ElecMol20
14-17 December 2020
ENS de Lyon
10th International Conference on Molecular Electronics

Bis-Acridinium Tweezers and Cyclophanes: Supramolecular Self-Assemblies, Self-Sorting and Multi-Switching Properties

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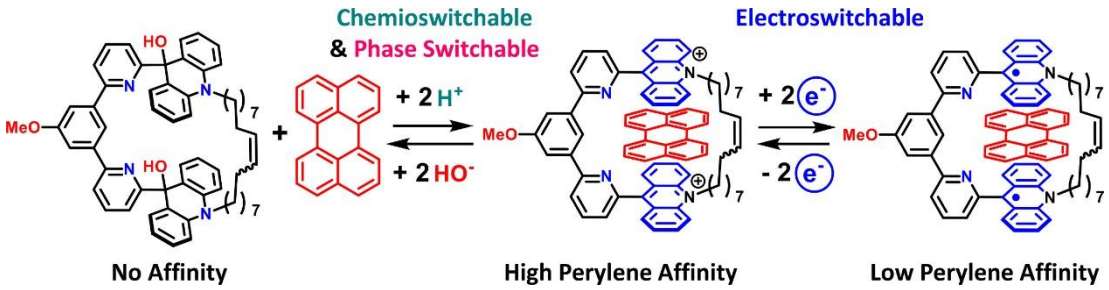
Abstract:

In Nature, the high degree of organization allows the formation of sophisticated assemblies (double helical structure of DNA, G-quadruplex secondary structures, etc.) able to perform advanced functions (modulation of reactivity, movement, etc.). In such complex mixtures, the organization is governed by selective molecular recognition and self-assembly processes[1] relying on weak interactions (hydrophobic, hydrogen-bonding, van der Waals, and π-π stacking interactions). Consequently, a growing interest in elaborating self-assembling systems has emerged in order to prepare functional synthetic systems in a simple and reliable manner.

We recently reported bis-acridinium receptors able to bind guest molecules.[2] Based on molecular tweezers and their cyclophane analogues, two acridinium recognition units linked by a semi-rigid spacer are pre-organized to bind a variety of aromatic guests. The acridinium recognition units are unique multi-responsive building blocks (electrochemically and chemically switchable) able to interact with electron rich guests.[3] Surprisingly, this class of bis-acridinium receptors exhibit i) self-complementary behaviors leading to the formation of entwined dimers,[2a] ii) narcissistic self-sorting as well[2b] as iii) π-donor/π-acceptor host-guest behaviors.[4] In addition, the multi-switching properties of these bis-acridinium receptors were investigated to alter the recognition events and were also studied as a selective phase transfer agent of perylene in perfluorocarbons.



Self-Assembly processes and Switching Properties of a Molecular Cyclophane bearing two Acridiniums.

References:

1 a) D. J. Cram and J. M. Cram, *Science*, **1974**, *183*, 803–809. b) J.-M. Lehn, *Science*, **1985**, *227*, 849–856. c) J.-M. Lehn, *Angew. Chem., Int. Ed. Engl.*, **1990**, *29*, 1304–1319. d) J.-M. Lehn, Supramolecular Chemistry: Concepts and Perspectives;Wiley-VCH: New York, NY, **1995**. e) J. Rebek, *Chem. Soc. Rev.*, **1996**, *25*, 255–264.

2 a) H.-P. Jacquot de Rouville, N. Zorn, E. Leize-Wagner and V. Heitz, *Chem. Commun.*, **2018**, *54*, 10966–10969; b) H.-P. Jacquot de Rouville, C. Gourlaouen and V. Heitz, *Dalton Trans.*, **2019**, *48*, 8725–8730.

3 H.-P. Jacquot de Rouville, J. Hu, V. Heitz, *ChemPlusChem*, **2021**, *86*, 110–129.

4 J. Hu, J. S. Ward, A. Chaumont, K. Rissanen, J.-M. Vincent, V. Heitz, H.-P. Jacquot de Rouville, *Angew. Chem. Int. Ed.*, **2020**, *59*, 23206–23212