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Supramolecular Chemistry in Water

SUPRAMOLECULAR CHEMISTRY

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Supramolecular Polymer from Pigment Red 254

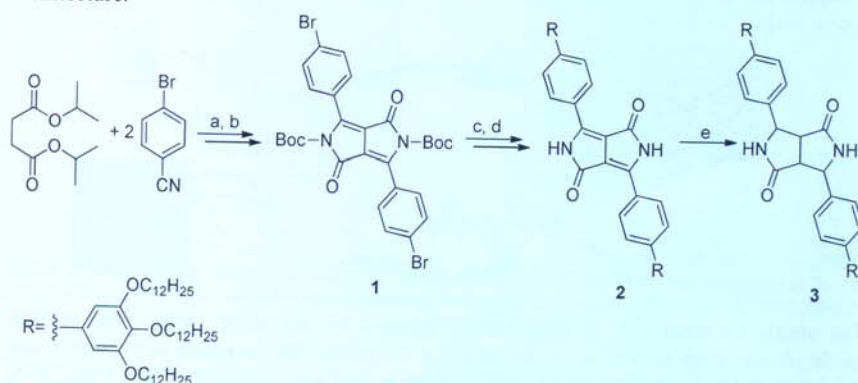
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Diketopyrrolopyrrole (DPP) is a high performance pigment (Colour Index PR 254) among the most important ones, used in automotive industries and in general paint and tinting applications. In recent years, research on DPP has focused on the synthesis of conjugated DPP polymers¹ and on their optical, electrochemical and electroluminescent properties, with the aim to formulate new derivatives for different applications, mainly in organic photovoltaics.² In such systems it is of crucial importance to precisely control the geometrical organization of the molecules³ and one way to do so is by means of supramolecular architectures.

Our research aims to build DPP-based supramolecular structures, mediated by hydrogen bonds and π - π stacking. This communication presents the synthesis of different DPP derivatives, as depicted in the scheme below, both in the oxidized (**2**) and in the reduced form (**3**). The aim is to study their supramolecular organization, and, moreover, to analyze how chirality (DPP derivative **3**) can affect the properties of the final architecture.



Reagents and conditions: a) Na, *t*-AmOH, 95 °C, 24 hrs, 34%; b) Di-*tert*-butyl dicarbonate, 4-DMAP, THF, r.t., 24 hrs, 98%; c) (3,4,5-tris(dodecyloxy)phenyl)boronic acid pinacol ester, [Pd(PPh₃)₄], K₂CO₃, Toluene, Reflux, 24 hrs, 63%; d) 0.5% v/v TFA/CH₂Cl₂, r.t., 1 h, 98%; e) H₂, Pd/C, EtOAc, r.t., 24 hrs, 35%.

References

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