

## Synthesis and Optical Properties of Donor-Acceptor-Donor Pyrrolopyrrole aza-BODIPYs

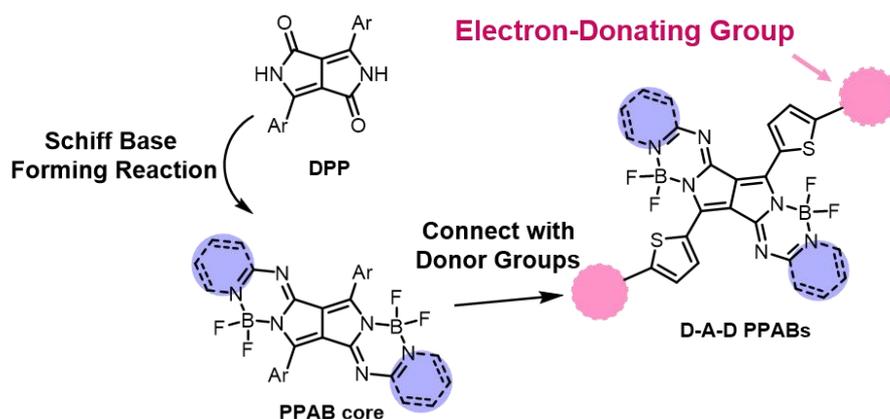
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Diketopyrrolopyrrole (DPP)-based donor-acceptor small molecules and polymers have been investigated as functional materials for organic electronics.<sup>1</sup> To enhance the optical properties of DPP in the far-red and near-infrared (NIR) regions, we attempted to expand  $\pi$ -conjugation using an aza-BODIPY structure and synthesized a dimeric aza-BODIPY analog called pyrrolopyrrole aza-BODIPYs (PPABs).<sup>2</sup>

In this research, to control optical properties of PPABs by forming a donor-acceptor-donor (D-A-D) architecture, electron-donating groups such as carbazole, phenothiazine, and diphenylamine, were introduced to PPABs via a thienyl bridge. The diphenylamine and thienyl bridge provided highly-lying HOMO, resulting in a narrow HOMO-LUMO gap. These D-A-D PPABs exhibited the red-shifted absorption and emission in the NIR region (fluorescence maximum around 743–816 nm) with relatively high fluorescence quantum yields up to 0.3 owing to the enhanced intramolecular charge transfer contributions. The role of the thienyl linker units and donor-acceptor interactions were investigated by the theoretical calculations.

In this presentation, the synthesis of D-A-D PPABs and their optical properties will be reported.



1) Grzybowski, M.; Gryko, D. T. *Adv. Opt. Mater.* **2015**, 3, 280.

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