

Supporting Information

Mechanism of Photogenerated Minority Carrier Movement in Organic Phototransistors

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Table S1. The device structure of different FBT-Th₄(1,4):PC₆₁BM blend film.

Device	Device structure
DEVICE 1:0	Si /SiO ₂ /OTS /FBT-Th ₄ (1,4):PC ₆₁ BM (D/A ratio = 1:0) /Au electrode
DEVICE 10:1	Si /SiO ₂ /OTS /FBT-Th ₄ (1,4):PC ₆₁ BM (D/A ratio = 10:1) /Au electrode
DEVICE 5:1	Si /SiO ₂ /OTS /FBT-Th ₄ (1,4):PC ₆₁ BM (D/A ratio = 5:1) /Au electrode
DEVICE	Si /SiO ₂ /OTS /FBT-Th ₄ (1,4):PC ₆₁ BM (D/A ratio = 1:1.5)

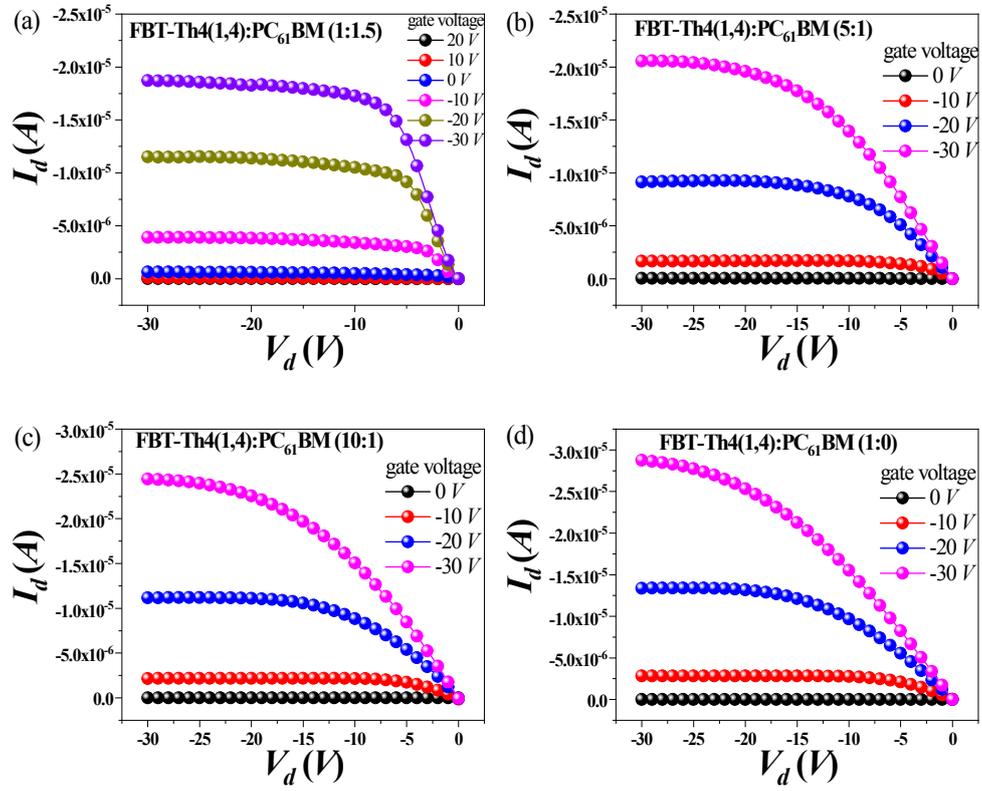


Figure S1. (a) The output characteristic curves of OPT devices in the dark state: (a) DEVICE 1:1.5, (b) DEVICE 5:1, (c) DEVICE 10:1, (d) DEVICE 1:0.

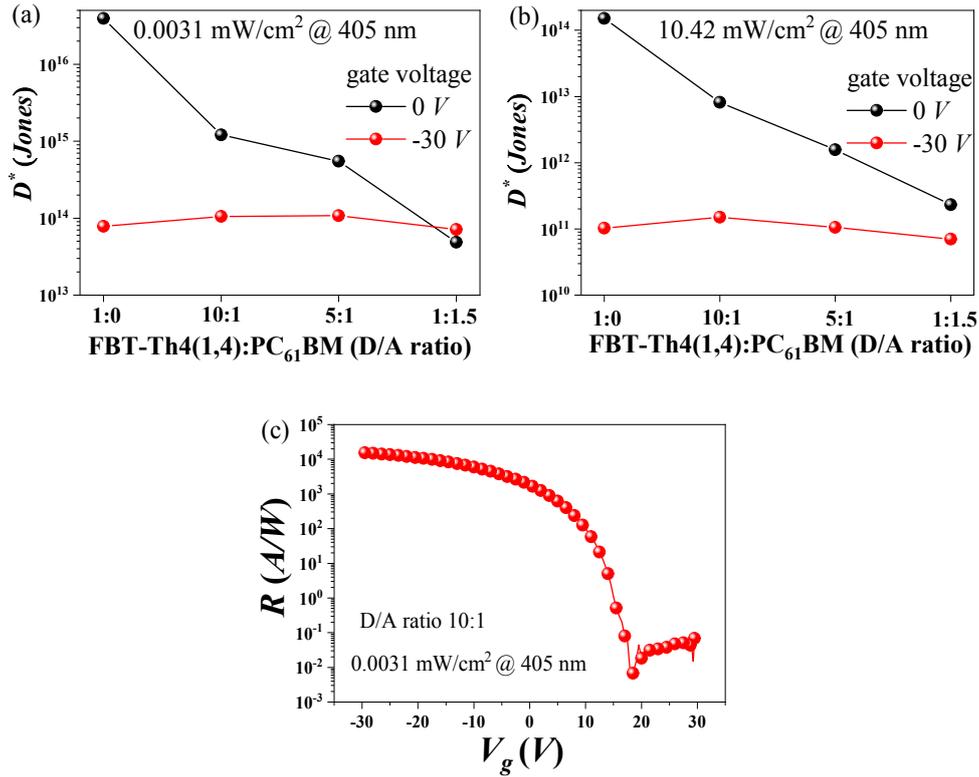


Figure S2. The dependence of the specific detectivity (D^*) on the D/A ratio of OPT devices under (a) 0.0031 mW/cm² and (b) 10.42 mW/cm². (c) the dependence of the responsivity (R) on the gate voltage of DEVICE 10:1 under 0.0031 mW/cm² @405 nm.

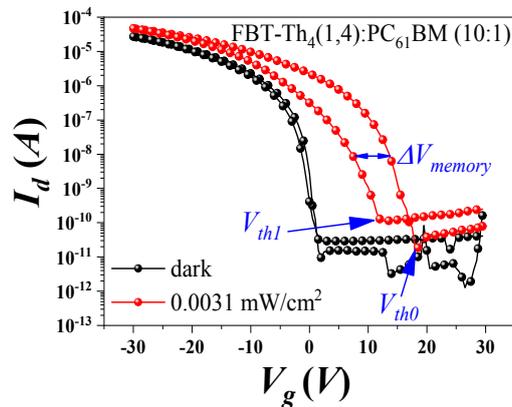


Figure S3. The transfer I - V characteristics curves of DEVICE 10:1 in dark and under illumination (0.0031mW/cm²). The value of ΔV_{memory} meet the equation: $\Delta V_{memory} = V_{th0} - V_{th1}$. Here, V_{th0} and V_{th1} are defined as the threshold voltage when the gate

voltage varies from 30 to -30 V (forward sweep) and -30 to 30 V (back sweep), respectively. The drain voltage is set to -30 V in Figure S3.

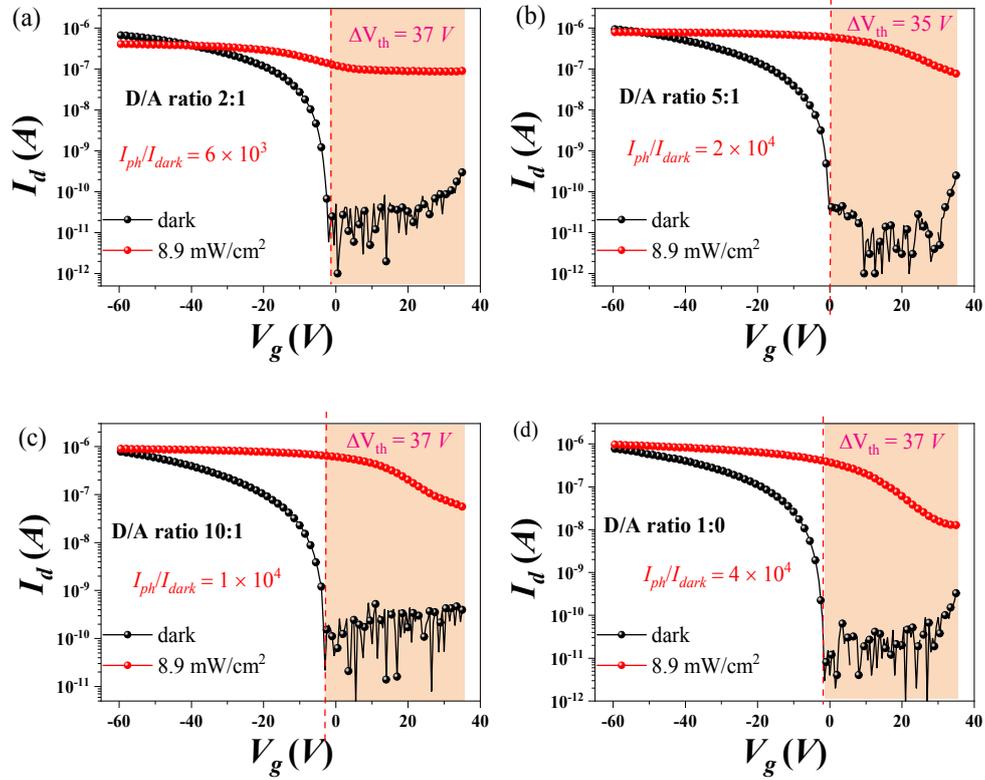


Figure S4. The transfer characteristic curves of OPT devices under 8.9 mW/cm² @532 nm with structure Si /SiO₂ /PMMA /PTB7:PC₆₁BM (D/A ratio) /Au electrodes: (a) D/A ratio = 2:1, (b) D/A ratio = 5:1, (c) D/A ratio = 10:1, (d) D/A ratio = 1:0. Here, the light was provided by diode pumped crystal laser with a wavelength of 532 nm. The drain voltage is set to -60 V in Figure S4.