

Interlocked Donor-Acceptor Cages: toward an innovative supramolecular approach to organize active materials for organic solar cells.

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One of the main challenges in the field of organic photovoltaics (OPV) lies in the control of the morphology of the photoactive layer, constituted by electron donor (D) and acceptor (A) patterns. The supramolecular chemistry toolbox could offer innovative pathways to control their spacial organization. Thereby, we aim to develop interlocked donor-acceptor cages in order to control in an innovative way the arrangement of the D and A subunits. In particular, supramolecular cages built by coordination driven self-assembly are very good candidates because of their easy synthesis and their ability to self-assemble spontaneously to produce interlocked three-dimensional structures.¹ Self-assembled coordination cages are obtained by spontaneous association between polytopic ligands, and complexes with a pre-organized geometry. In the context of our current research program dedicated to producing self-assembled molecular receptors,² we recently demonstrated that a truxene based ligand, associated with dinuclear Ruthenium complexes, can produce interlocked supramolecular cages (**Figure 1**).

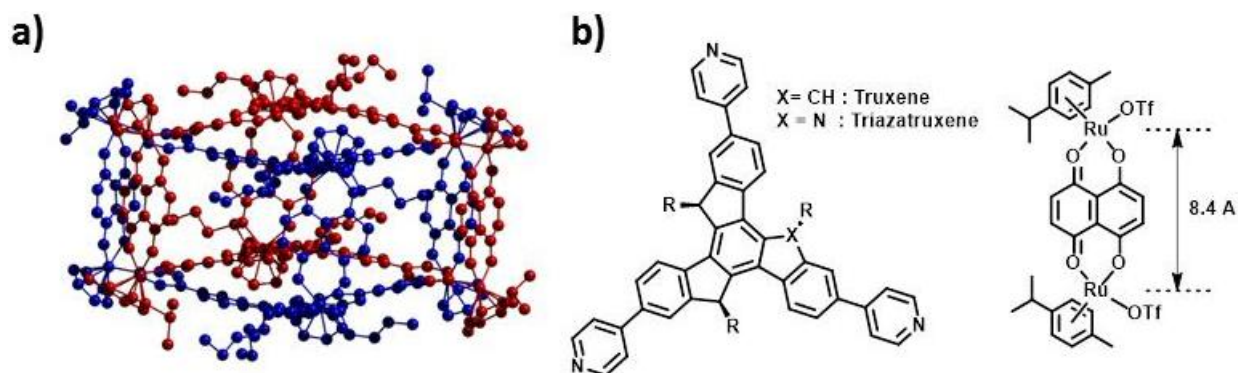


Figure 1. a) X-Ray structure of an interlocked self-assembled cage based on truxene core, b) Truxene/Triazatruxene ligand and ruthenium complex.

On the basis of this work, a new family of coordination cages involving the electron-donor triazatruxene core (D) has been developed. The synthesis, the characterization (including at the solid state) & the physicochemical properties of these self-assembled Donor-Acceptor cages will be presented.

¹ a) M. Frank, M. D. Johnstone, G. H. Clever, *Chemistry – A European Journal* **2016**, 22, 14104-14125. b) Huang, S.-L.; Hor, T. S. A.; Jin, G.-X. *Coord. Chem. Rev.* **2017**, 333, 1.

² a) G. Szalóki, V. Croué, V. Carré, F. Aubriet, O. Aleveque, E. Levillain, M. Allain, J. Arago, E. Orti, S. Goeb, M. Sallé, *Angew. Chem. Int. Ed.* **2017**, 56, 16272-16276; b) G. Szalóki, V. Croué, M. Allain, S. Goeb, M. Sallé, *Chem. Commun.* **2016**, 52, 10012-10015; c) V. Croué, S. Goeb, G. Szalóki, M. Allain, M. Sallé, *Angew. Chem. Int. Ed.* **2016**, 55, 1746-1750; d) V. Croué, S. Goeb, M. Sallé, *Chem. Commun.* **2015**, 51, 7275-7289