

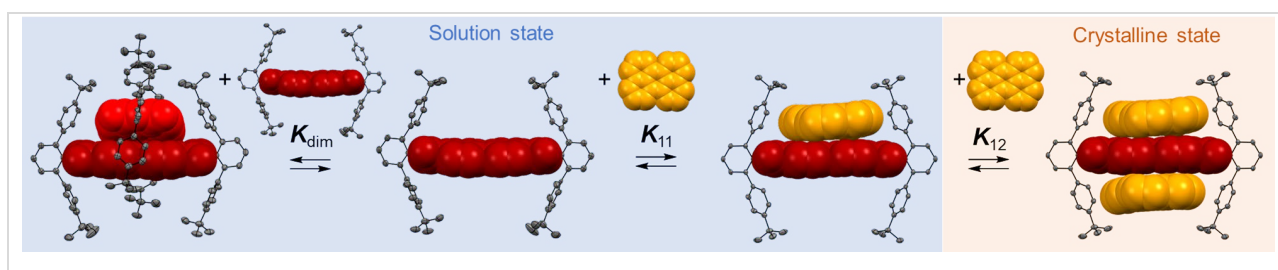
# Donor-Acceptor Complex Formation by Social Self-sorting of Polycyclic Aromatic Hydrocarbons and Perylene Bisimides

S. Soldner, O. Anhalt, M. B. Sárosi, M. Stolte, Frank Würthner\*

Universität Würzburg, Institut für Organische Chemie and Center for Nanosystems Chemistry

Am Hubland, 97074 Würzburg

\* wuerthner@uni-wuerzburg.de



**Figure 1:** Perylene bisimides equipped with bulky imide substituents self-assemble into orthogonally stacked dimers or bind up to two polycyclic aromatic hydrocarbons.

Electron-donor–acceptor (EDA) complexes between electron-rich and electron-poor  $\pi$ -scaffolds are desired in the solid state for various applications<sup>[1]</sup> and even more in solution for fundamental photophysical studies.<sup>[2]</sup> However, EDA complexes between the electron-poor perylene bisimides (PBIs) and electron-rich polycyclic aromatic hydrocarbons (PAHs) could so far only be realized in solution with PBI cyclophane supramolecular hosts.<sup>[3]</sup>

Here, self-assembly versus complexation with PAH guest molecules is studied for a series of PBIs in solution as well as in the solid state. Bulky imide substituents at the chromophore guide their self-assembly into discrete dimer aggregates with null-type exciton coupling. Host-guest titration experiments with different PAHs afford 1:1 and 1:2 complexes whose properties are studied by single crystal X-ray analysis as well as UV/Vis and fluorescence spectroscopy.<sup>[4]</sup>

## References:

- [1] D. S. Weiss, M. Abkowitz, *Chem. Rev.* **2010**, *110*, 479-526.
- [2] P. Spent, R. M. Young, M. R. Wasielewski, F. Würthner, *Chem. Sci.* **2016**, *7*, 5428-5434.
- [3] P. Spent, F. Würthner, *Angew. Chem. Int. Ed.* **2015**, *54*, 10165–10168.
- [4] S. Soldner, O. Anhalt, M. B. Sárosi, M. Stolte, F. Würthner, *Chem. Commun.* **2023**, *59*, 11656-11659.