

Table S1 Composition of polymer nanocomposite dielectric inks for fully-printed OFETs

Ink	P(VDF-TrFE) (g)	PMMA (g)	BaTiO ₃ (g)	Silica (g)	NMP (mL)	Viscosity (Pa.s)
S1	0.308	0.132		0.04 (8%)	1.6	11
S2	0.308	0.132	0.132 (22%)	0.03 (5%)	1.7	11
S3	0.308	0.132	0.263 (36%)	0.028 (4%)	1.8	14
S4	0.308	0.132	0.5 (52%)	0.03 (3%)	1.6	15

Equipments

The viscosity was measured by Brookfield Viscometer DV-II+ Pro, Spindle CPE-40, 0.3 rpm, 25 °C. AFM was measured by Bruker Dimension Icon Microscope System. Cross section specimens for SEM were prepared by cross section polisher JEOL IB-09010CP. SEM micrographs were observed by Scan Gen B for JSM 5600. The silver source and drain electrodes of transistor device were deposited by Dek 265 Horizon Auto Stencil Printer. The screen printing masks were fabricated by SCREENTEC, with the mesh No. SS400, mesh angle of 45° and mesh tension of 23'', and emulsion thickness of 30 μm. TIPs-pentacene as active material was deposited by Model Coatmaster 510 Film Applicator & Drying Time. The transfer and output characteristics of the OFETs were measured by Semiconductor Characterization System 4200-SCS.

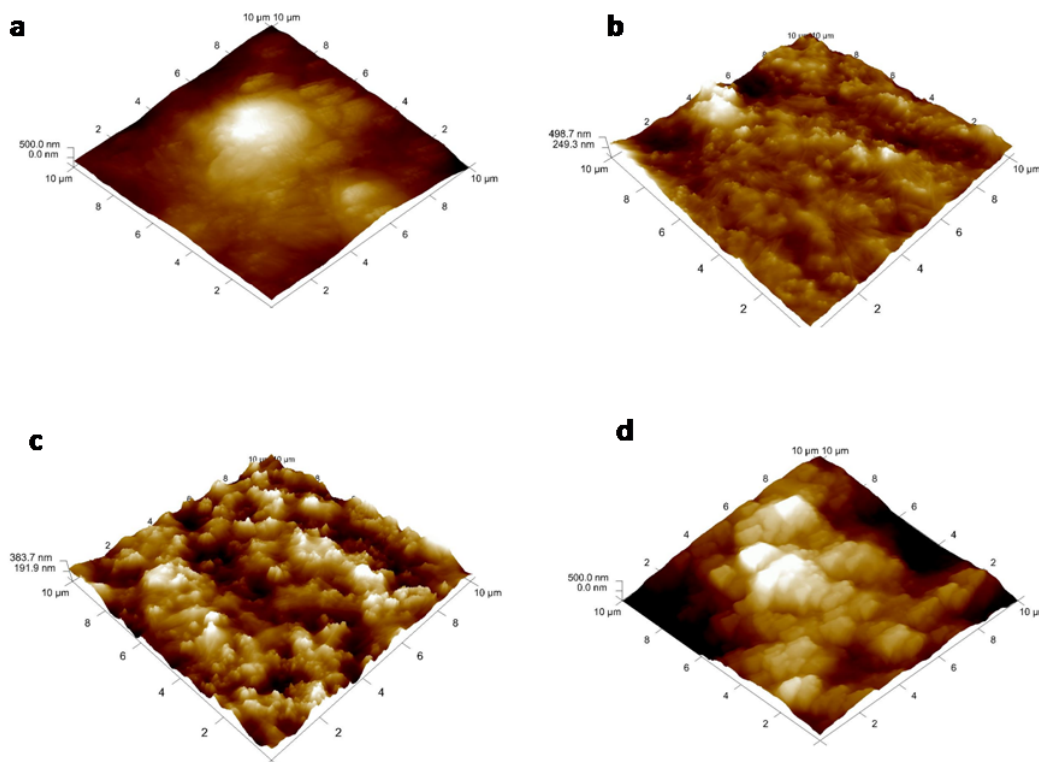


Fig. S1 The 3D AFM images (a) dielectric S1; (b) S2; (c) S3; and (d) S4.

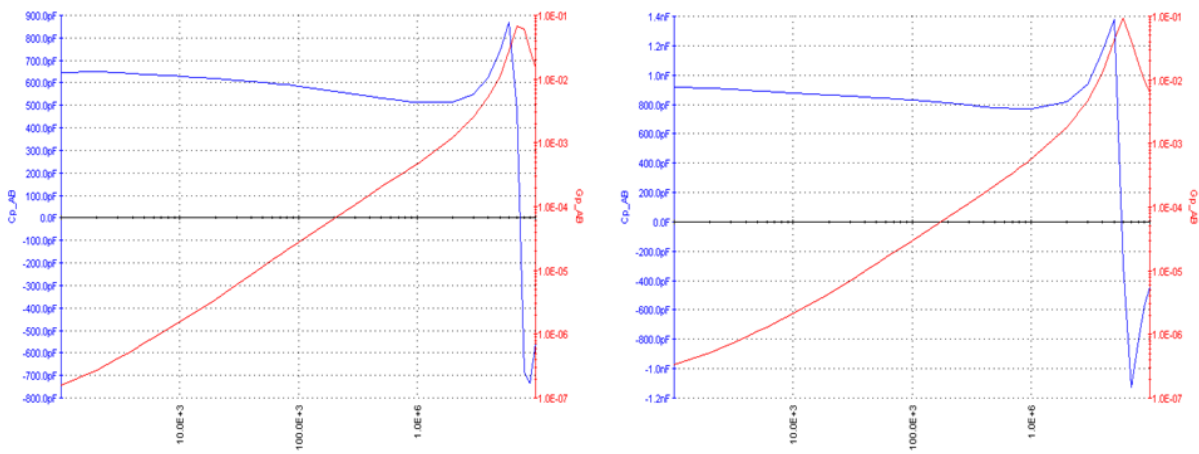


Fig. S2 Capacitance-voltage curves of dielectric S1 and S4 (capacitor area of $1 \times 1 \text{ cm}^2$)

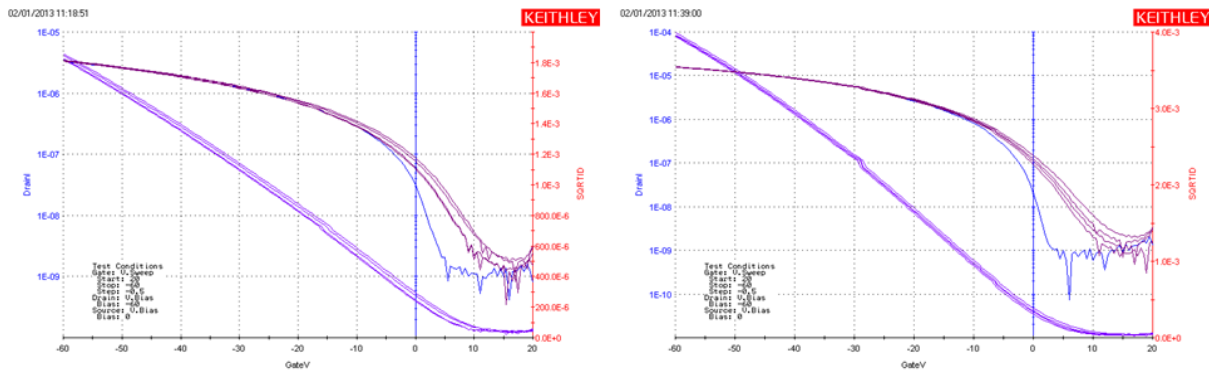


Fig. S3 The characteristics of TIPs-pentacene OFETs using S2 and S3 as gate dielectrics under multiple bias sweeping

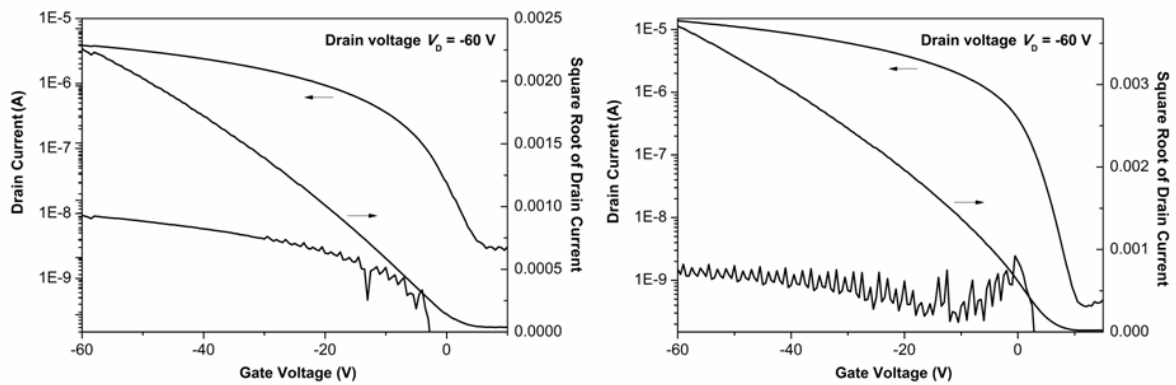


Fig. S4 The comparison of leakage current of OFETs using S1 and S2 as gate dielectrics

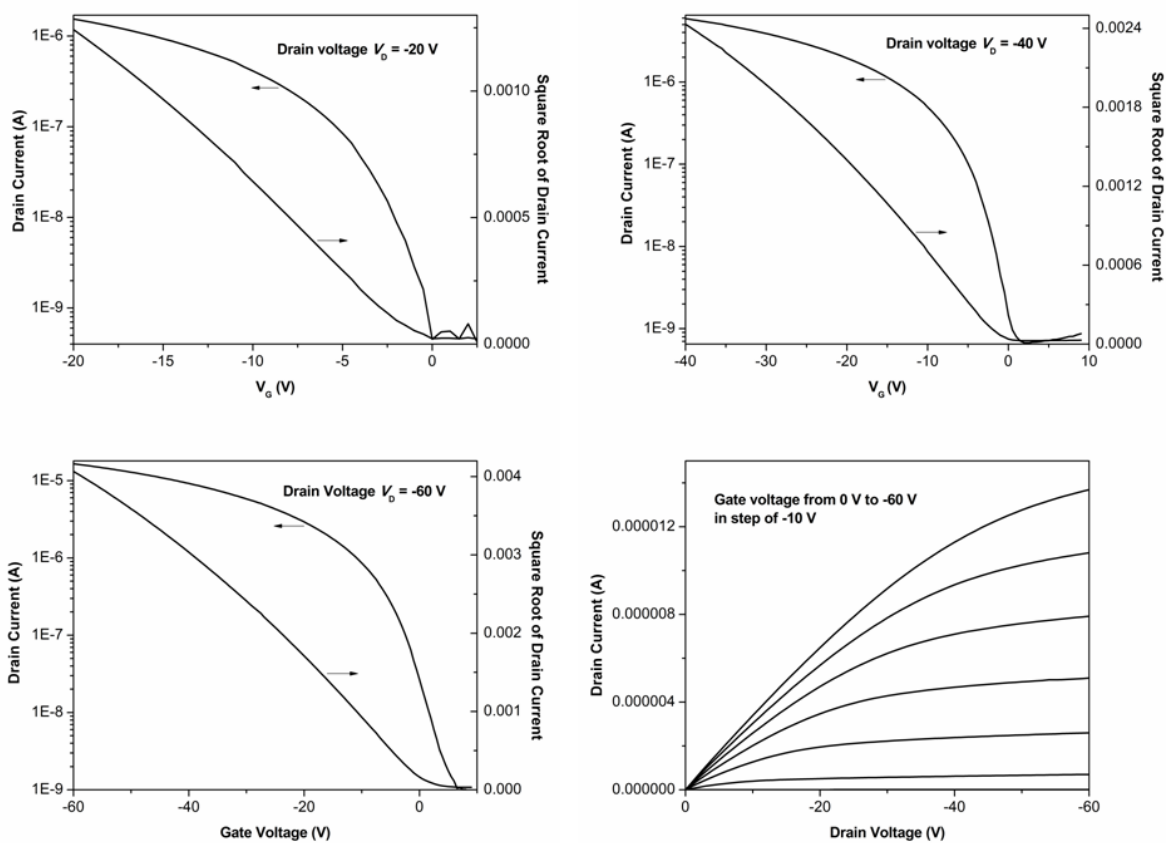


Fig. S5 The transfer I - V curves of TIPs-pentacene OFETs using the dielectric S2 at V_D of -20 V, -40 V and -60 V; The output I - V curves of TIPs-pentacene OFETs using the dielectric S2

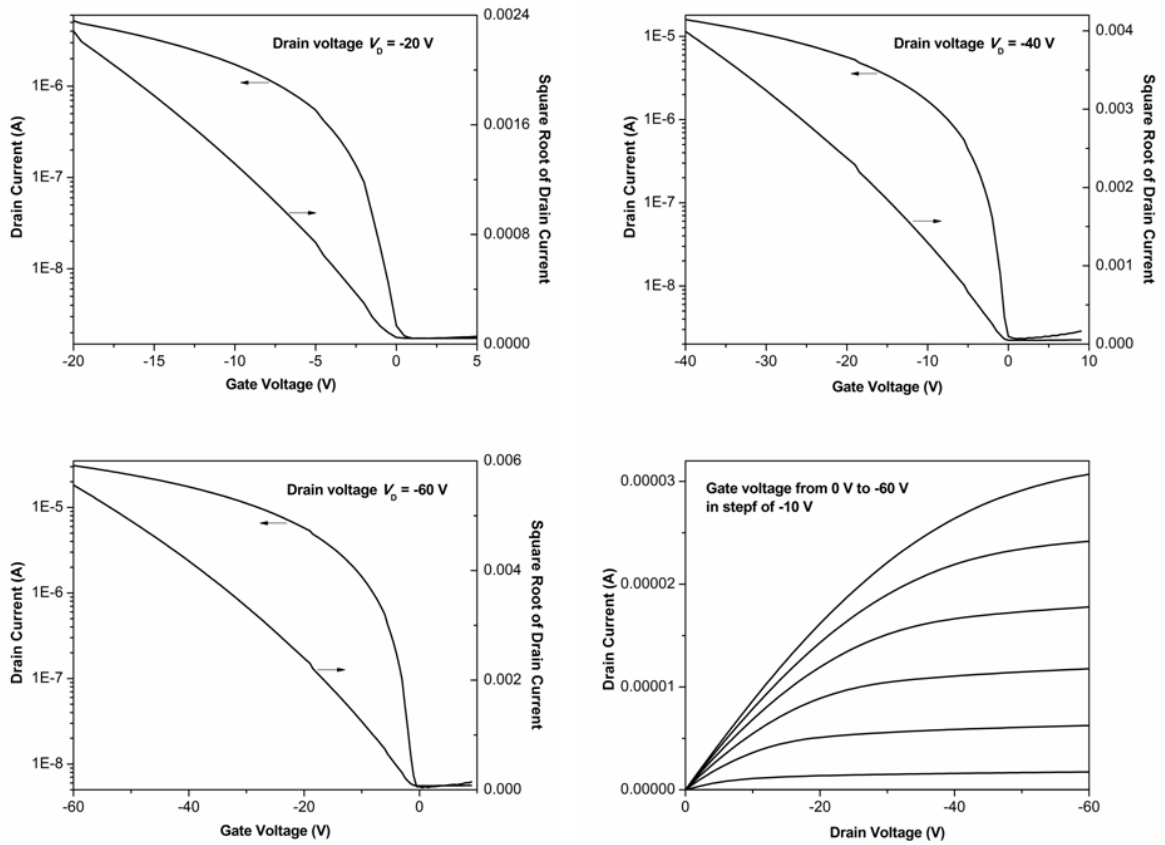


Fig. S6 The transfer I - V curves of TIPs-pentacene OFETs using the dielectric S3 at V_D of -20 V, -40 V and -60 V; The output I - V curves of TIPs-pentacene OFETs using the dielectric S3