Coupled Polymethines in a New Light

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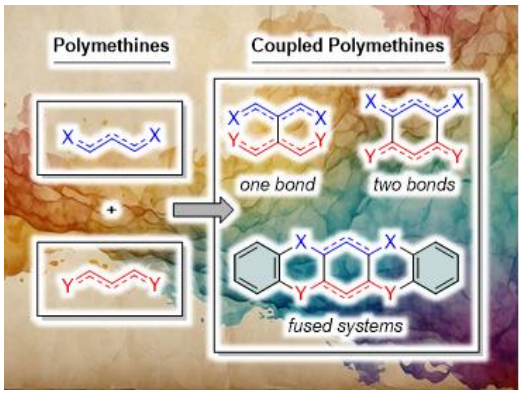
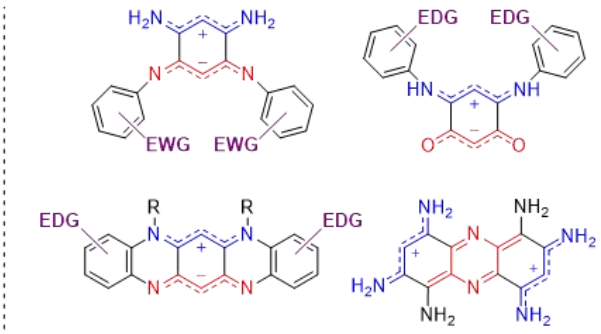
Contemporary applications related to bio-photonics, energy conversion or optics may require near-infrared (NIR) dyes that can be tailored-made and obtained within few synthetic steps, with a view to maximize their potential production and for atom economy purposes. Nevertheless, the conception of NIR organic chromophores generally implies intricate molecular design and multi-step synthesis affording imposing conjugated architectures.

To aim at developing simple and efficient red-to-NIR dyes, we recently focused on a strategy based on cyanines and the coupling principle, which formulates that the connection of two polymethine units via a single bond or π-bonds generates an interaction reducing the energy gap and affecting the photophysical properties of the chromophore.[1,2] This concept was theoretically predicted in 1966 and rarely illustrated several decades later, allowing back then to design visible dyes.

Our latest endeavors highlighted the potential of coupled polymethines to readily design simple red-to-NIR dyes with (bis-)zwitterionic or (bis-)cationic structures built around quinoidal (polycyclic) rings.[3-6] We recently developed new families of extended coupled polymethines based on polymethine-oxonol chromophores featuring unique UV to NIR acidochromic switching properties.[7,8]





Références

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