

Panchromatic Absorption of Pyrrolopyrrole aza-BODIPY analogs Based on the Push-Pull Strategy

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The creation of novel push-pull chromophores and studies on their attractive properties including intramolecular charge-transfer (ICT) bands and nonlinear optical properties are attracting research interest because of their impact on next-generation electronic and optoelectronic devices. Tetracyanobuta-1,3-diene (TCBD) is a powerful electron-accepting unit, which is easily integrated into activated alkynes via a [2+2] cycloaddition-retroelectrocyclization (CA-RE) reaction.¹

With these in mind, a push-pull unit consisting of triphenylamine and TCBD was linked to aza-BODIPY analogues called pyrrolopyrrole aza-BODIPYs (PPABs),² resulting in panchromatic visible/near-infrared chromophores (Figure 1). The charge transfer from the push-pull units to the PPAB core can be controlled by the linker units: in the case of the 2,5-thienylene linker the red-shift of the absorption is more significant compared with the 1,4-phenylene linker. In both cases, the fluorescence emission was quenched probably due to the charge separation and recombination in the excited state. Cyclic voltammetry (CV) and differential pulse voltammograms (DPV) revealed multistep electrochemical reduction properties for both compounds.

In this presentation, the synthesis, and optical and electrochemical properties of these panchromatic PPABs will be presented.

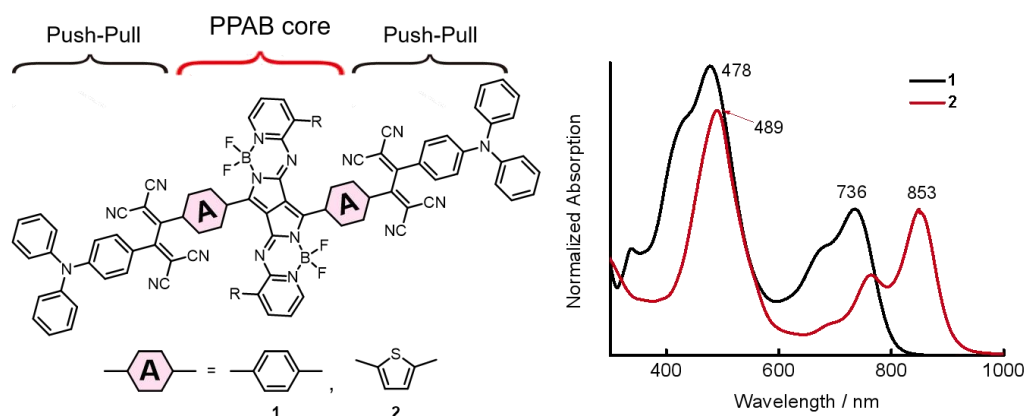


Figure 1. Structures of panchromatic PPABs and the UV/vis/NIR absorption spectra in chloroform.

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- 2) S. Shimizu, T. Iino, Y. Araki, N. Kobayashi, *Chem. Commun.* **2013**, 49, 1621.