Interestingly, fluorescent threaded species may show high quantum yields up to 91%. We will then discuss how this strategy can be used to afford rotaxanes.





Related publications:

Acetylenic chemistry: a) Y. Trolez, J.-C. Guillemin, *Angew. Chem. Int. Ed.* **2005**, *44*, 7224; b) J.-C. Guillemin, Y. Trolez, A. Moncomble, *Adv. In Space Res.* **2008**, *42*, 2002; c) N. Kerisit, L. Toupet, Y. Toupet, J.-C. Guillemin, *Chem. Eur. J.* **2013**, *19*, 17683; d) N. Kerisit, L. Toupet, P. Larini, L. Perrin, J.-C. Guillemin, Y. Trolez, *Chem. Eur. J.* **2015**, *21*, 6042; e) I. Curbet, S. Colombel-Rouen, R. Manguin, A. Clermont, A. Quelhas, D. S. Müller, T. Roisnel, O. Baslé, Y. Trolez, M. Mauduit, *Chem. Sci.* **2020**, *11*, 4934

Boron assemblies: a) M. Hicguet, L. Verrieux, O. Mongin, T. Roisnel, F. Berrée, A. Fihey, B. Le Guennic, Y. Trolez, *Angew. Chem. Int. Ed.* **2024**, e202318297; b) M. Hicguet, O. Mongin, Y. Leroux, T. Roisnel, F. Berrée, Y. Trolez, *ChemistryOpen* **2024**, e202400196; c) M. Hicguet, O. Mongin, F. Berrée, Y. Trolez, *ChemRxiv.* **2025**, doi:10.26434/chemrxiv-2025-pxqqx-v2