Supplementary Information

Engineered Molecular Stacking Crystallinity of Bar-coated Film TIPS-

pentacene/Polystyrene Films for Organic Thin-Film Transistors

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Figure S1 Atomic force microscopy with height profiles and optical images of TIPS-pentacene-only films at different concentrations.



Figure S2 Current-voltage (I-V) transfer characteristics of TIPS-pentacene-only films at different concentrations.

Bar-coating Direction



0.1 mm/s0.4 mm/s0.8 mm/s2.0 mm/s10.0 mm/sFigure S3 Optical images of TIPS-pentacene-only films at different coating speeds.



Figure S4 Current-voltage (I-V) transfer characteristics of TIPS-pentacene-only films at different coating speeds.



Bar-coating Direction



Figure S5 Optical and atomic force microscopy images with height profiles of TIPS-pentacene/PS (*MW* = 1300) binary films at different weight percentages of TIPS-pentacene.



Figure S6 Current-voltage (I-V) transfer characteristics of TIPS-pentacene/PS (*MW* = 1300) binary films at different weight percentages of TIPS-pentacene.



Bar-coating Direction



Figure S7 Optical and atomic force microscopy images with height profiles of TIPS-pentacene/PS (*MW* = 4000) binary films at different weight percentages of TIPS-pentacene.



Figure S8 Current-voltage (I-V) transfer characteristics of TIPS-pentacene/PS (*MW* = 4000) binary films at different weight percentages of TIPS-pentacene.



Figure S9 Optical and atomic force microscopy images with height profiles of TIPS-pentacene/PS (*MW* = 35,000) binary films at different weight percentages of TIPS-pentacene.



Figure S10 Current-voltage (I-V) transfer characteristics of TIPS-pentacene/PS (*MW* = 35,000) binary films at different weight percentages of TIPS-pentacene.

TIPS-pentacene [wt%]	d-spacing [Å]
100	16.195
80	17.006
60	17.416
40	18.079

 Table S1 Calculated d-spacing results of TIPS-pentacene/PS (MW = 4000) binary films at different weight percentages

Materials	Solubility Parameter [MPa ^{1/2}]
TIPS-pentacene	18.2^{1}
PS	17.52 ²
PMMA	22.69 ²

Table S2 Calculated solubility parameters for TIPS-pentacene and different insulating polymers, polystyrene (PS) and poly(methyl methacrylate) (PMMA), dissolved in toluene solvent.



Figure S11 Schematic diagram of TIPS-pentacene/PS (*MW* = 4000) binary films at different weight percentages of TIPS-pentacene.



Figure S12 Transfer curves of TIPS-pentacene/PS (MW = 4000) binary films at (a) 40 wt% and (b) 100 wt% of TIPS-pentacene at different temperatures. Calculated mobilities of TIPS-pentacene/PS (MW = 4000) binary films at (c) 40 wt% and (d) 100 wt% of TIPS-pentacene at different temperatures. Calculated activation energies of TIPS-pentacene/PS binary films at (e) 40 wt% and (f) 100 wt% of TIPS-pentacene at different temperature ranges.

Supporting References

1. Chen J, Martin DC, Anthony JE. Morphology and molecular orientation of thin-film bis (triisopropylsilylethynyl) pentacene. J Mater Res. 2007;22(6):1701-1709.

2. Brandrup J, Immergut EH, Grulke EA, Abe A, Bloch DR. *Polymer handbook*. Vol 89. Wiley New York; 1999.