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Supplementaty Information

Micropatterned Crystalline Organic Semiconductors via Direct Pattern Transfer Printing with PDMS Stamp

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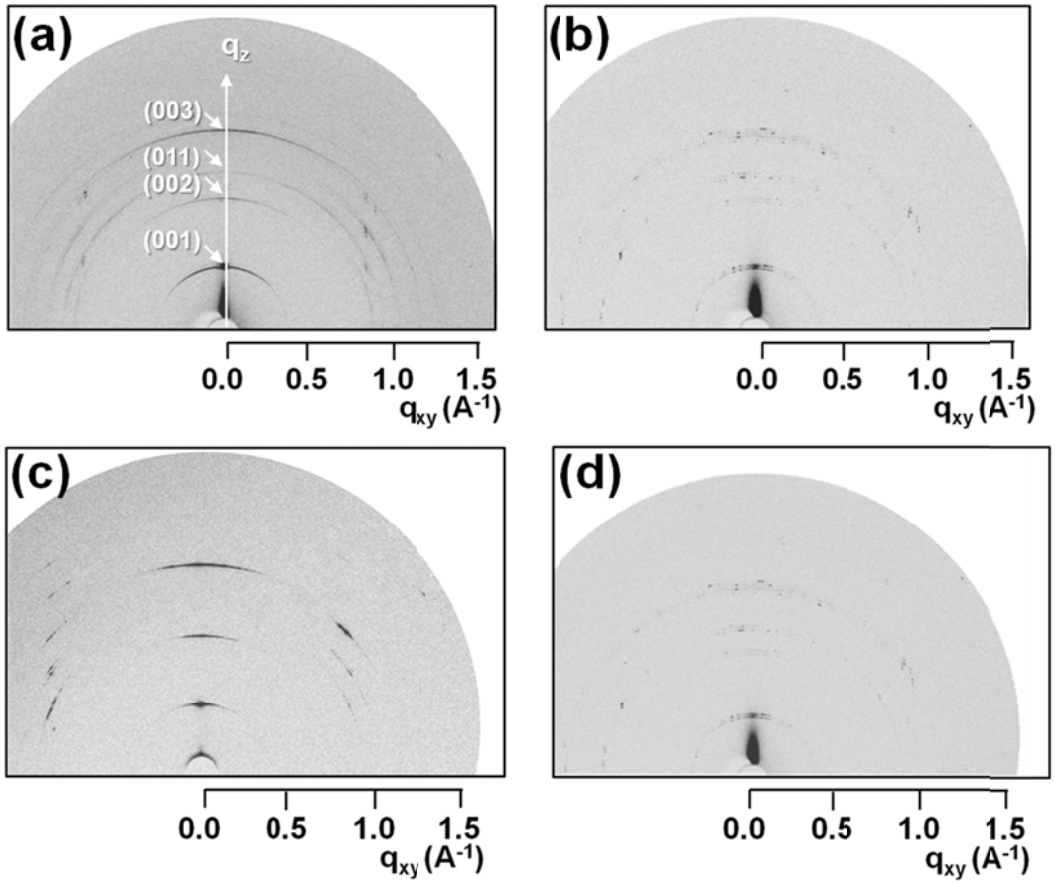

Figure S1. 2D GIXRD patterns for TIPS-PEN films obtained by conventional deposition techniques. The films prepared by spin coating with 2 wt% TIPS-PEN in toluene (a) and chlorobenzene (b), and drop casting with 1 wt% TIPS-PEN in toluene (c) and chlorobenzene (d).

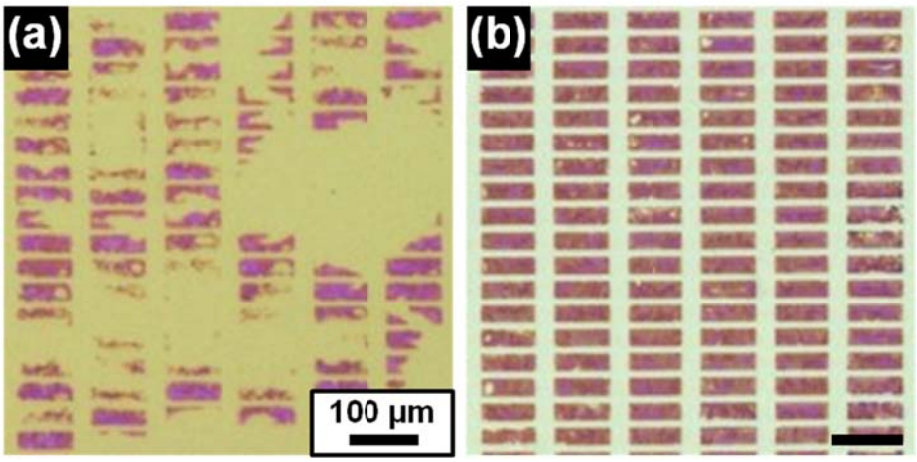

Figure S2. The optical images of the transferred TIPS-PEN films by the direct pattern transfer process with PDMS pad without glass substrate (a) and the PDMS pad attached to a glass substrate (b).

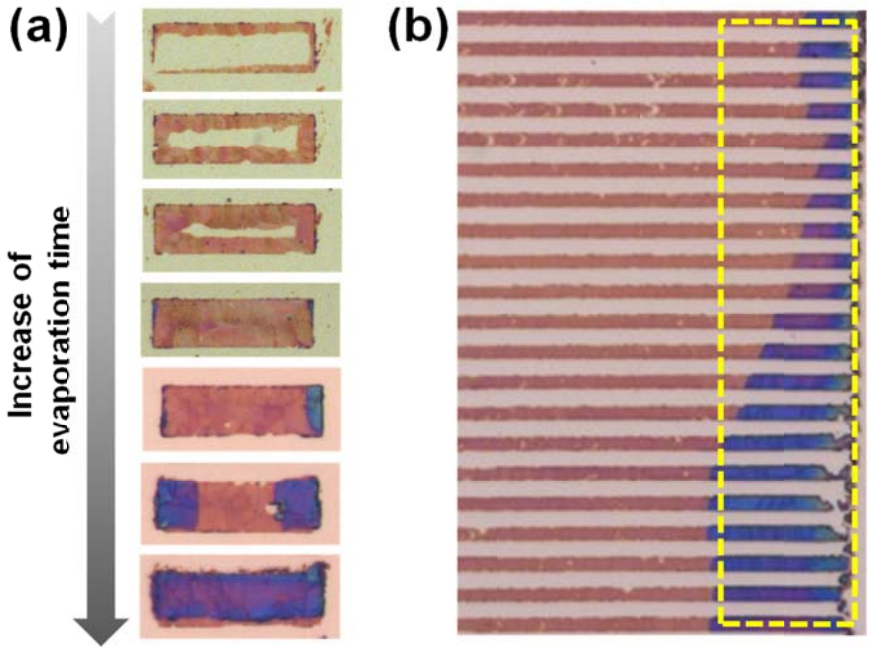

Figure S3. The degree of TIPS-PEN crystallization with the elapsed time upon solvent evaporation in rectangular patterns (~length x width dimensions of 20 x 70 μm^2) (a) and in line patterns (20 μm) (b). The nucleation and growth of organic crystalline materials prefers to occur at the edge region of patterns. Below the effective evaporation time, the TIPS-PEN crystals are mostly discovered at the pattern edge. Then, the crystal growth is dominant from the edge to center direction until the films are homogeneous. After the effective evaporation time, the nucleation and growth at the edge region are governed again, so the color of TIPS-PEN films changes to purple, and it means that the films become thicker.

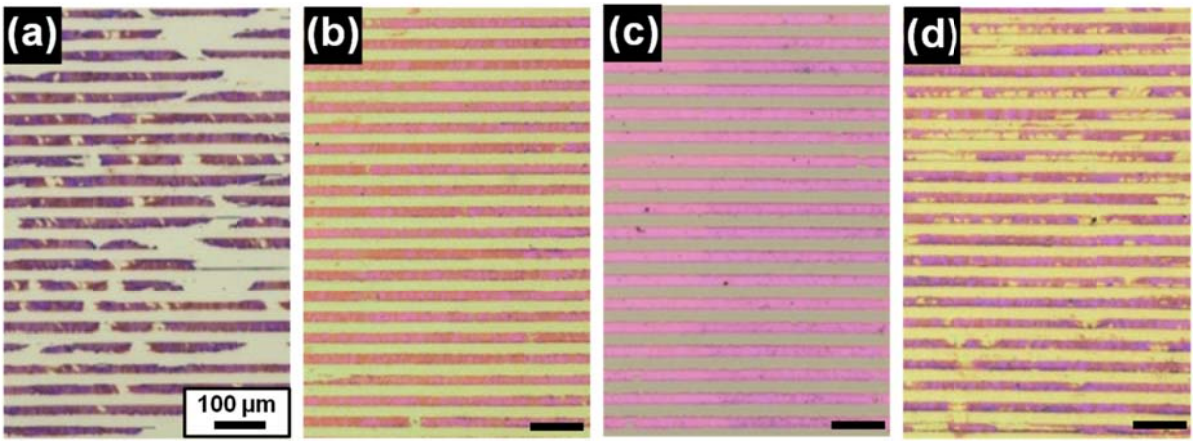

Figure S4. The optical microscopy images of the transferred TIPS-PEN patterns. When the TIPS-PEN/PDMS stamp was in conformal contact with the SiO_2 surface, the transferred TIPS-PEN micropattern was discontinuous (a). After spin coating of pure solvent (for the SiO_2 surface) (b) or PMMA solution (for the Si surface) (c), the micropatterned TIPS-PEN film became uniform and continuous. As the TIPS-PEN film was transferred on the PMMA surface after the removal of residual solvent, the line patterns were irregular and non-uniform (d).

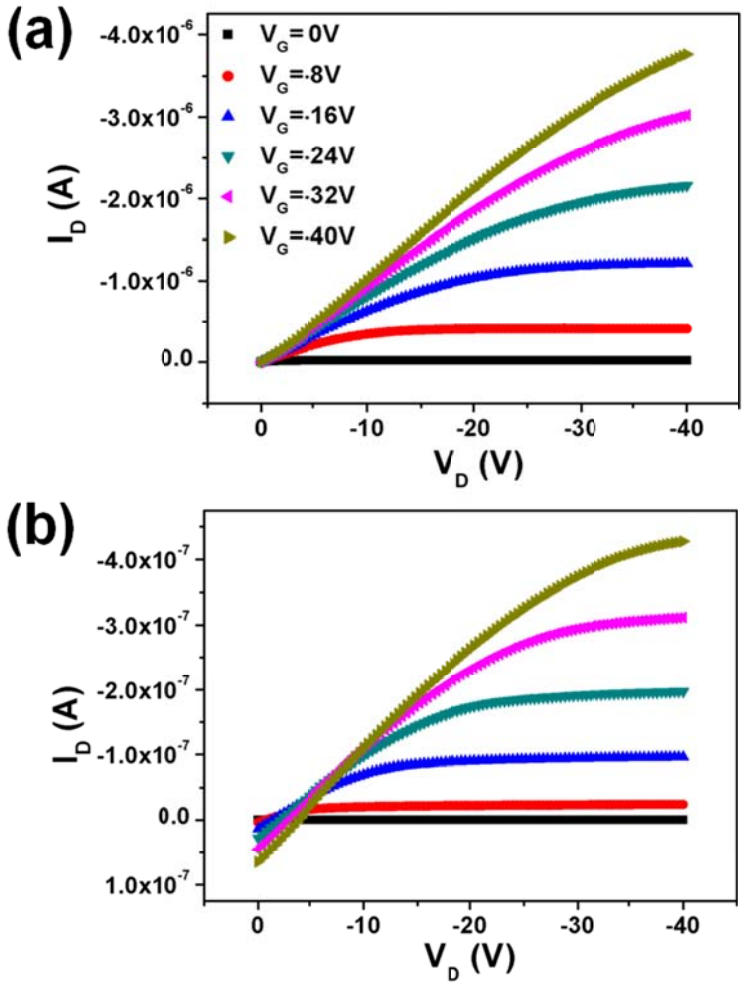

Figure S5. The output curve of the OTFTs with patterned TIPS-PEN semiconductors on SiO_2 surfaces (a) and PMMA surfaces (b), respectively.

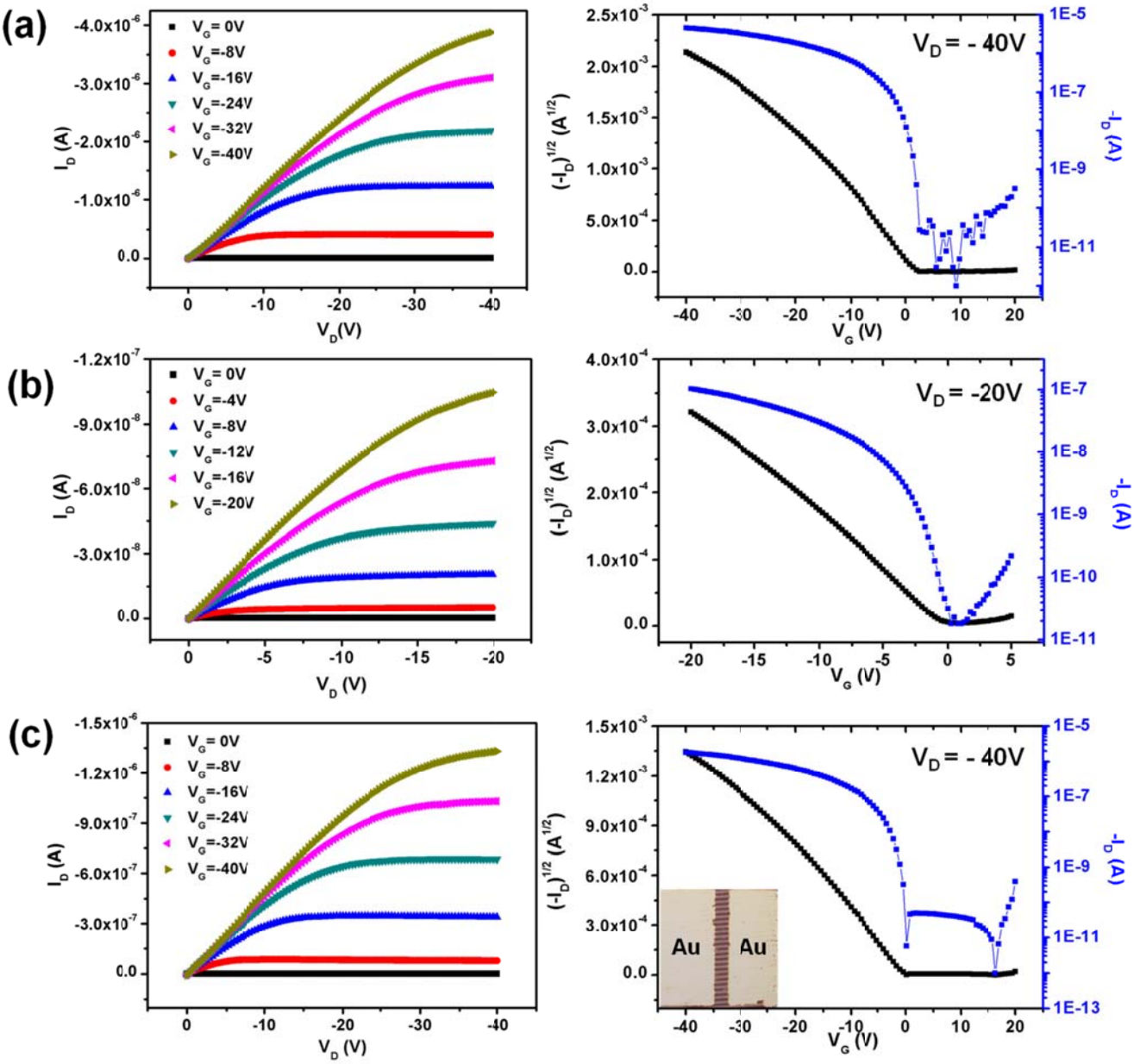

Figure S6. Output curve and transfer curve of the OTFTs with TIPS-PEN semiconductors prepared by different bottom electrode/ dielectric layer/soaking solution. (a) Si wafer/SiO_2 (after spin coating of toluene)/ 1 wt% TIPS-PEN in chlorobenzene, (b) ITO glass/PMMA/1 wt% TIPS-PEN in chlorobenzene, and (c) Si wafer/ SiO_2 layer (after spin coating of toluene)/ 1 wt% TIPS-PEN in toluene. The bottom gate, top contact OTFTs shows in the inset of transfer curve in (c).