

Supporting Information

Significantly Increasing the Ductility of High Performance Polymer Semiconductors Through Polymer Blending

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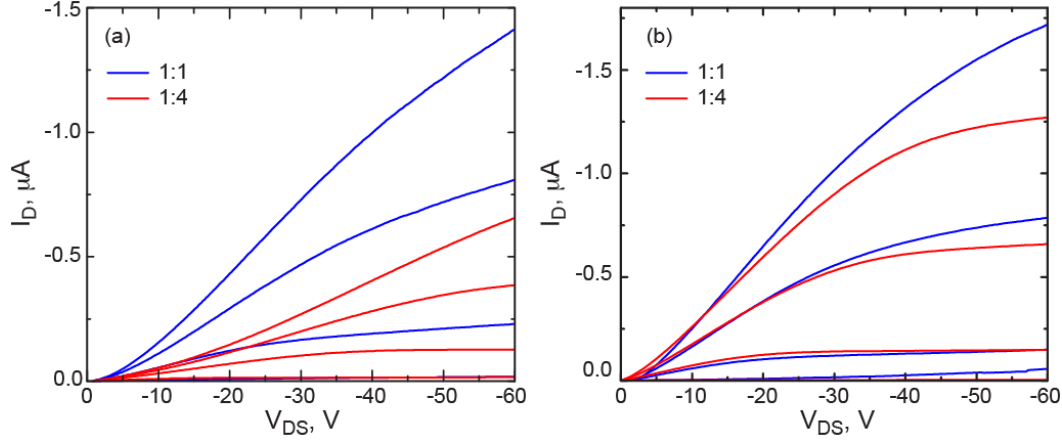


Figure S1. Output characteristics of 5 μm channel length devices for the 1:1 and 1:4 blend films that were (a) unstrained and (b) strained by 75 % for transport parallel to the strain direction.

In **Figure S2**, the resistance is estimated following a previously described method.¹ Here, we only briefly describe the method. The resistance is estimated by taking the slope of the inverse of the current with channel length at a source-drain voltage of -60 V and at various gate-source voltages. The slope is then extrapolated to a zero channel length and multiplied by the source-drain voltage as an estimate of the contact resistance. The channel resistance per μm of channel length is estimated by taking the slope of the inverse of the drain current vs. channel length multiplied by the source-drain voltage.¹

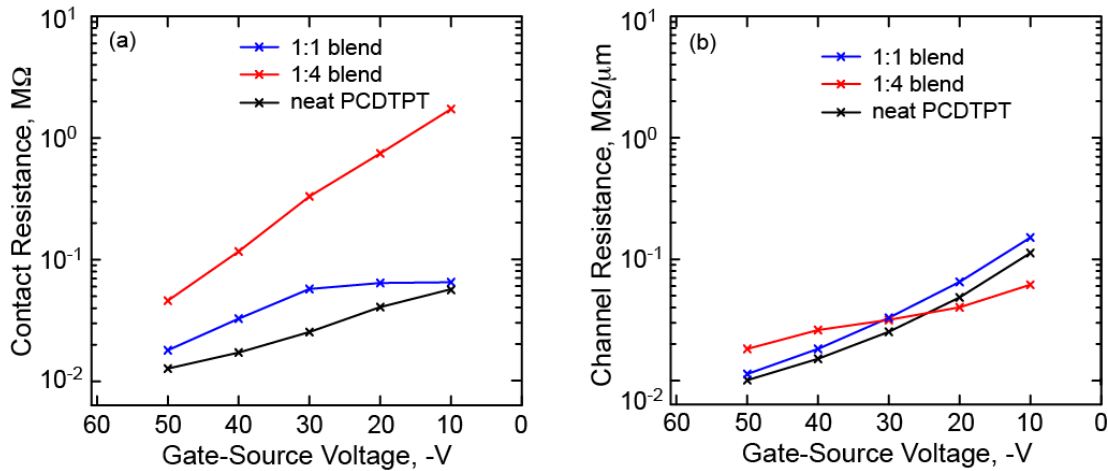


Figure S2. The total contact resistance (a) and channel resistance per μm of channel length (b) given for a source-drain voltage of -60V, for a channel width of 1000 μm .

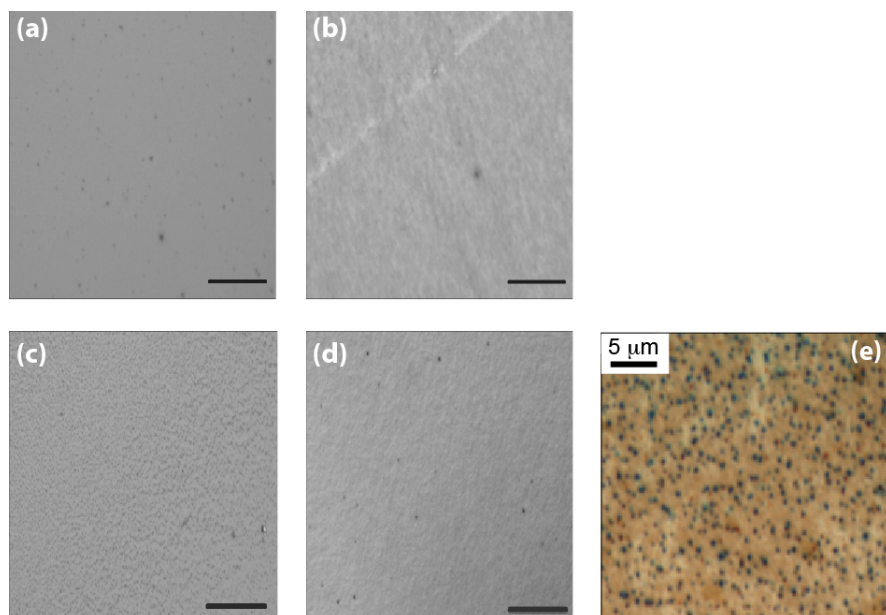


Figure S3. Optical microscope image of unstrained (0%) and 75% strained blend films. a) 1:1 PCDTPT:P3HT unstrained film. b) 1:4 PCDTPT:P3HT unstrained film. c) 1:1 PCDTPT:P3HT 75% strained film. d) 1:4 PCDTPT:P3HT 75% strained film. The scale bar in the image is 40 μm . (e) Higher magnification microscope image of lateral segregation in 1:1 PCDTPT:P3HT blend film. The greenish blue spots are attributed to be PCDTPT.

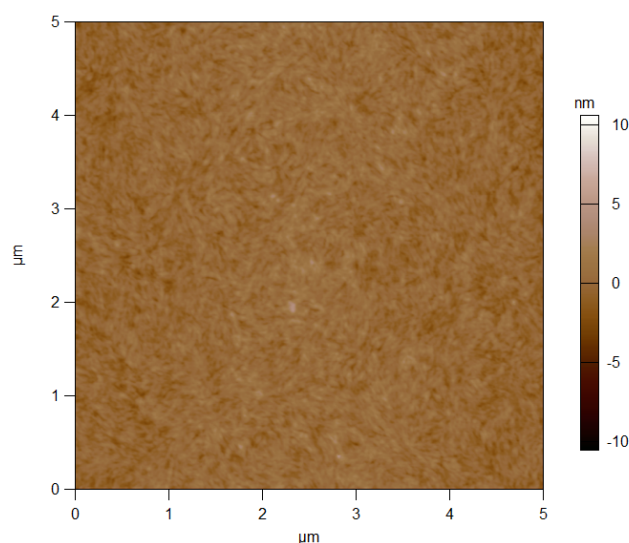


Figure S4. AFM image of neat PCDTPT film, showing no signs of nodule formation as observed in the 1:4 film.

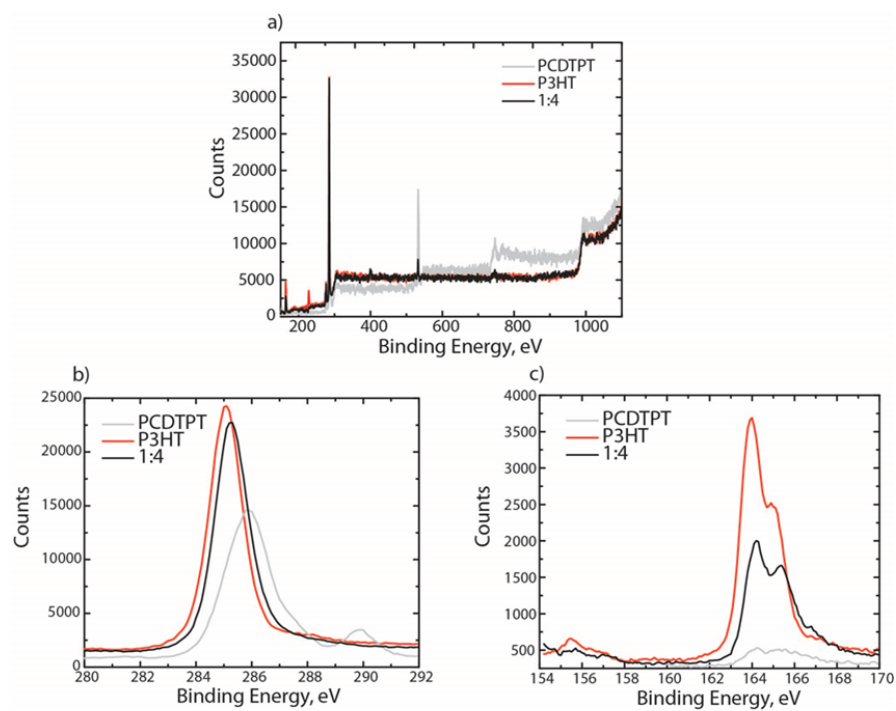


Figure S5. XPS data of PCDTPT, P3HT, and 1:4 PCDTPT:P3HT films. a) is a survey, b) is C 1s and c) is S 2p.

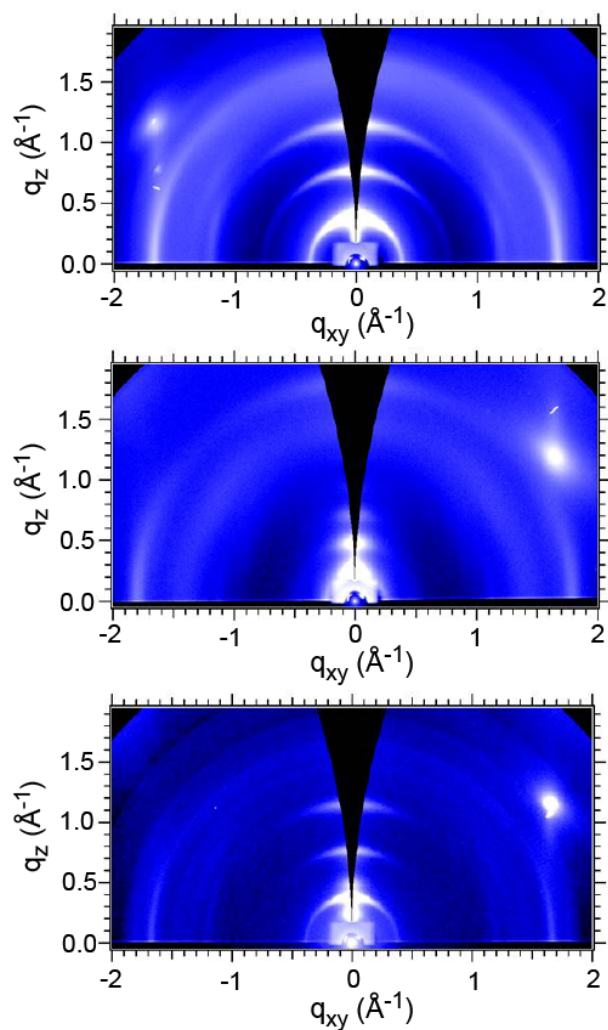


Figure S6. 2D GIXD images of (top) neat P3HT film, (middle) neat PCDTPT film, (bottom) 1:4 P3HT:PCDTPT blend film. Bright spots in the upper corners of images are due to the silicon substrate.

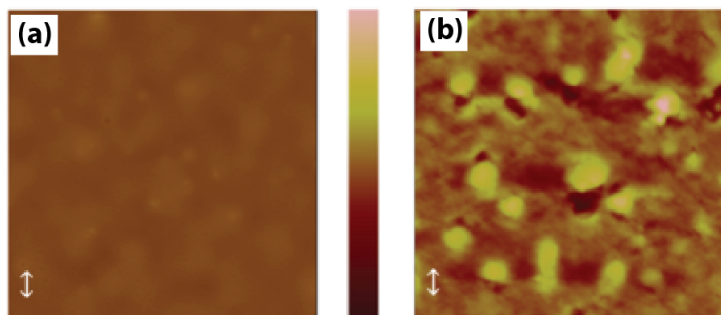


Figure S7. AFM images of strained PCDTPT:P3HT films. a) 1:1 PCDTPT:P3HT film under 25% strain. b) 1:1 PCDTPT:P3HT film under 50% strain. The scan area is 5 μm x 5 μm .

REFERENCES

1. Klauk, H.; Schmid, G.; Radik, W.; Weber, W.; Zhou, L.; Sheraw, C.D.; Nichols, J.A.; Jackson, T.N.; Contact Resistance in Organic Thin Film Transistors, *Solid-State Electron.* **2003**, *47*, 297-301.