

Supplementary Information

Improving Ternary Blend Morphology by Adding Conjugated

Molecule in Non-fullerene Polymer Solar Cells

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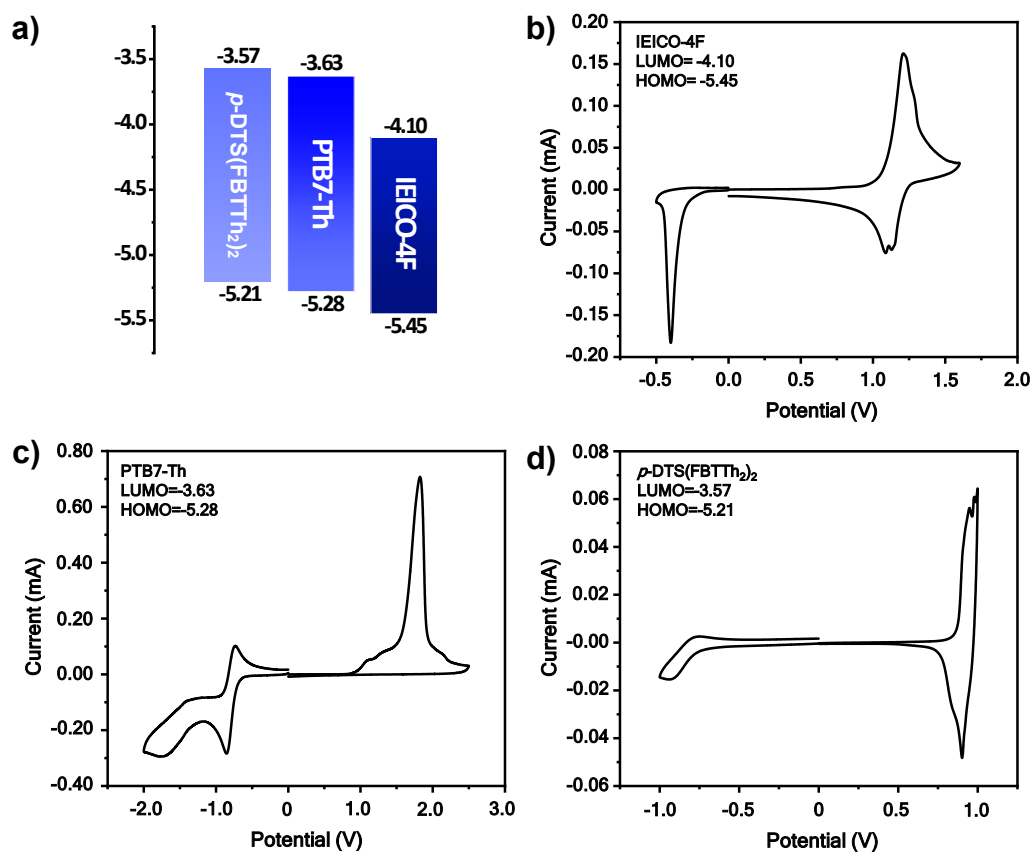


Fig S1. Energy level diagrams for IEICO-4F, PTB7-Th, and p -DTS(FBTTh₂)₂. It is obvious that the HOMO of two donors (PTB7-Th and p -DTS(FBTTh₂)₂) is almost equal, which is significantly reduce the sacrifice of V_{OC} of ternary solar cells.

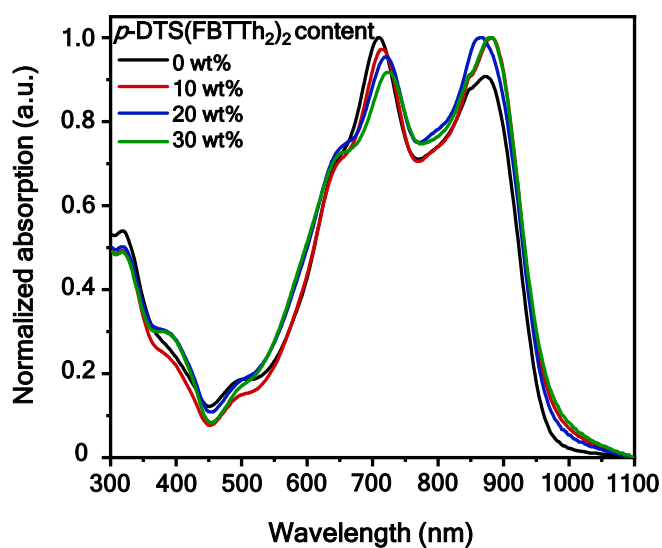


Fig S2. The Normalized absorption of blend film with different p -DTS(FBTTh₂)₂ contents.

The red shift around 700 nm is coincide with the EQE red shift in the spectra of 500-700 nm.

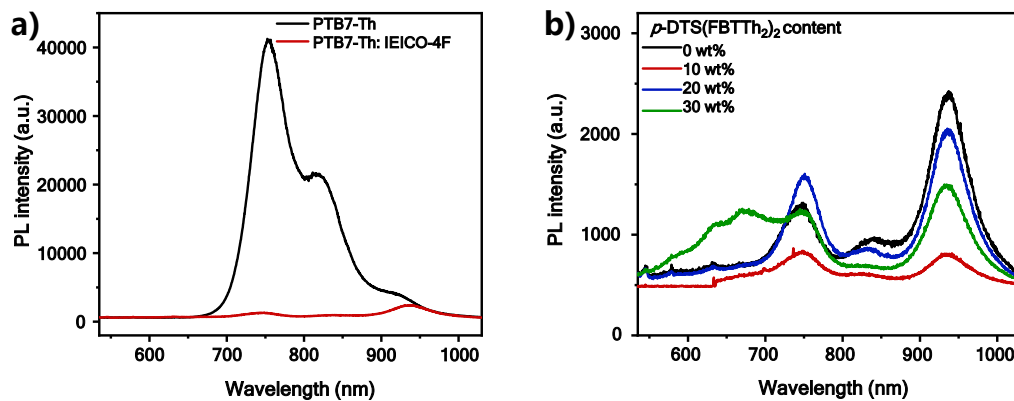


Fig S3. (a) The PL (photoluminescence) of PTB7-Th pure film and PTB7-Th: IEICO-4F blend film; (b) The PL of blend film with different p -DTS(FBTTh₂)₂ contents.

Table S1. Hole and electron mobility in PSCs with different ratio of p -DTS(FBTTh₂)₂ in the binary film.

| p -DTS(FBTTh ₂) ₂ Content (wt%) | μ_e (cm ² v ⁻¹ s ⁻¹) | μ_h (cm ² v ⁻¹ s ⁻¹) | μ_e/μ_h |
|-------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------|
| 0 wt% | 1.156*10 ⁻³ | 0.997*10 ⁻³ | 1.25 |
| 10 wt% | 2.272*10 ⁻³ | 2.029*10 ⁻³ | 1.12 |
| 20 wt% | 2.860*10 ⁻³ | 2.181*10 ⁻³ | 1.31 |
| 30 wt% | 1.761*10 ⁻³ | 1.243*10 ⁻³ | 1.42 |