Phthalocyanines: Old Dyes, New Tricks

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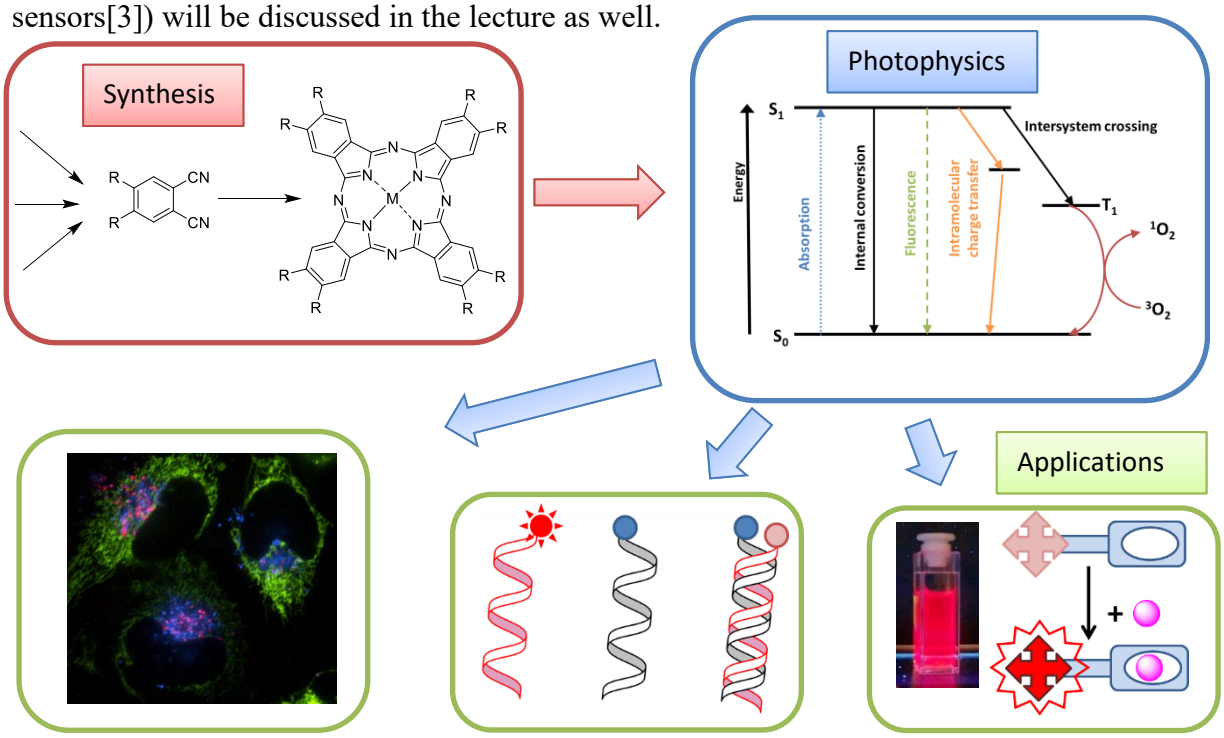
Phthalocyanines are deeply colored planar synthetic macrocyclic compounds closely related to naturally occurring porphyrins. Since their first serendipitous discovery in 1907, they have been widely used as dyes and pigments (production in dozens thousands of tons per year) but have found their place also in other material chemistry field like responsive layers in compact discs, dyes in LED panels, etc. Thanks to interesting photophysical properties they have recently found their place also in emerging applications like photodynamic therapy, fluorescent sensors or quenchers of fluorescence in DNA-hybridization probes.

The talk will be focused on several approaches to synthesis of phthalocyanines and their azaanalogues. Interesting structure-photophysical properties relationships will be discussed subsequently. Based on these studies, we are now able to design the structure of these compounds in order to maximize singlet oxygen production, fluorescence or other deactivation pathways of excited states, e.g. intramolecular charge transfer, an uncommon relaxation channel for phthalocyanines. Several applications based on singlet oxygen production or fluorescence (e.g. photodynamic therapy[1], dark quenchers of fluorescence[2] or molecular sensors[3]) will be discussed in the lecture as well.



[1] Kollar J, Machacek M, Halaskova M, Lenco J, Kucera R, Demuth J, Rohlickova M, Hasonova K, Miletin M, Novakova V, Zimcik P, *J. Med. Chem.*, **2020**, 63, 7616-7632

[2] Demuth J, Kucera R, Kopecky K, Havlinova Z, Libra A, Novakova V, Miletin M, Zimcik P, *Chem. Eur. J.*, **2018**, 24: 9658-9666.

[3] Lochman L, Machacek M, Miletin M, Uhlířová Š, Lang K, Kirakci K, Zimcik P, Novakova V, *ACS Sensors*, **2019**, 4, 6, 1552-1559.