Supporting Information for

Low temperature cross-linked, high performance polymer gate dielectrics for solution-processed organic field-effect transistors

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Synthesis of azide functionalized polymethylmethacrylate (PMMA-N_3).

3-Azidopropyl methacrylate (1.04 g, 6.0 mmol), methylmethacrylate (1.40 g, 14.0 mmol), AIBN (0.066 g, 0.40 mmol) and toluene (20 mL) were combined in a 100 mL Schlenk flask equipped with a stir bar and argon was bubbled through the solution for 30 minutes. The solution was subsequently heated to 70 ℃ for 14 h. The reaction was cooled to room temperature and was precipitated into anhydrous methanol (250 mL). The mixture was filtered and the residue was dried in vacuo to afford the titled compound as a white powder (1.6 g, M_n = 13,171 g/mol, PDI = 2.7). ^{1}H NMR (δ, $CDCl_3$): 4.16-3.95 (m, 2H), 3.72-3.50 (m, 8.4H), 3.48-3.34 (m, 2H), 2.08-0.68 (m, 25H); FTIR 2990, 2944, 2099, 1805, 1727, 1487, 1440, 1255, 1147, 991 cm^{-1}. Methylmethacrylate: Azide functionalized methylmethacrylate = 6.4: 3

Synthesis of azide functionalized polystyrene (PS-N_3).

4-Vinylbenzyl azide (0.96 g, 6.0 mmol), styrene (1.46 g, 14.0 mmol), AIBN (0.066g, 0.40 mmol) and toluene (20 mL) were combined in a Schlenk flask (100 mL)

equipped with a stir bar and argon was bubbled through the solution for 30 minutes. The solution was subsequently heated to 70 ℃ for 14 h. The reaction was cooled to room temperature and was precipitated into anhydrous methanol (250 mL). The mixture was filtered and the residue was dried in vacuo to afford the titled compound as a pale yellow powder (0.70 g, M_n = 15,503 g/mol, PDI = 1.5). ^{1}H NMR (δ, $CDCl_3$): 7.22-6.21 (m, 16H), 4.36-3.98 (m, 2H), 2.34-0.72 (m, 12.5H); FTIR 3075, 3029, 2928, 2843, 2091, 1603, 1495, 1440, 1247, 759 cm^{-1}. Styrene: Azide functionalized styrene = 7.2: 3

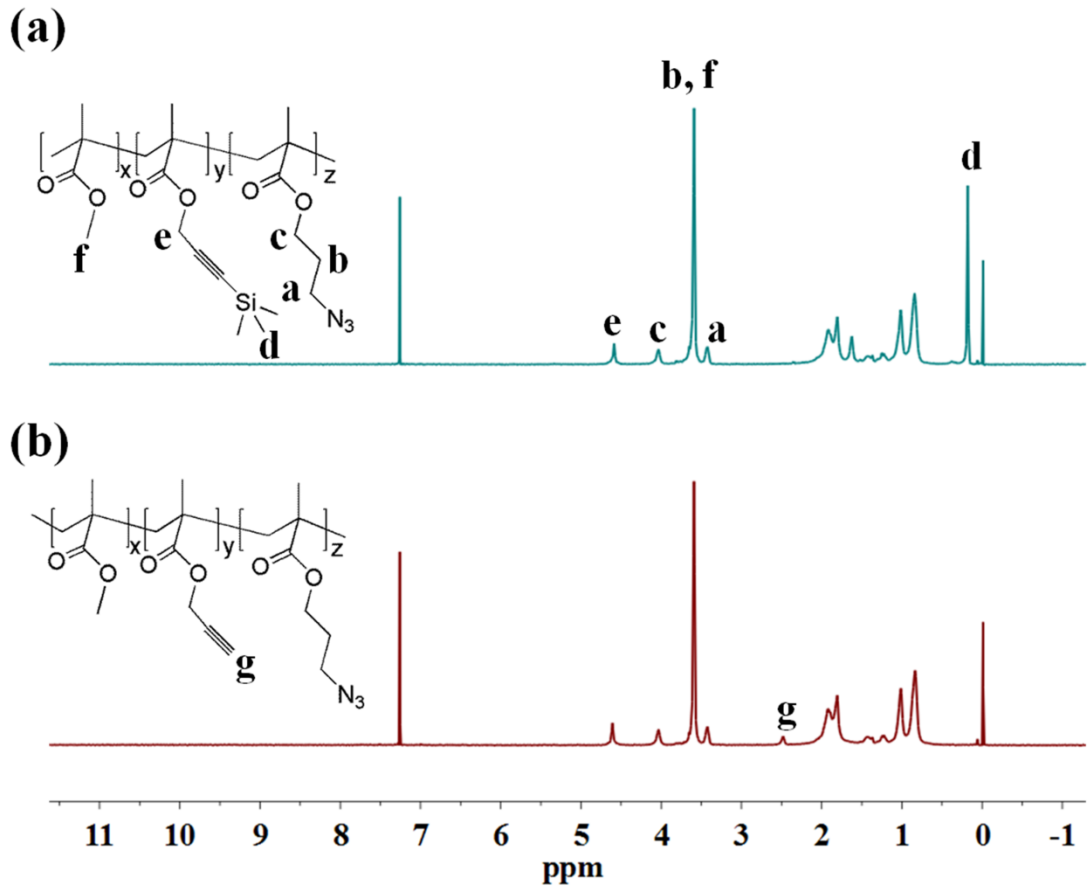

Fig. S1 ^{1}H NMR spectrum of (a) **co-PMMA$_1$** (b) **co-PMMA$_2$**

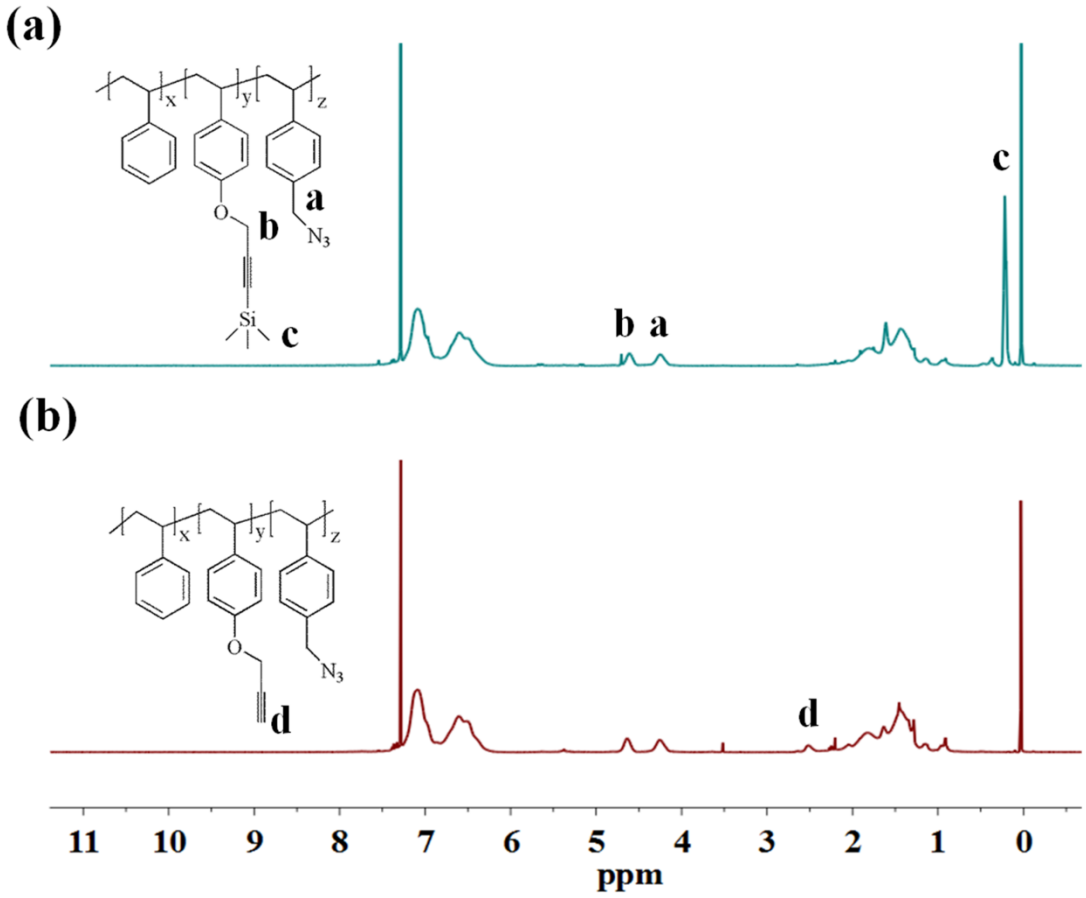

Fig. S2 ^{1}H NMR spectrum of (a) **co-PS$_1$** (b) **co-PS$_2$**

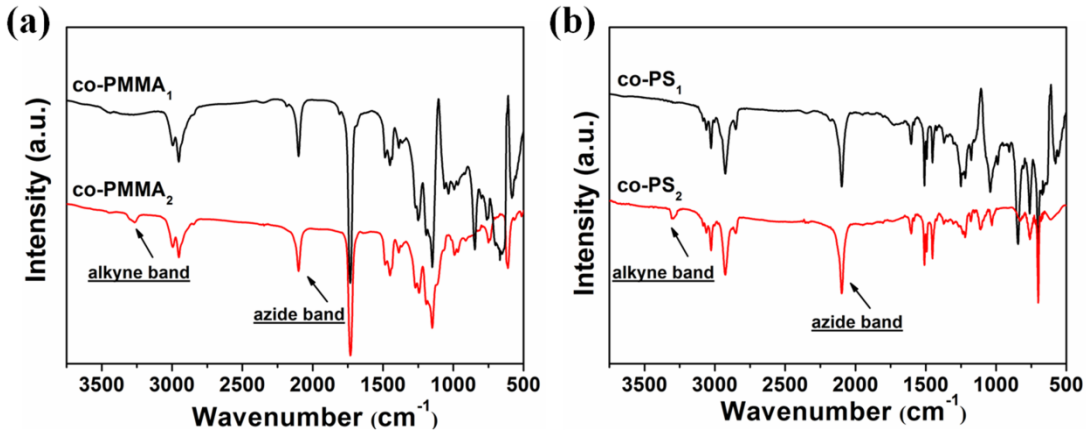

Fig. S3 FTIR spectrum of (a) **co-PMMA$_1$**, **co-PMMA$_2$** and (b) **co-PS$_1$**, **co-PS$_2$**

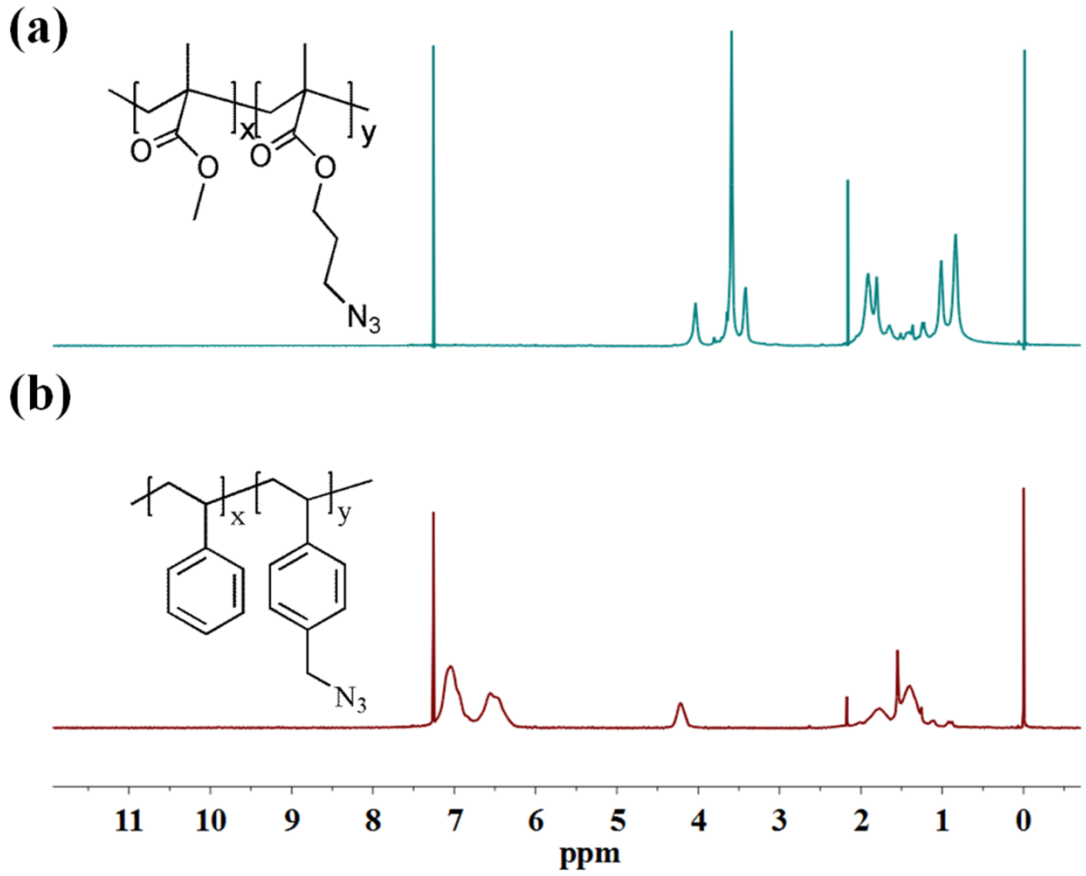

Fig. S4 ^{1}H NMR spectrum of (a) **PMMA-N_3** (b) **PS-N_3**

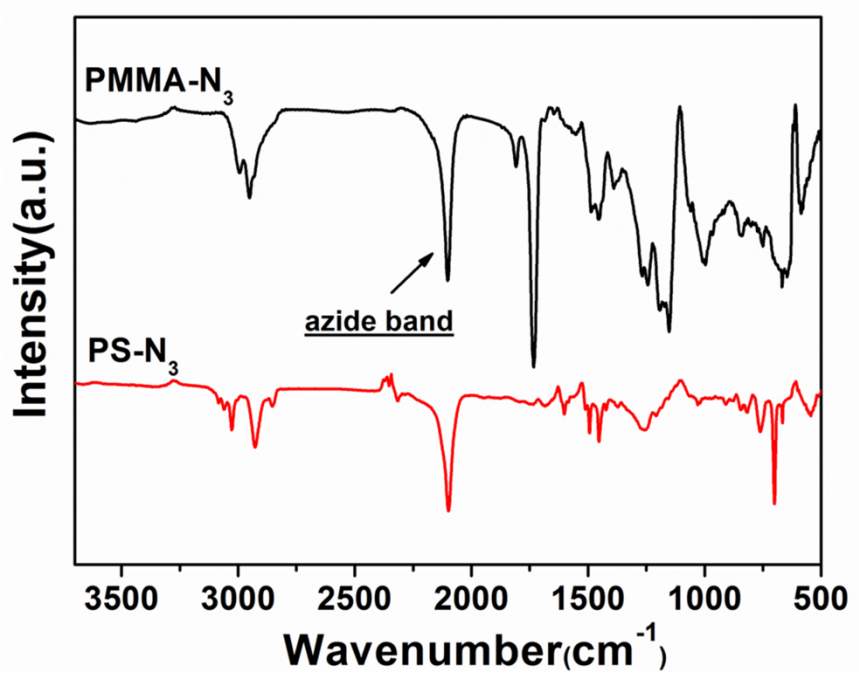

Fig. S5 FTIR spectrum of (a) **PMMA-N_3** (b) **PS-N_3**

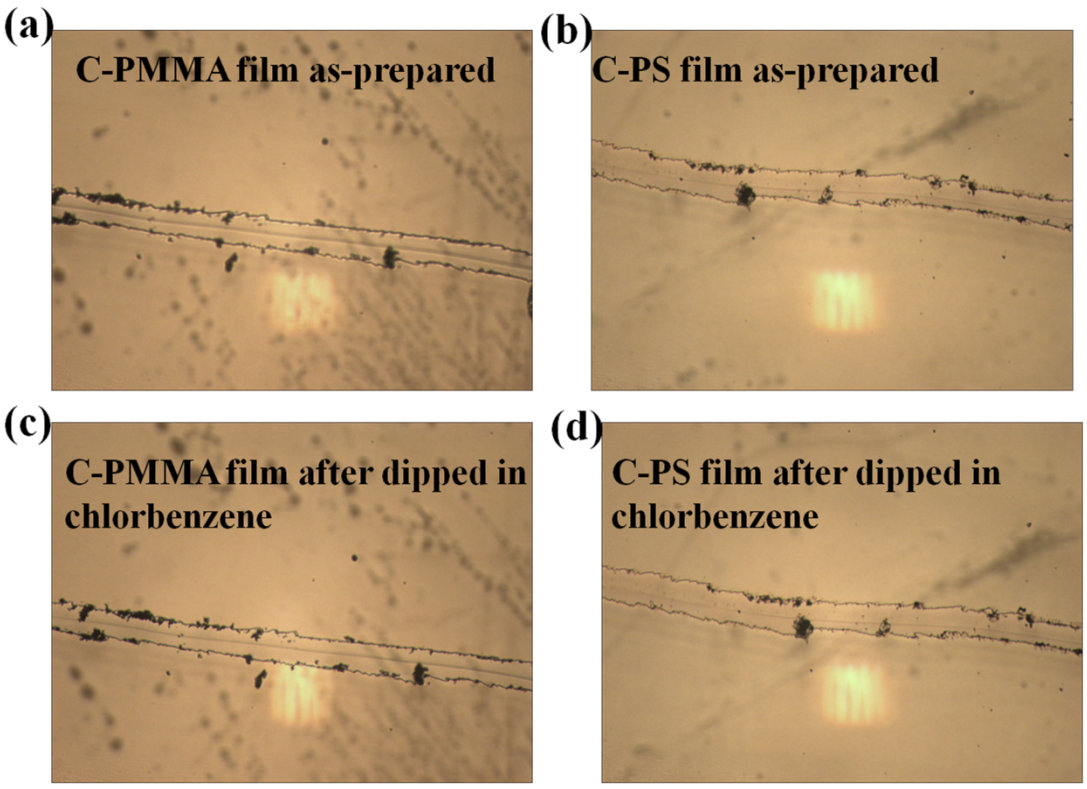

Fig. S6 The top-view polarized optical micrographs of (a, b) cross-linked polymer films as-prepared and (c, d) cross-linked polymer films after dipped in chlorobenzene for 2 min.

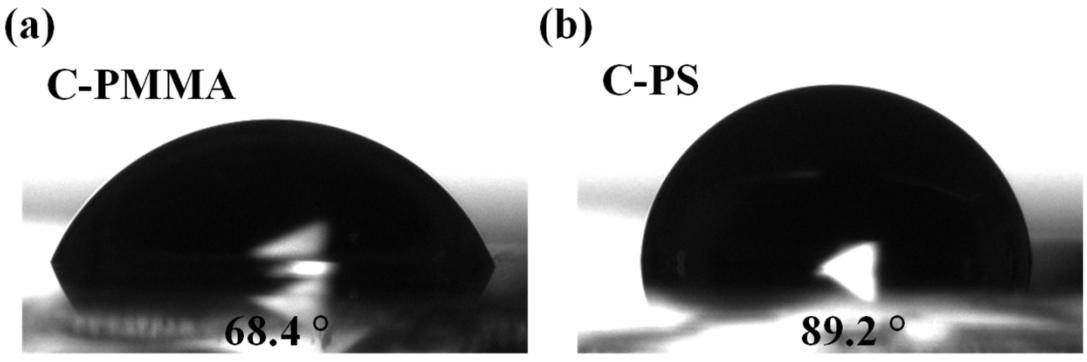

Fig. S7 Water contact angles of the cross-linked polymer films (a) **C-PMMA** and (b) **C-PS**.

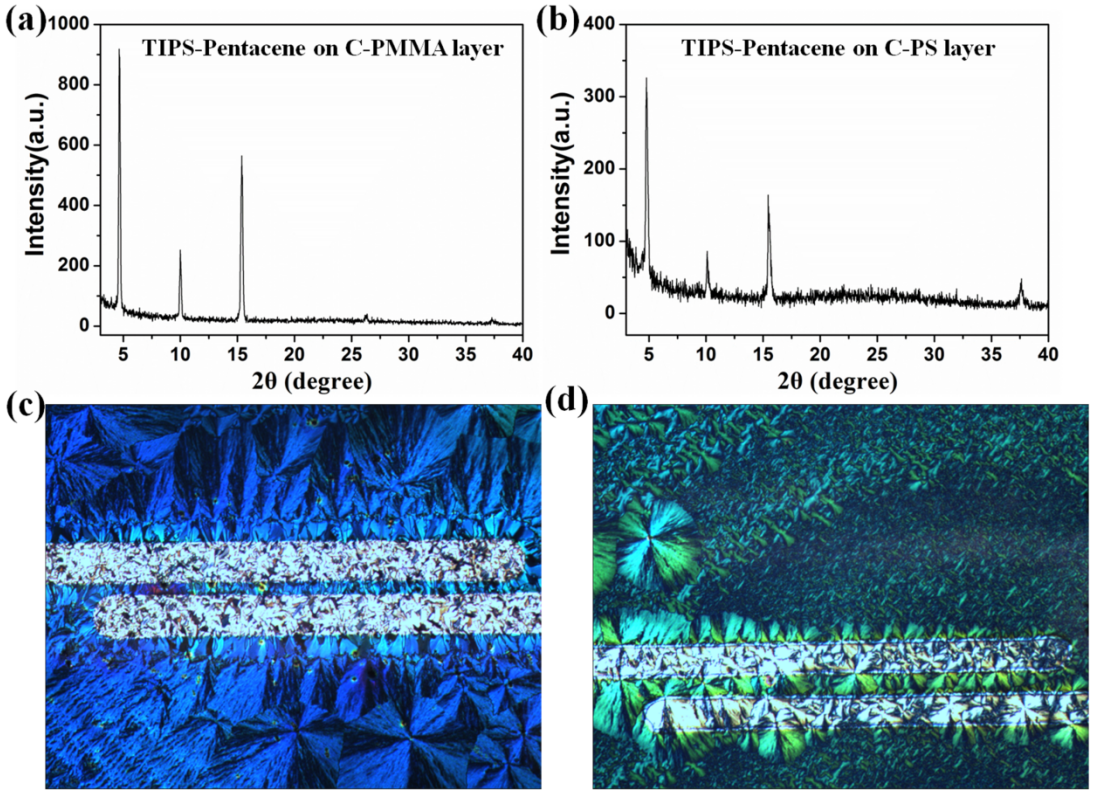

Fig. S8 The XRD patterns of the drop-casted TIPS-pentacene/PS films on cross-linked dielectric layers (a) **C-PMMA** and (b) **C-PS**; The polarized optical micrographs of the drop-casted TIPS-pentacene/PS films on cross-linked dielectric layers (top view) (c) **C-PMMA** and (d) **C-PS**.