Electronic Supplementary Information for

Evaluation of the Charge Transfer Efficiency of
Organic Thin-Film Photovoltaic Devices Fabricated
Using Photoprecursor Approach

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1. Details of Instrumental Set-up for Evaluation of the Charge Transfer Efficiency

The $\eta_{ED}$ of the prepared BHJ-OPVs was evaluated using a sample-scanning confocal microscope in combination with a picosecond-pulsed laser excitation. The laser beam from a picosecond-diode laser (405 nm or 640 nm, 10 MHz, 100 ps FWHM, Picoquant) was introduced to an inverted microscope (IX71, Olympus) and focused onto the active layer of the OPV by an objective lens (60 ×, N.A.:0.7, LUCPlanFLN, Olympus). The fluorescence from the active layer of the OPV device was collected by the same objective lens and passed through a confocal pinhole (100 μm) and suitable filters. To detect the fluorescence of the parent acenes, a 405 nm laser was used as an excitation source, and a long-pass filter (LP02-442RU, Semrock) and a short-pass filter (FF01-650/SP, Semrock) were used to cut the excitation laser beam and fluorescence from PC$_{71}$BM, respectively. The fluorescence of PC$_{71}$BM was detected using a 640 nm laser as an excitation source, and a long-pass filter (LP02-647RU, Semrock) was used to cut the excitation laser beam. The detected fluorescence was split into two paths by a 50/50 beam splitter, and the two paths were detected using a spectrometer (SpectraPro2358, Acton Research Corporation) with a cooled CCD camera (PIXIS400B, Princeton Instruments) and an avalanche single-photon counting module (APD: SPCM-AQR-14, PerkinElmer). The signal from the APD was connected to a time-correlated single-photon counting board (SPC-630, Becker & Hickl) for the fluorescence image and lifetime measurements. The time-resolution of the lifetime measurement, i.e., the instrumental response function (IRF) of the system, was estimated by the deconvolution analysis of a fluorescence decay curve of erythrosine in water, which has a reported fluorescence lifetime of 87 ps.$^1$ The estimated FWHM of the IRF was approximately 300 ps. The fluorescence images, lifetime, and spectra of the BHJ-OPVs were measured simultaneously using this instrumental setup.
2. Phase AFM images

Phase AFM images of the active-layers of BHJ-OPVs fabricated using the photoprecursors and PC$_{71}$BM are shown in Fig. S1.

![Phase AFM images](image)

**Figure S1.** Phase AFM images obtained from the active-layers of BHJ-OPV consisting of DTA and PC$_{71}$BM (a) and EH-DBTA and PC$_{71}$BM.

References