Orthogonal Self Assembly and Selective Solvent Vapor Annealing: Simplified Processing of a Photovoltaic Blend

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ELECTRONIC SUPPORTING INFORMATION

Experimental Details.

Chemicals. Chloroform and methanol (spectrophotometric grade) were purchased from Aldrich Chemical co. and used as received. Dithieno[2,3-*d*:2',3'-*d*']benzo[1,2-*b*:4,5-*b*']dithiophene (DTBDT-C_6) and N,N'-Di-[13-(2,5,8,11,15,18,21,24-octaoxapentacosanyl)]perylene-3,4:9,10-tetracarboxy diimide (PEG-PDI) have been synthetized according to previously reported literature protocols.[1]

All the other chemicals and solvents were used without any purification.

Methods. PEG-PDI and DTBDT-C_6 stock solutions (200 μM) were prepared dissolving the solids in $CHCl_3$. Solutions containing either the neat components or their 1:1 mixture were spin coated (1500 rpm, 60 s) on silicon substrates covered by a few nm thick native oxide layer (SiOx). The substrates were cleaned prior to use with standard RCA procedure. The solvent vapor annealing (SVA) procedure was carried out in methanol (30 min, room temperature) as described elsewhere.[2]

Techniques. UV-vis absorption spectra were recorded on a Jasco spectrophotometer (mod. V-560) using quartz cuvettes. Atomic force microscopy (AFM) and Kelvin Probe Force Microscopy (KPFM) images were recorded using a Multimode IIIA (Veeco) scanning probe microscope with Extender Electronics module. Imaging was done in tapping mode using a conductive SCM-PIT probe (Veeco, Pt/Ir coated Si with frequency $f_0 = 75$ KHz and nominal tip radius ≤ 20 nm). All images were collected under ambient conditions at 10% relative humidity and RT with a scanning raster rate of 1 Hz. KPFM measurements were acquired in lift mode (lift height = 30 nm, V_{AC}=500 mV).

References

1 a) P. Gao, D. Beckmann, H. N. Tsao, X. Feng, V. Enkelmann, M. Baumgarten, W. Pisula and K. Müllen, *Adv. Mater.*, 2009, **21**, 213. b) M. R. Hansen, T. Schnitzler, W. Pisula, R. Graf, K. Müllen and H. W. Spiess, *Angew. Chem. Int. Ed.*, 2009, **48**, 4621.

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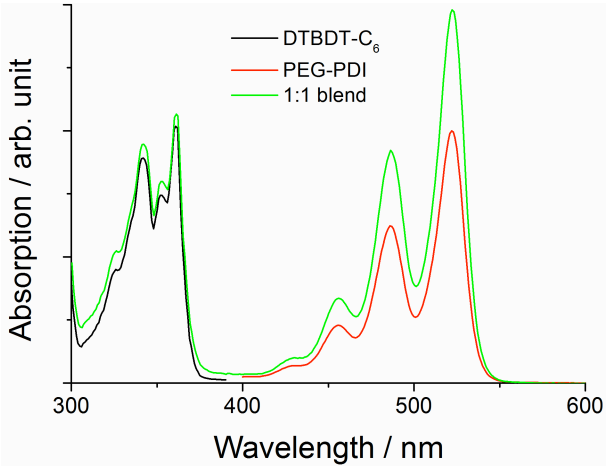

Fig. S1. UV-vis absorption spectra of the electron donor (black), acceptor (red), and their blend (green) dissolved in $CHCl_3$. Concentrations: ~ 10^{-5} M; optical path length: 0.5 cm.

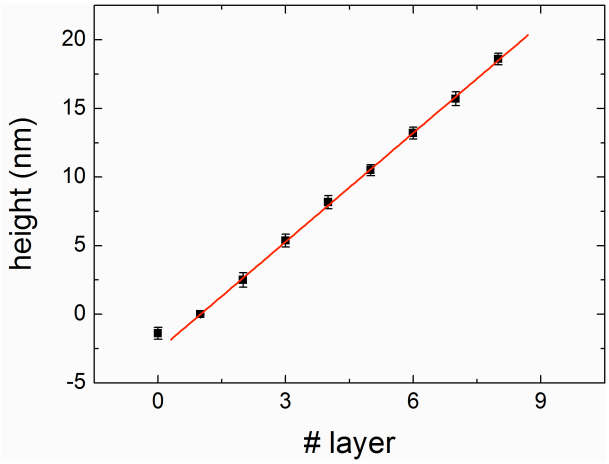

Fig. S2. Height of PEG-PDI layers after SVA in methanol vs. layer number, as determined through histogram analysis of AFM topographical images. First layer: (1.8 ± 0.2 nm); overlayers (2.9 ± 0.2 nm).