[ Supporting Information ]

Solution-Processable All-Small Molecular Bulk Heterojunction Films for Stable Organic Photodetectors: Near UV and Visible Light Sensing

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This supporting information contains following data:

1. Optical absorption spectrum of chlorobenzene (solvent).
2. Optical absorption spectrum of EHPPPD-MT in chlorobenzene for checking the absorption edge.
3. Optical absorption spectrum of the PC61BM film.
4. Fast photoresponse of the OPDI with the EHPPPD-MT:PC61BM (1:2) layer under quick on/off modulation of the high intensity green light.
5. Analysis of 2D GIXD image for the pristine EHPPPD-MT film.
6. Assignment of carbon atoms in the EHTPPD-MT molecule for 13C-NMR spectrum analysis.
Figure S1. Optical absorption spectrum of chlorobenzene used as a solvent for the optical absorption measurement of EHTPPD-MT in Figure 1b.

Figure S2. Optical absorption spectrum of EHTPPD-MT in solution (solvent: CB (chlorobenzene)): The absorption edge is measured as 780 nm (1.6 eV) from the onset point given with the green guidelines.
Figure S3. Optical absorption spectrum of the PC61BM film. As shown in Figure 1b and Figure 2c, the strong absorption of the BHJ layers at the wavelength of <400 nm can be attributed to the contribution of PC61BM in the presence of relatively small EHTPPD-MT absorption (300~470 nm).

Figure S4. Fast photoresponse of the OPDI with the EHTPPD-MT:PC61BM (1:2) layer under quick on/off modulation of the high intensity green light (532 nm, PIN = 133.4 mW/cm²). The rise and decay response was much faster than those in Figure 6, even though the applied voltage was increased. Note that there was still a limit in quick data acquisition because the electrometer (Keithley 2400) used in this work could read only 7~8 current values per second.
Figure S5. (a) 2D GIXD image for the pristine EHTPPD-MT film coated on the ITO-glass substrate. (b) The simulation result using the original 2D GIXD image in (a) by employing a software (Anaelu 1.0) [D. W. Breiby, O. Bunk, J. W. Andreasen, H. T. Lemke, M. M. Nielsen, J. Appl. Cryst., 2008, 41, 262]. (c) Illustration of crystal structures and parameters on the basis of the simulated result in (c). (d) Possible alignment of EHTPPD-MT molecules in the viewing direction normal to the \((a,c)\) plane. We note that the present analysis refers to following two references: (1) A. K. Palai, J. Lee, T. J. Shin, A. Kumar, S. –U. Park, and S. Pyo, Chem. Commun., 2014, 50, 8845; (2) V. S. Gevaerts, E. V. Herzig, M. Kirkus, K. H. Hendriks, M. M. Wienk, J. Perlich, P. Müller-Buschbaum, R. A. J. Janssen, Chem. Mater., 2014, 26, 916.
Figure S6. Assignment of carbon atoms in the EHTPPD-MT molecule in order to confirm the molecular structure using $^{13}$C-NMR spectroscopy. The chemical shift (ppm) for each carbon atoms measured are given in the experimental section.