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Supporting Information for

Thermal-Assisted Self-Assembly: A Self-Adaptive Strategy towards Large-Area Uniaxial Organic Single-Crystalline Microribbon Arrays

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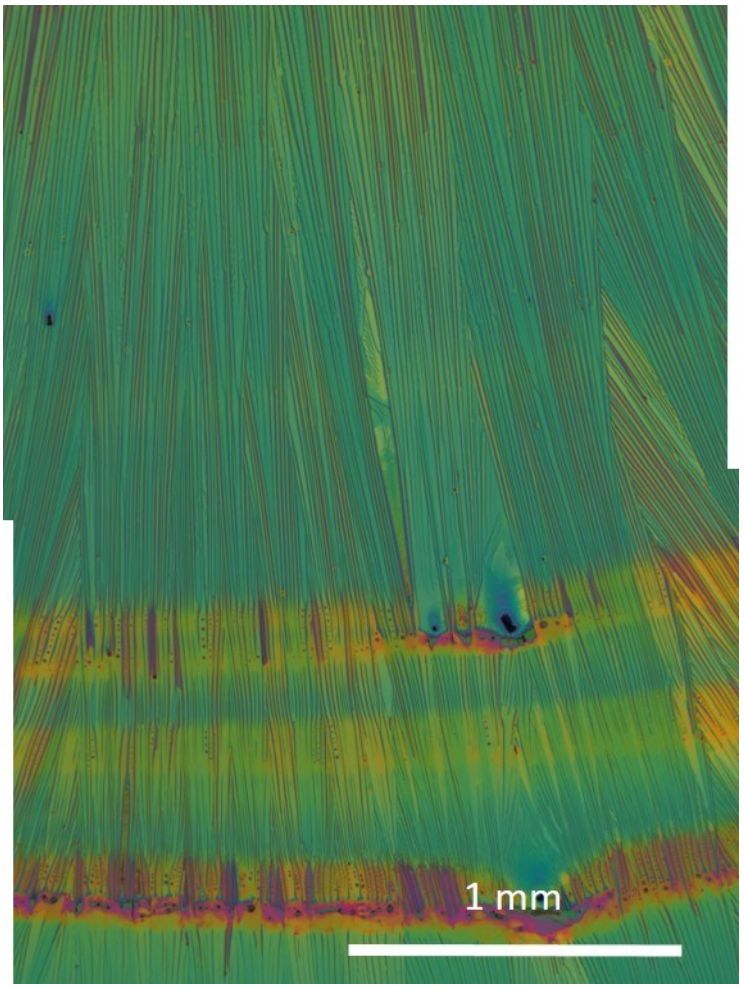

Figure S1. A coalesced optical microscope image of large-area TIPS-pentacene uniaxial OSCMAs with millimeter-long ribbons.

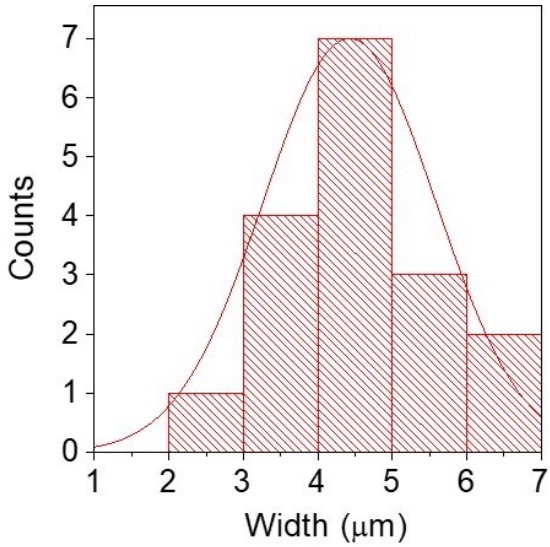

Figure S2. (a) Optical microscope image of TIPS-pentacene uniaxial OSCMAs. (b) Histograms of the width of TIPS-pentacene uniaxial OSCMAs.

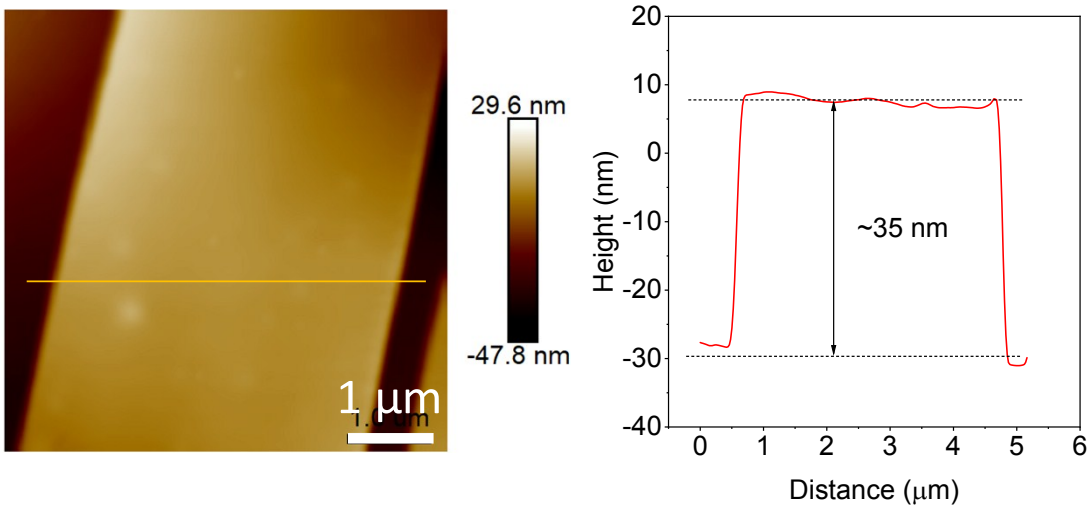

Figure S3. (a) AFM image of an individual TIPS-PEN microribbon. (b) Height profile of the microribbon.

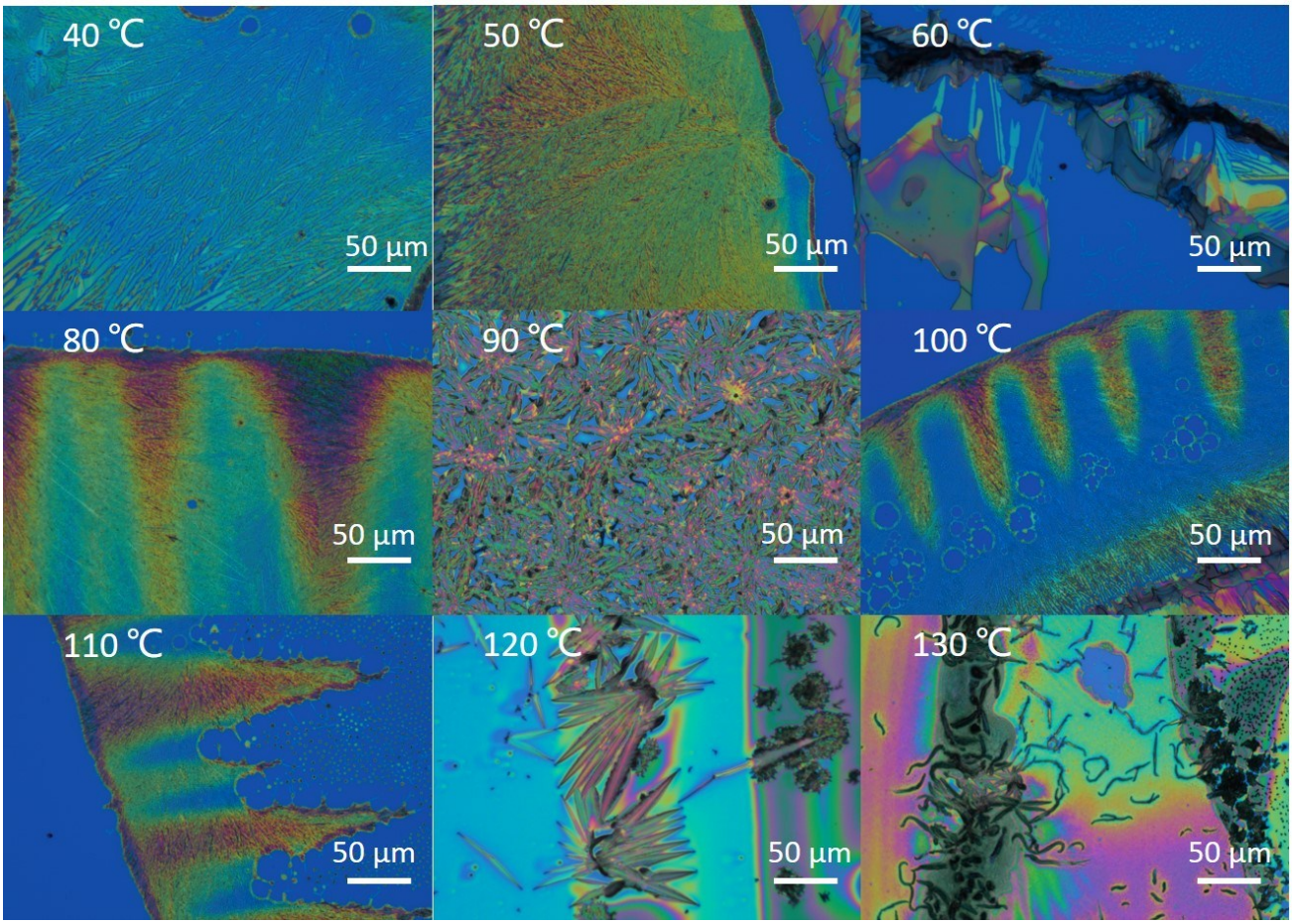

Figure S4. Optical microscope images of TIPS-pentacene crystals produced by drop-casting at different uniform temperature.

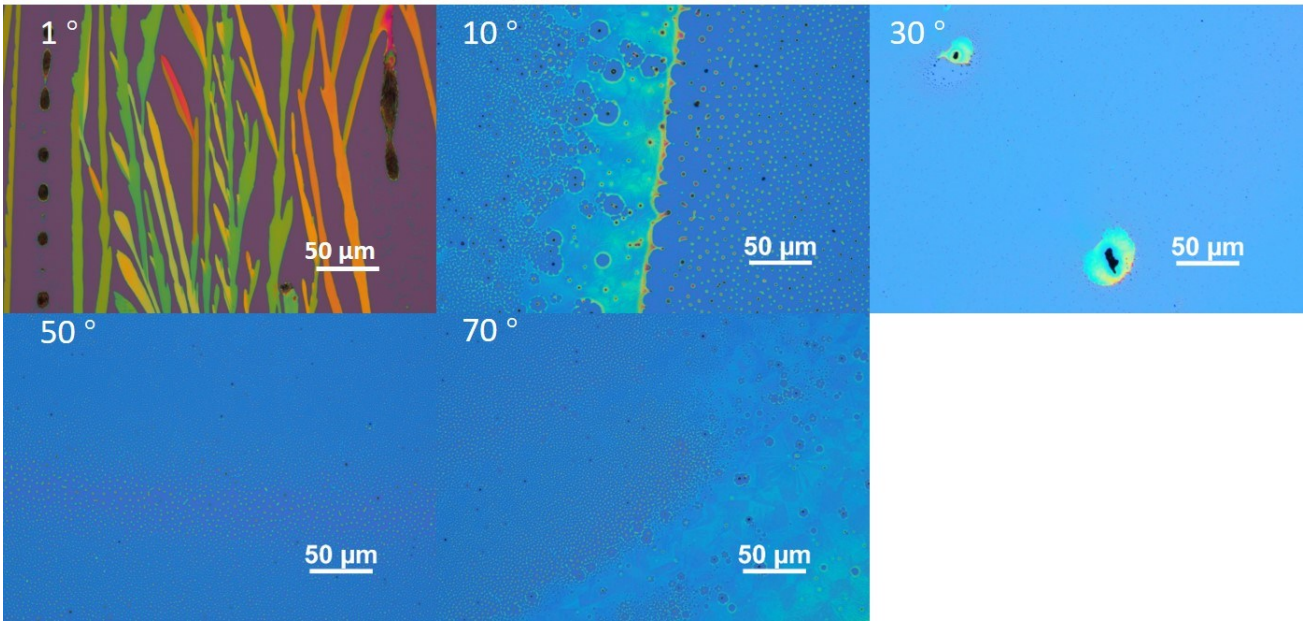

Figure S5. Optical microscope images of TIPS-pentacene crystals obtained on substrates tilting at different tilt angles without heating.

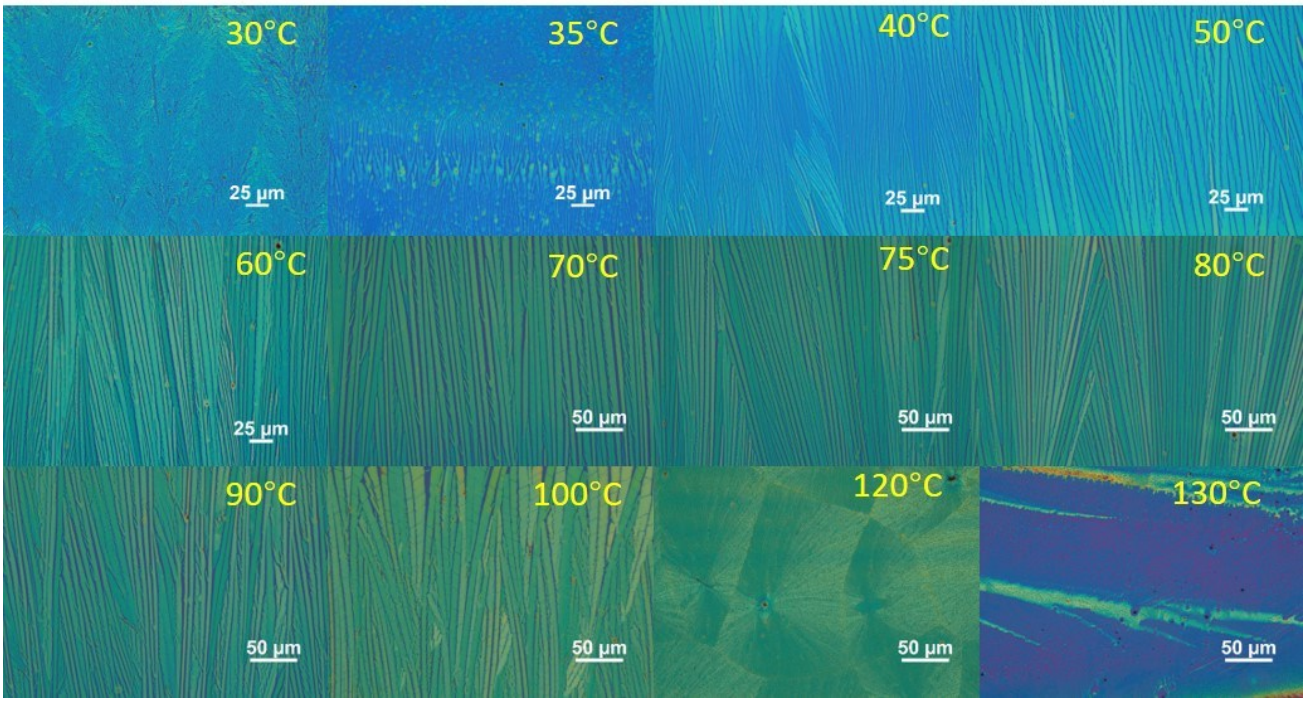

Figure S6. Optical microscope images of TIPS-pentacene crystals produced by the TASA method at different temperatures.

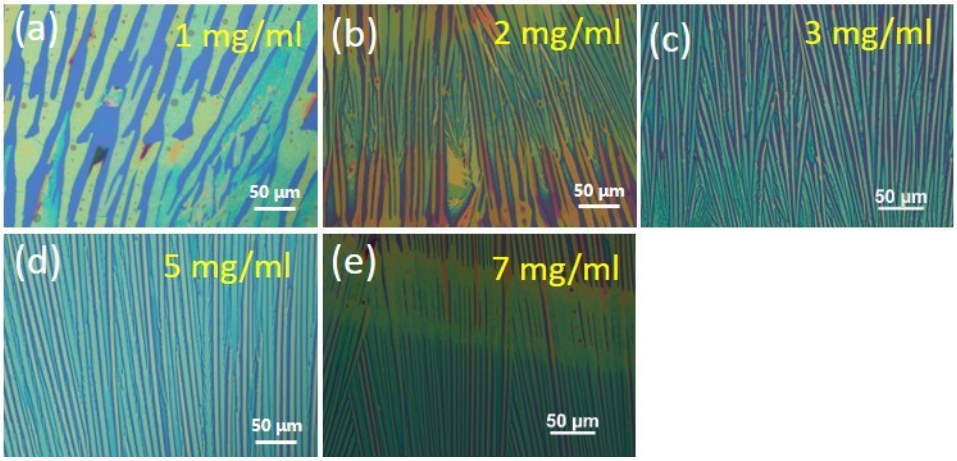

Figure S7. Optical microscope images of TIPS-pentacene crystals obtained from different concentrations.

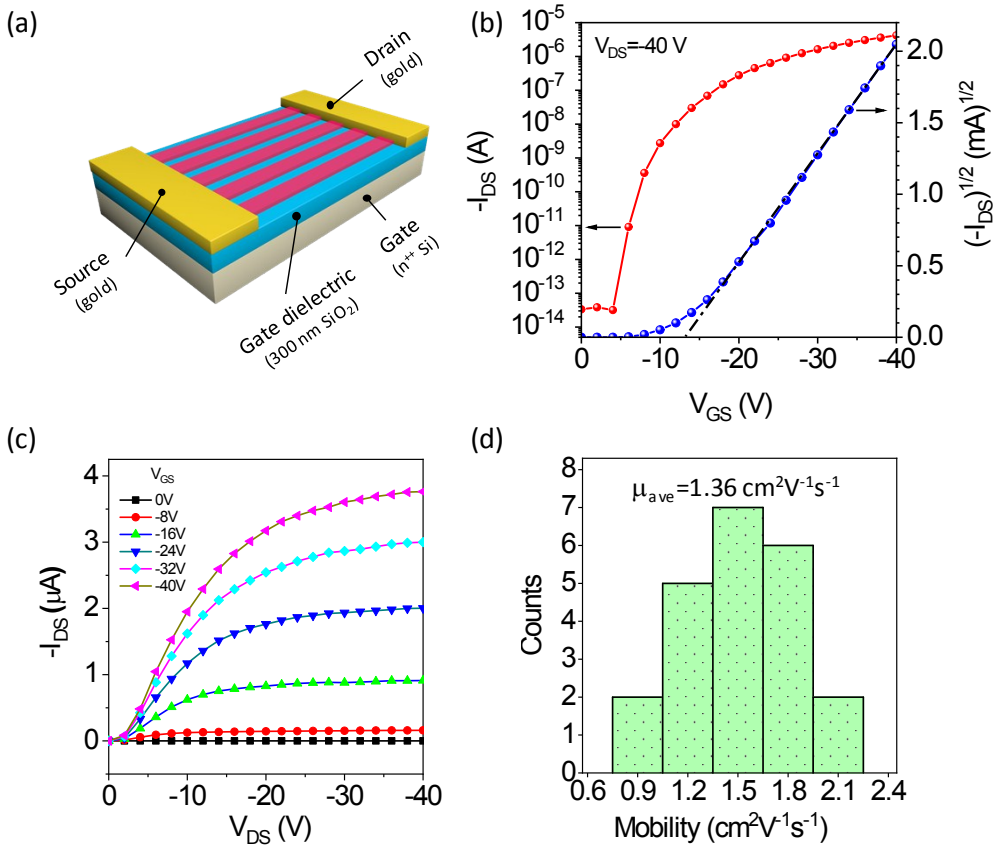

Figure S8. (a) Schematic of OFETs based on uniaxial OSCMAs of TIPS-pentacene. (b, c) The transfer and output curves of the OFETs. (d) Histogram of the hole mobilities calculated from 22 devices.

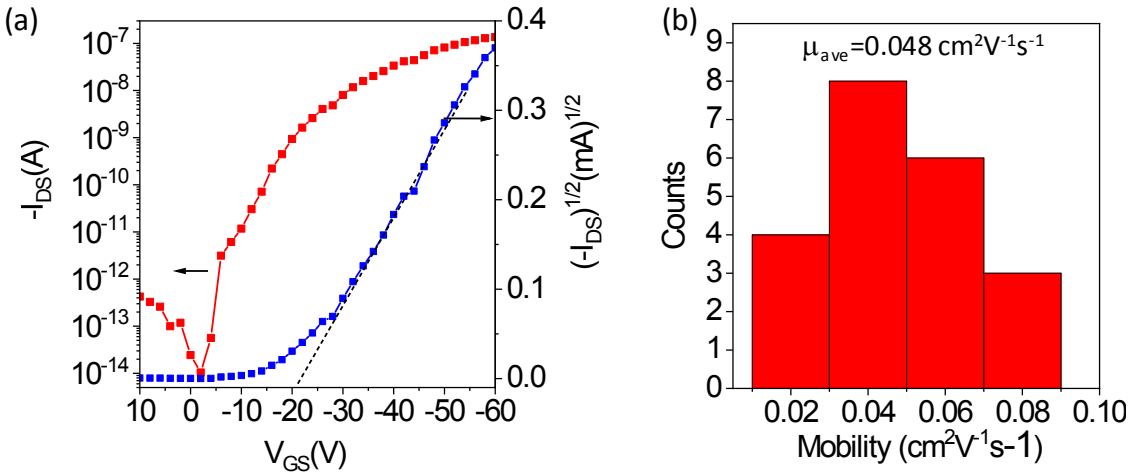

Figure S9. (a) Transfer characteristics of the OFETs based on TIPS-PEN films prepared by drop-casting on a hot plate. (b) The mobility distribution collected from 21 OFETs.

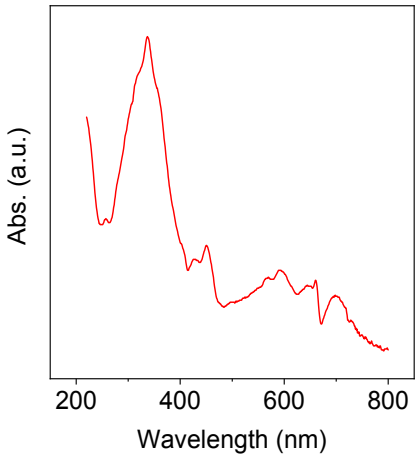

Figure S10. UV-Vis of the TIPS-pentacene uniaxial OSCMAs.

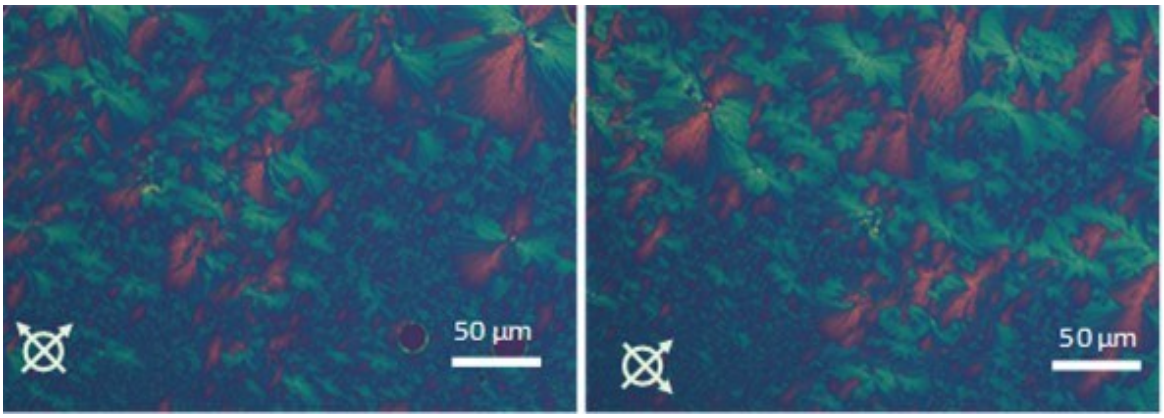

Figure S11. POM images of the drop-casting TIPS-pentacene film. When the polarization angle is changed, the brightness and the color of the film in different areas changed unevenly, indicating the polycrystalline nature of the film. Thus they showed lower performances (e.g., charge carrier mobility) compared with the OSCMAs.

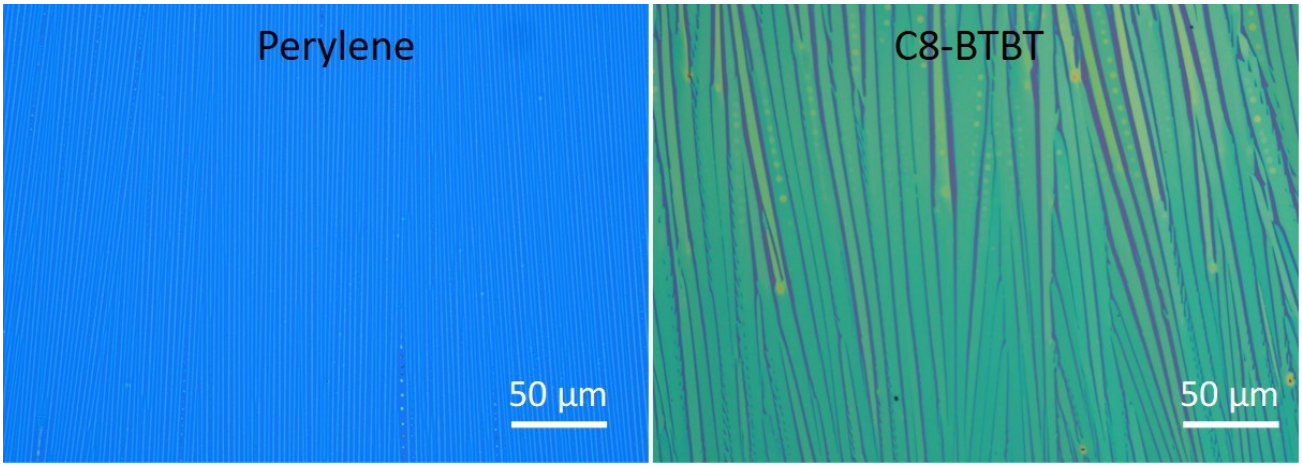

Figure S12. OM images of OSCMAs of Perylene and C8-BTBT grown by the TASA method. OSCMAs of Perylene were grown in toluene with a concentration of 3 mg/ml. the heater block was kept at 40℃. OSCMAs of C8-BTBT were grown in chlorobenzene with a concentration of 5 mg/ml. the heater block was kept at 60℃.

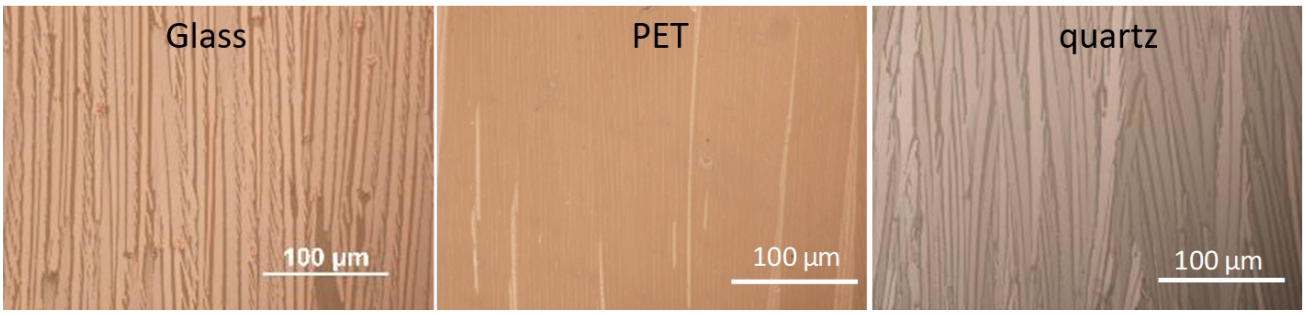

Figure S13. OM images of TIPS-pentacene grown on glass, PET and quartz. TIPS-pentacene was dissolved in toluene. The concentration was 5 mg/ml. The heater block temperature 40℃, 55℃ and 60℃ for glass, PET and quartz, respectively.

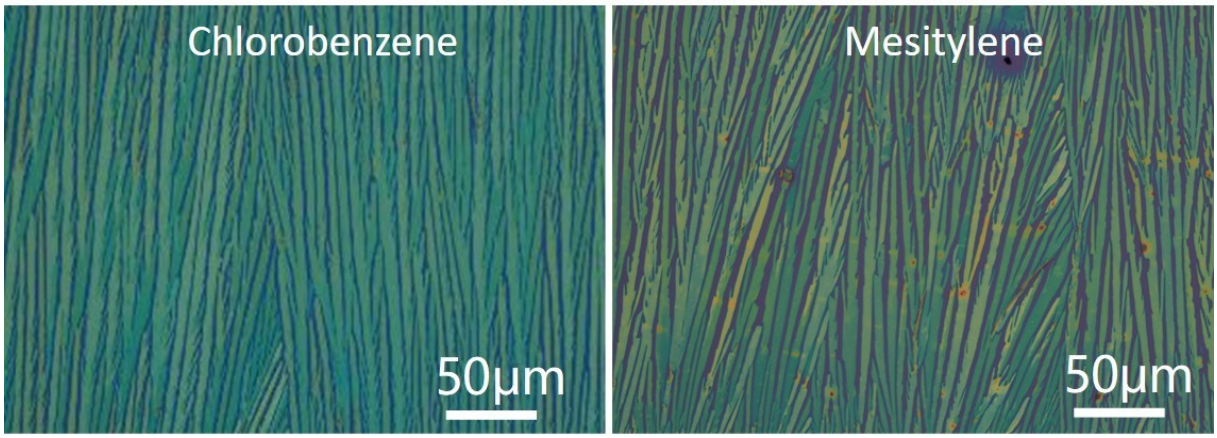

Figure S14. Typical OM images of TIPS-pentacene produced by the TASA method using chlorobenzene and mesitylene as the solvent.

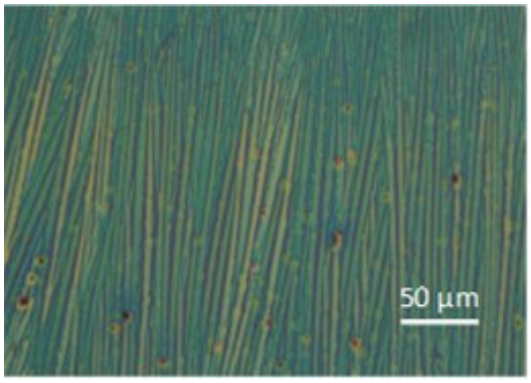

Figure S15. The OM images of TIPS-pentacene grown on OTS treated substrate.

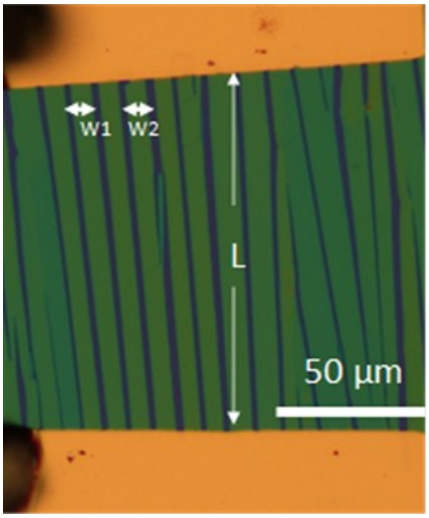

Figure S16. The channel width was the sum of the widths of the microribbons between the two electrodes.

Table S1. Comparison of figure of merit of phototransistor based on organic semiconductors.

Semiconductor	μ_{max} ($cm^2 V^{-1} s^{-1}$)	P	R (AW^{-1})	D^* (Jones)	λ (nm)	Ref.
BBDTE (SC*)	1.62	10^5	9.8×10^3	N/A	380	1
A-EHDTT (SC)	1.2~1.6	1.4×10^5	1.4×10^4	N/A	400	2
DNTT (TF*)	N/A	8.1×10^4	1.7×10^4	2×10^{14}	460	3
DPP-DTT/PCBM (TF)	N/A	5×10^4	350	5.7×10^{13}	810	4
C8-BTBT /polythioether (TF)	NA	1×10^5	2.5	6.3×10^{14}	350	5
BOPAnt (SC)	2.96	2×10^5	3.1×10^3	N/A	blue	6
C8BTBT:PLA (TF)	N/A	$\sim 1 \times 10^5$	393	N/A	365	7
6T (TF)	0.09	1.3×10^3	1.5~2.4	N/A	UV	8
P3HT (TF)	0.01-0.07	3.8×10^3	250	N/A	white	9
DPP-DTT/PCBM (TF)	0.14 (p) / 0.06 (n)	3×10^4	8×10^5	3×10^{12}	808	10
TFT-CN (SC)	1.36	5×10^5	9×10^4	6×10^{14}	808	11
DPA(TF)	12	8.5×10^7	1.34×10^5	1.2×10^{17}	430	12
TIPS-Pentacene（TF）	0.11(±0.08)	1.07×10^5	2.0×10^{-2}	N/A	460	13
TIPS-Pentacene (TF)	6.3×10^{-2}	N/A	53.5×10^{-3}	N/A	white	14
TIPS-Pentacene (TF)	0.02	10^6~10^7	N/A	N/A	white	15
TIPS-Pentacene（SC）	2.06	1.36×10^8	845	1.98×10^{15}	365	This work

*SC: single crystal, TF: thin film

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