Supplementary Information (SI) for Nanoscale.

High-Performance Broadband Organic Photodetectors via Water-Transfer Printing with Biomedical Monitoring Capability

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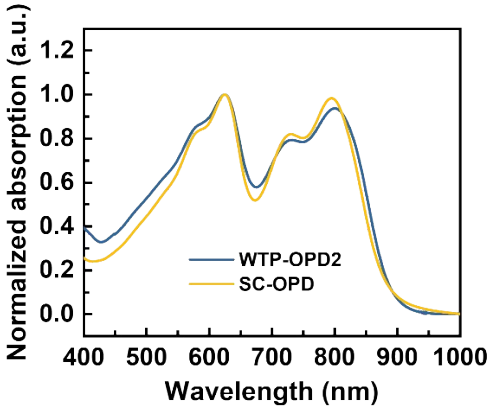

Figure S1. The absorption spectra of WTP-OPD2 and SC-OPD.

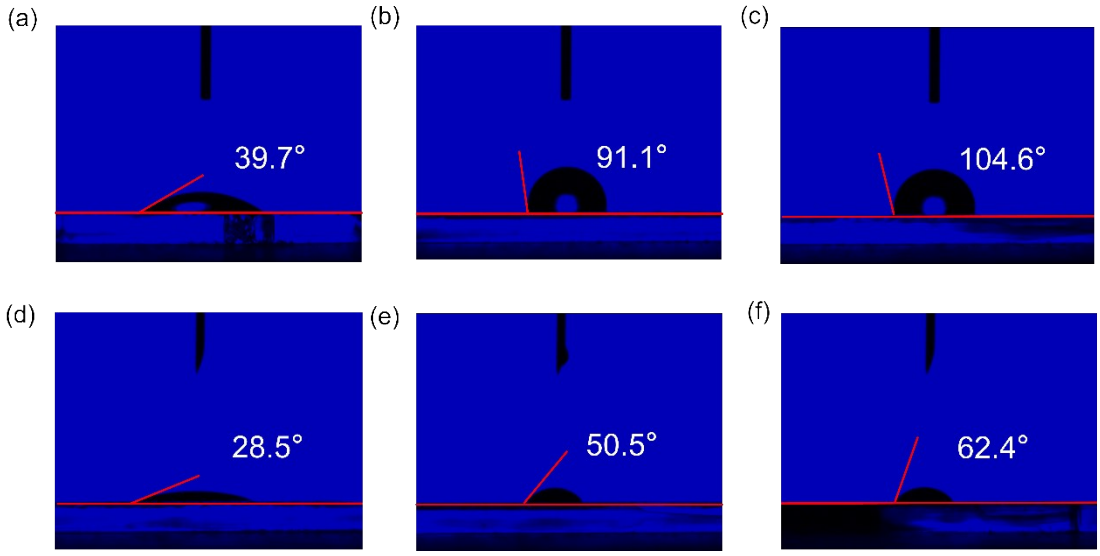

Figure S2. Contact angle measurements of water and diiodomethane on various films. Profiles of water (a, b, c) and diiodomethane (d, e, f) droplets on CuSCN, WTP-PM6:L8-BO and SC-PM6:L8-BO, respectively.

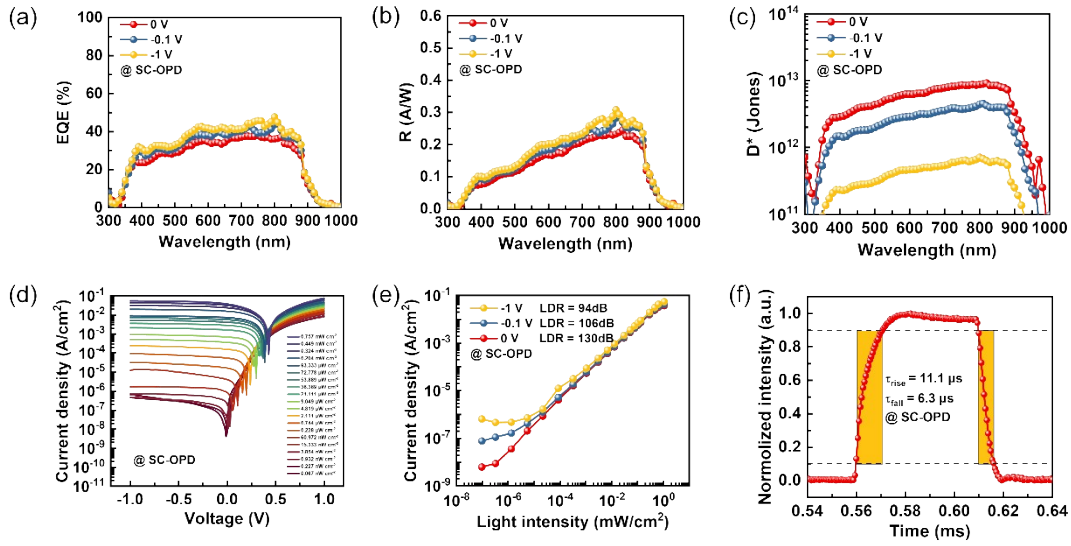

Figure S3. Performance of SC-OPD. (a) EQE; (b) R; (c) D*; (d) J_{ph} under different light intensities; (e) Linearity; (f) Response time.

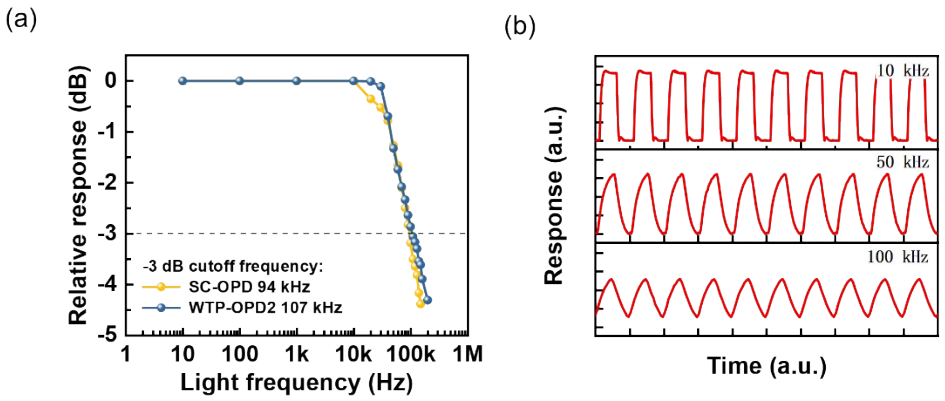

Figure S4. (a) Comparison of the –3 dB cutoff frequencies between WTP-OPD2 and SC-OPD; (b) Schematic illustration of the photoresponse variation of the device with increasing light modulation frequency

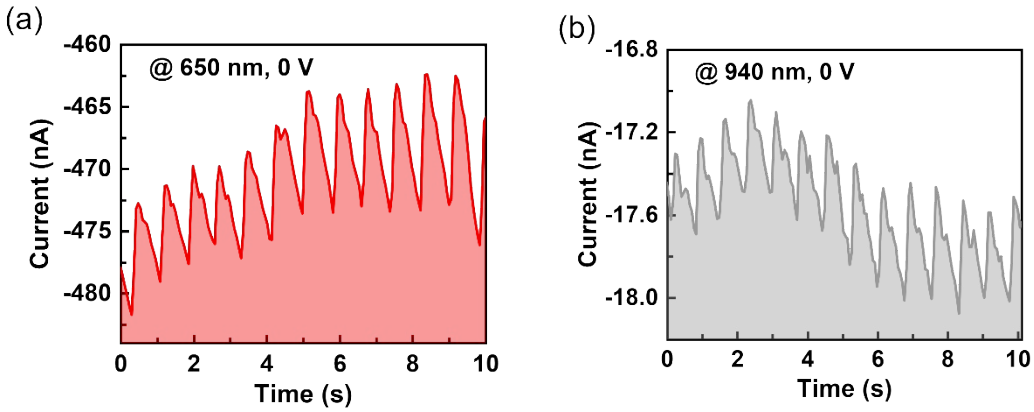

Figure S5. Device response under (a) 650 nm and (b) 940 nm illumination.

Table S1. Parameters of the testing liquids of water and diiodomethane.

Liquid	Dispersion force [V_L^d]	Polar force [V_L^P]	Surface energy [V_L]
Water	21.8	51.0	72.8
Diiodomethane	50.8	0.0	50.8

Table S2. The contact angle and surface energy of different materials.

Materials	Water contact Angle(°)	Diiodomethae contact Angle(°)	Surface energy (mN/m)
CuSCN	39.7	28.5	66.37
WTP -PM6:L8-BO	91.1	50.5	35.39
SC- PM6:L8-BO	104.6	62.4	27.36

The surface energy and interfacial energy calculations

The surface energy is calculated by using the following equation:

$$V_L = V_L^d + V_L^p \quad (1)$$

$$1 + \cos\theta = 2\left(\sqrt{V_L^d}\cdot\frac{\sqrt{V_L^d}}{V_L} + \sqrt{V_L^p}\cdot\frac{\sqrt{V_L^p}}{V_L}\right) \quad (2)$$

where V_L represents pure material surface energy, V^d and V^P are dispersion force and polarity force. Surface energy (V_L) was determined by the contact angles of the testing liquids of water and diiodomethane, and the parameters of the testing liquids as Table 1 and 2 as shown above. In light of the surface energy of two different materials, interfacial energy between two different materials can be determined according to the equation below:

$$V_{A-B} = V_A + V_B - 4\left(\frac{V_A^d \cdot V_B^d}{V_A^d + V_B^d} + \frac{V_A^p \cdot V_B^p}{V_A^p + V_B^p}\right) \quad (3)$$

where V_A and V_B represent the surface energy of sample A and sample B, respectively;

V_A^d and V_B^d are dispersion forces of sample A and sample B, respectively; V_A^p and V_B^p are polarity forces of sample A and sample B, respectively.