

Exploring the influence of hydrogen-bonding in supramolecular electronics: from a model system to state-of-the-art semiconductors

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Résumé

The presence of noncovalent interactions in organic semiconductors has been demonstrated to be beneficial in several applications, resulting in the enhancement of charge transport and device efficiency. Particularly, supramolecular polymers resulting from hydrogen-bonding have been proven to increase solar cell efficiency by 50%.¹ Nevertheless, the race for achieving efficiency records, has hampered research focused on solving other fundamental issues. Regarding hydrogen-bonding, no comparative studies have been performed, finding scattered examples in literature with different semiconductors, hydrogen-bonding units and without complete studies including the optoelectronic and self-assembly properties.² The main goal of our research is to understand the role and impact of hydrogen bonds in supramolecular electronics to apply them efficiently in devices. Here we show a comparative study using diketopyrrolopyrrole (DPP) as a model system and how the results are translated into state-of-the-art materials, such as quinquethiophene-rhodanine and isoindigo derivatives. Different families of hydrogen-bonded DPP supramolecular polymers displaying different hydrogen-bonding parameters will be discussed,³ including photoconductivity measurements done using electrodeless microwave conductivity techniques.

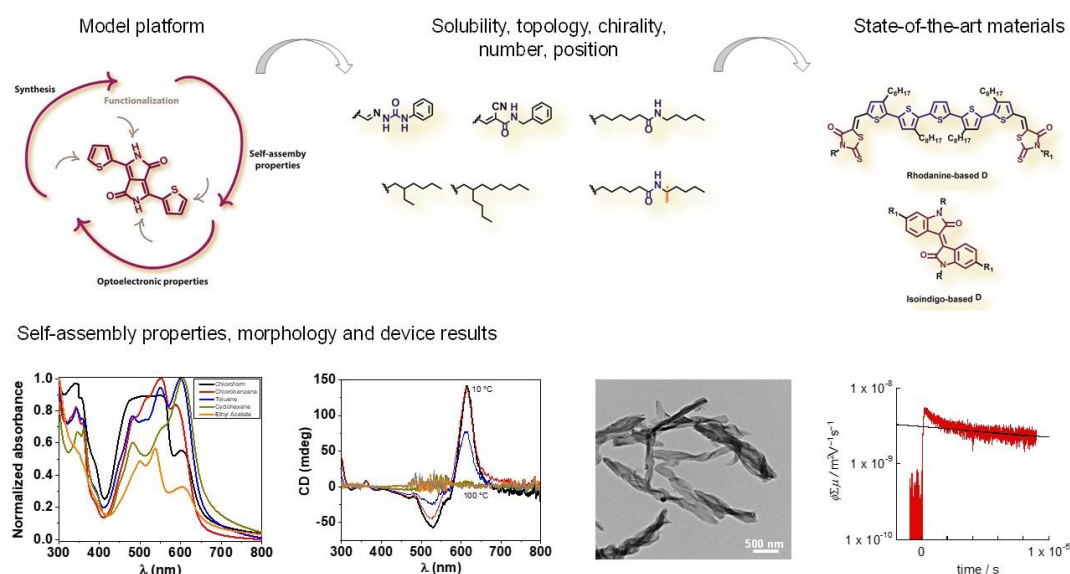


Figure. Model system, parameters to study, state-of-the-art materials and measurements

Références

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