

Supporting Information

Effect of Alcohol Polarity on the Aggregation and Film-Forming Behaviors of Poly(3-hexylthiophene)

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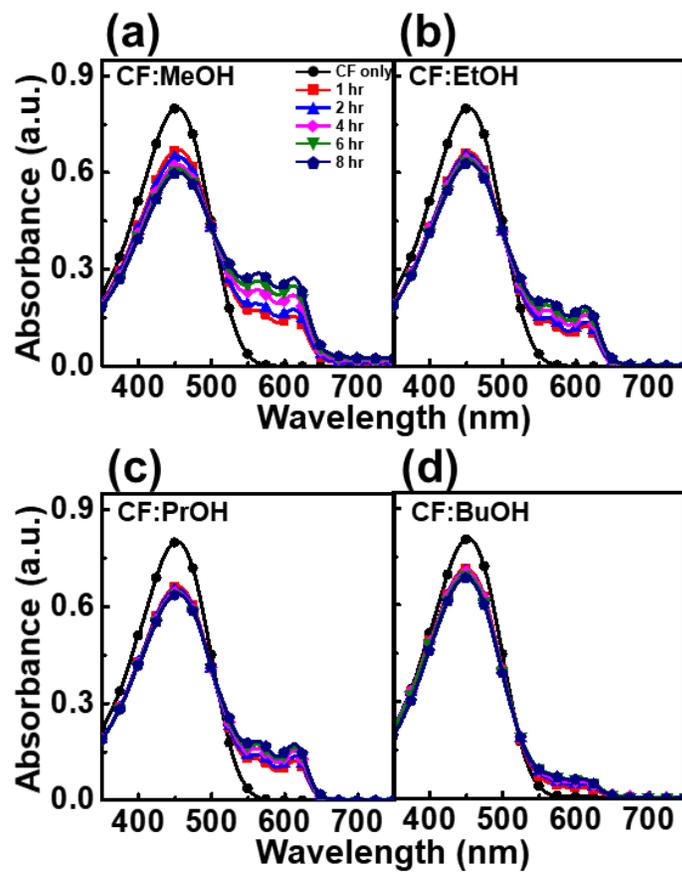


Figure S1. Absorption spectra of P3HT solution with polar solvent additives as a function of aging time when the 1 mmol of alcohol additive is added in the 1 ml P3HT solution.

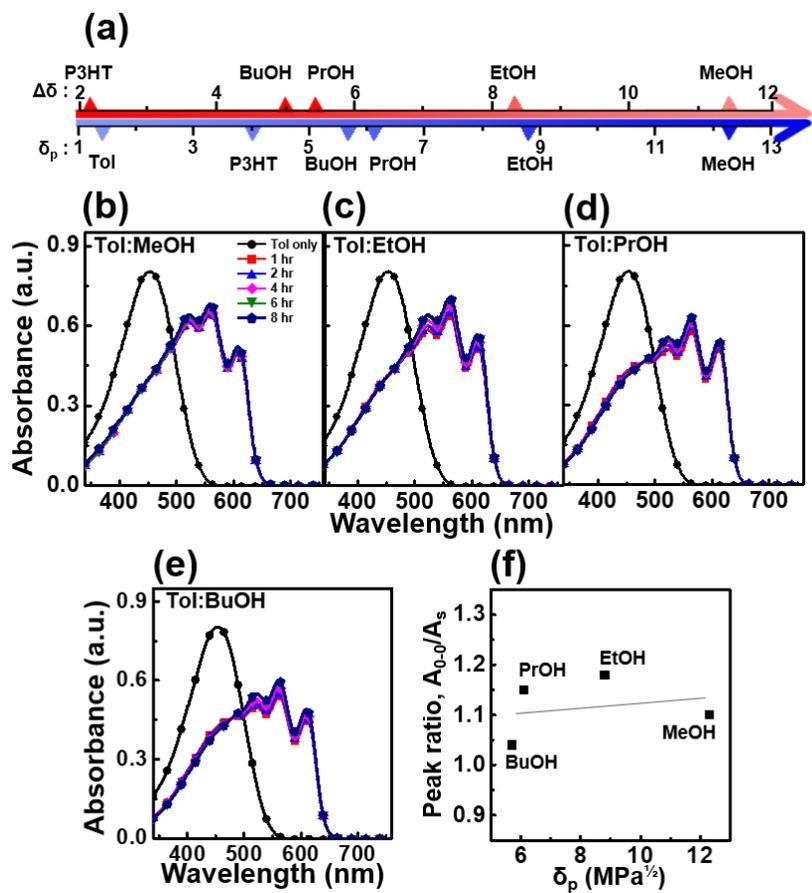


Figure S2. (a) HSP differences and polarity parameters ($\text{MPa}^{1/2}$) between toluene (Tol) and alcohol solvents. Absorption spectra of P3HT solution with polar solvent additives as a function of aging time: (b) Tol:MeOH, (c) Tol:EtOH, (d) Tol:PrOH, and (e) Tol:BuOH. (f) Peak ratio, A_{0-0}/A_s , of the P3HT solution vs. polarity parameters of alcohol polar solvent additives.

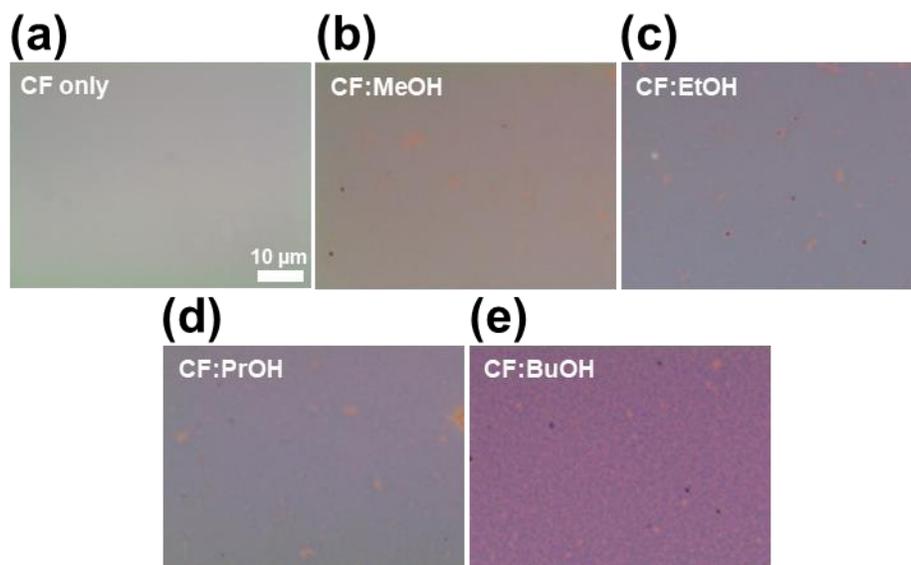


Figure S3. Optical microscopy images of P3HT films processed from the various solution mixtures.

Table S1. Physical properties and solubility parameters of the P3HT and various solvents.

	P3HT	Tol	MeOH	EtOH	PrOH	BuOH
$\Delta\delta$ (P3HT)	-	2.1	9.3	6.2	3.3	1.9
$\Delta\delta$ (Tol)	2.1	-	11.4	8.3	5.4	5
δ (MPa^{1/2})	20.3	18.2	29.6	26.5	23.6	23.2
δ_d (MPa^{1/2})	19.5	18.0	15.1	15.8	15.8	16.0
δ_p (MPa^{1/2})	4.0	1.4	12.3	8.8	6.1	5.7
δ_h (MPa^{1/2})	4.2	2	22.3	19.4	16.4	15.8
BP (°C)	-	111	64.7	78.4	82.6	97

Table S2. The device parameters of FETs made from P3HT solution with alcohol added.

	Time (min)	μ ($\text{cm}^2\text{V}^{-1}\text{s}^{-1}$) ($\times 10^{-3}$)	On-off ratio ($\times 10^3$)	V_{th} (V)
Pristine	-	0.93 ± 0.13	1.80 ± 0.47	19 ± 3.98
	1	2.64 ± 0.16	3.64 ± 1.34	26 ± 12.34
MeOH	3	2.35 ± 0.17	4.80 ± 8.25	17 ± 3.56
	5	2.31 ± 0.19	3.86 ± 1.87	17 ± 2.65
	7	1.79 ± 0.46	5.03 ± 3.69	10 ± 6.21
	10	2.56 ± 0.20	1.54 ± 1.08	24 ± 2.61
	1	2.80 ± 0.35	4.06 ± 2.17	21 ± 3.57
EtOH	3	2.63 ± 0.31	1.65 ± 2.20	19 ± 4.93
	5	1.96 ± 0.22	1.32 ± 0.76	28 ± 6.99
	7	2.15 ± 0.27	2.48 ± 0.94	18 ± 1.22
	10	1.95 ± 0.57	4.20 ± 0.95	14 ± 2.45
	1	19.52 ± 7.11	11.00 ± 4.18	45 ± 9.74
PrOH	3	21.47 ± 2.51	28.30 ± 22.75	30 ± 5.83
	5	20.07 ± 5.11	4.73 ± 2.74	44 ± 15.97
	7	25.94 ± 2.33	16.75 ± 7.31	30 ± 7.53
	10	17.26 ± 1.21	17.82 ± 6.69	35 ± 9.39
	1	12.40 ± 3.77	0.92 ± 2.30	59 ± 14.12
BuOH	3	13.15 ± 3.14	1.67 ± 3.88	42 ± 12.29
	5	15.97 ± 0.99	2.62 ± 0.48	39 ± 5.26
	7	14.40 ± 0.30	3.04 ± 2.96	28 ± 3.78
	10	14.69 ± 2.12	0.89 ± 1.05	48 ± 5.26