Performance boost of a merocyanine photoacid by supramolecular encapsulation

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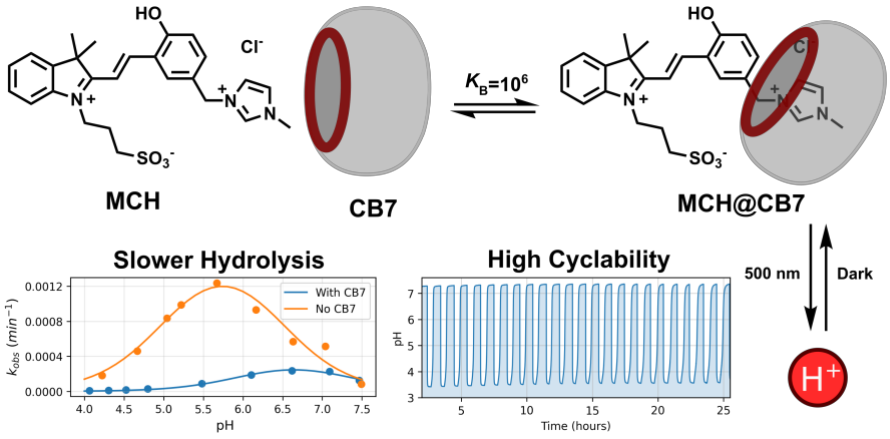
Merocyanine photoacids possess the ability to control the pH of their solutions by means of visible light irradiation. Their applications are remarkable and cover many fields including biochemistry[1], medicinal chemistry[2], material science and engineering[3], analytical chemistry [4], supramolecular chemistry[5] and synthetic organic chemistry[6]. However, the instability of merocyanines towards hydrolysis along with the poor solubility in water are important limiting factors in their application space. To circumvent these problems, we have synthesized and characterized an imidazolium merocyanine derivative displaying high water solubility and strong affinity towards cucurbit[7]uril. The host-guest complex becomes more stable towards hydrolysis and prolongs the timespan of operation.



In the presentation I will cover the main aspects of the aqueous (photo)chemistry of the merocyanine photoacids along with the supramolecular aspects that lead to a general increase of their performance in water.

[1] F. J. Rizzuto, C. M. Platnich, X. Luo, Y. Shen, M. D. Dore, C. Lachance-Brais, A. Guarné, G. Cosa, H. F. Sleiman, *Nature Chemistry* **2021**, *13*, 843–849.

[2] C. Wang, P. Zhao, G. Yang, X. Chen, Y. Jiang, X. Jiang, Y. Wu, Y. Liu, W. Zhang, W. Bu, *Materials Horizons* **2020**, *7*, 1180–1185.

[3] X.-M. Chen, X.-F. Hou, H. K. Bisoyi, W.-J. Feng, Q. Cao, S. Huang, H. Yang, D. Chen, Q. Li, *Nat Commun* **2021**, *12*, 4993.

[4] P. K. Patel, K. Y. Chumbimuni-Torres, *Analyst* **2016**, *141*, 85–89.

[5] S. M. Jansze, G. Cecot, K. Severin, *Chemical Science* **2018**, *9*, 4253–4257.

[6] B. Yang, K. Dong, X.-S. Li, L.-Z. Wu, Q. Liu, *Organic Letters* **2022**, *24*, 2040–2044.