Supporting Information

Novel copolymers incorporating dithieno[3,2-*b*:2′,3′-*d*]thiophene moieties for air-stable and high performance organic field-effect transistors

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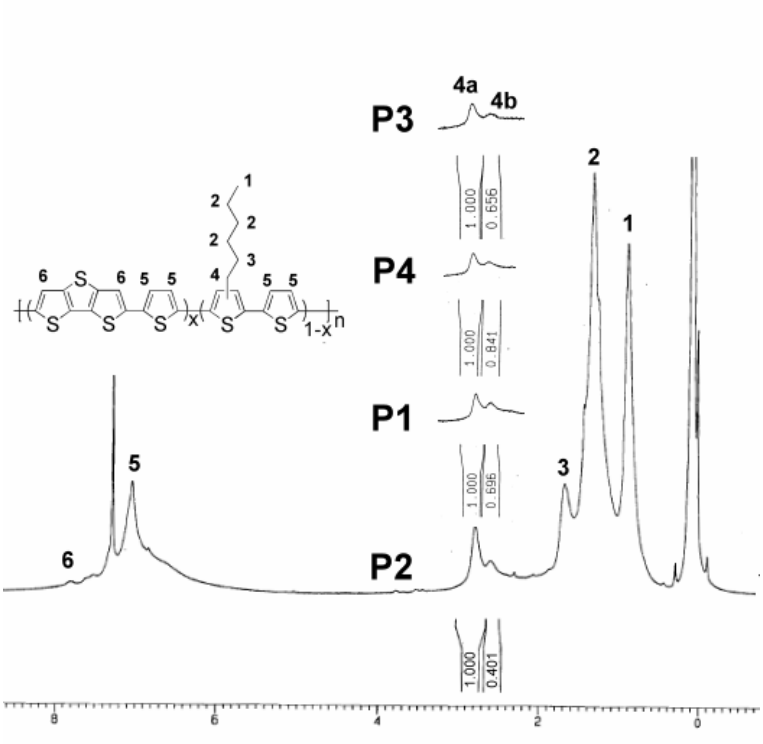

Figure S1. The ^{1}H NMR spectra of the copolymers.

Table S1. Electrochemical properties of the copolymers.

Polymers	$E_{ox}^{1/2}$ (V)	$E_{red}^{1/2}$ (V)	E_{HOMO} (eV)	E_{LUMO} (eV)	E_g^{ec} (eV)	E_g^{opt} [a] (eV)
P1	0.30	–2.14	–5.06	–2.62	2.44	2.01
P2	0.32	–2.15	–5.04	–2.63	2.41	1.98
P3	0.42	–2.17	–5.11	–2.59	2.52	2.00
P4	0.38	–2.17	–5.08	–2.60	2.48	1.95

a. The optical band gap was obtained from the equation E_g^{opt} =1240/λ_{edge}, where λ_{edge} is the onset value of absorption spectrum in long wavelength direction.

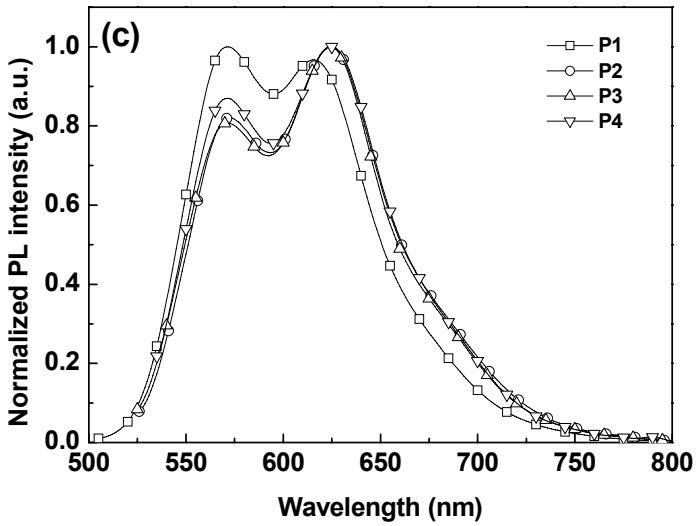

Figure S2. Photoluminescence spectra of the copolymer dilute solutions in chloroform.

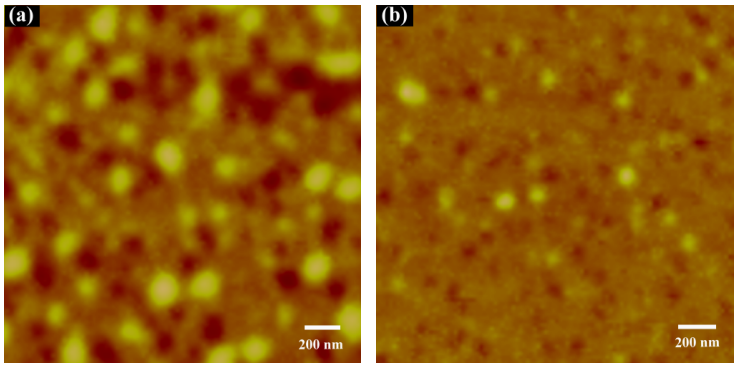

Figure S3. AFM images of films by spin coating: a) **P1** solutions onto OTS-modified SiO_2/Si substrate annealing at 170 °C for 30 min and b) **P2** solutions onto OTS-modified SiO_2/Si substrate annealing at 170 °C for 30 min.

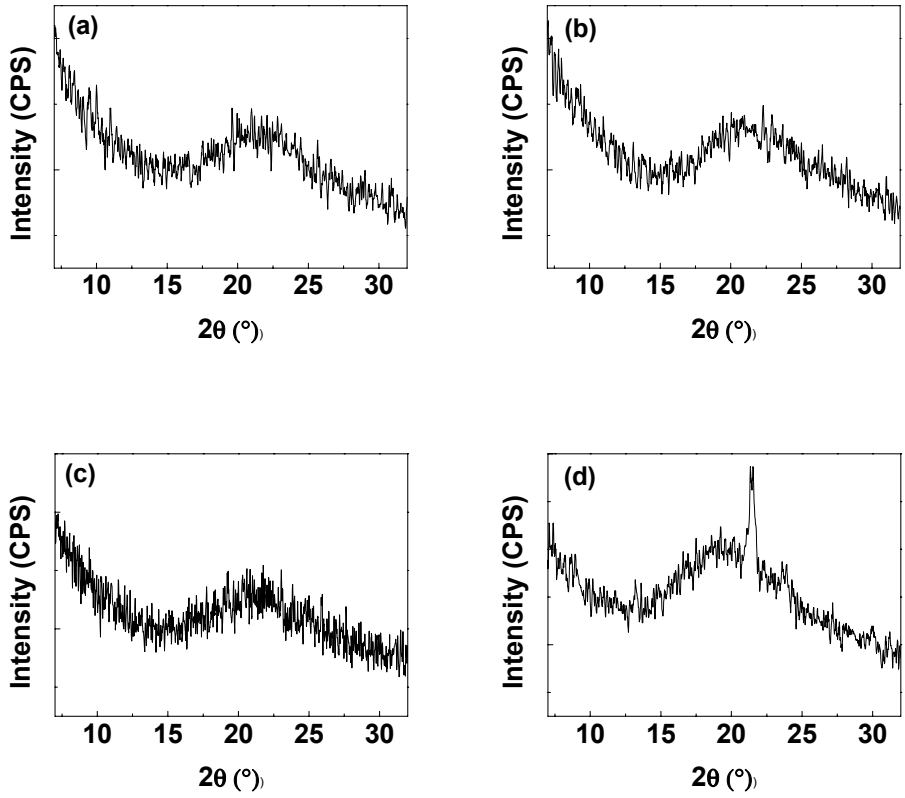

Figure S4. XRD patterns of untreated thin films: (a) for **P1**, (b) for **P2**, (c) for **P3** and (d) for **P4** solution spun coated on OTS-modified SiO_2/Si substrates.

Table S2. FET properties of devices by spin coating polymer solutions onto bare SiO_2

and OTS-modified SiO_2 substrates.

	Bare SiO_2			OTS-modified SiO_2					
				R.T.			170 ° C		
	μ	$I_{on/off}$	V_G	μ	$I_{on/off}$	V_G	μ	$I_{on/off}$	V_G
P1	4×10^{-5}	800	−12	1.7×10^{-4}	10^3	−28	[−]	[−]	[−]
P2	6.8×10^{-5}	100	−31	4.1×10^{-4}	10^3	−5	[−]	[−]	[−]
P3	5.1×10^{-4}	10^3	−2.1	3.5×10^{-4}	10^3	6.2	0.016	3×10^4	−5.5
P4	7.6×10^{-4}	10^3	−2.3	2.7×10^{-4}	10^3	−6.5	0.012	10^4	−4.7

[−]: not measured for the films became un-continuous.

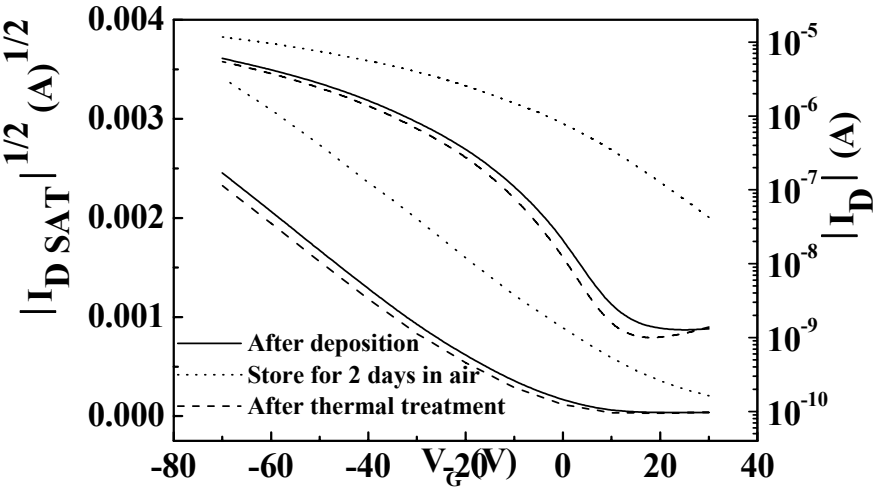

Figure S5. FET performance of device based on **P3** stored at ambient conditions with about 40% humidity and performance of device after second thermal treated.