

Perylene Diimide Derivates for Organic Photovoltaics

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Non-fullerene acceptors (NFAs) are various compounds used in organic solar cells in order to replace the widely used fullerenes. By organic synthesis it is more easy to design tailor made acceptor compounds to match better with the energy levels of donor polymers in bulk heterojunctions (BHJ) in order to get more efficient solar cells.

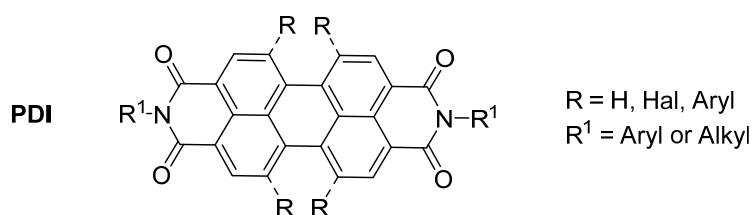


Figure 1: Perylene derivatives tested in this study.

We prepared series of perylene diimide (PDI, Figure 1) derivatives with different substituents. The synthesis and photo-, electro-chemical characterization was accompanied by DFT calculations which allowed us to understand and discuss the properties of the PDI compounds. Lead compounds were used to prepare BHJ organic solar cells with commercially available donor polymers. The performance parameters of these solar cells are given together with a further design strategies for second generation of new NFA based on perylene diimides.