Supporting Information

Improved photon-to-electron response of ternary blend organic solar cells with low band gap polymer sensitizer and interfacial modification

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Fig. S1 PCE histograms of the binary and ternary inverted PSCs with and without C3-SAM.

The PCE distribution of the binary and ternary PSCs was match up with the trend of the performance summarized in Table 1. Compared with that of the PSCs without C3-SAM modification, the device performance of the binary and ternary PSCs with C3-SAM modification showed a narrow distribution of PCE. This indicated that the C3-SAM could also improve the reproducibility of organic solar cells11.
Fig. S2 a) Schematic device structure of the conventional single junction ternary solar cells; b) J–V characteristics and c) EQE spectra of PTB7:PDTP-DFBT:PC\textsubscript{71}BM with different weight fractions of PDTP-DFBT under AM 1.5G illumination at 100 mW cm\textsuperscript{-2}.

<table>
<thead>
<tr>
<th>PTB7:PDTP-DFBT:PC\textsubscript{71}BM</th>
<th>$J_{sc}$ (mA cm\textsuperscript{-2})</th>
<th>$V_{oc}$ (V)</th>
<th>FF (%)</th>
<th>PCE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:0:1.5</td>
<td>14.25</td>
<td>0.75</td>
<td>71.18</td>
<td>7.61</td>
</tr>
<tr>
<td>0.9:0.1:1.5</td>
<td>14.49</td>
<td>0.75</td>
<td>70.96</td>
<td>7.72</td>
</tr>
<tr>
<td>0.8:0.2:1.5</td>
<td>14.44</td>
<td>0.75</td>
<td>69.55</td>
<td>7.53</td>
</tr>
<tr>
<td>0.7:0.3:1.5</td>
<td>14.35</td>
<td>0.75</td>
<td>67.47</td>
<td>7.26</td>
</tr>
</tbody>
</table>

**Table S1** Summarized solar cell parameters of the ternary PTB7:PDTP-DFBT:PC\textsubscript{71}BM blends with different weight ratios of PTB7:PDTP-DFBT conventional devices

**Conventional device fabrication**

The cleaned ITO glass substrates were spin-coated with PEDOT:PSS AL-P 4083 at 3000 rpm for 40 s, followed by heating at 140°C in air for 15 min. The PEDOT:PSS coated substrates were then transferred into a N\textsubscript{2} glovebox for further processing. In the following, 25 mg/ml PTB7:PDTP-DFBT:PC\textsubscript{71}BM (10 mg/ml for polymer and 15 mg/ml for PC\textsubscript{71}BM) solution in chlorobenzene solvent with 3% solvent additives (DIO) was
spin-cast on the PEDOT:PSS at 1400 rpm to form 110 nm thickness active layer. 0.4mg/ml PFN methanol solution was spin-cast on the active layer at 3000 rpm for 40s to form a cathode modification layer. Finally, a 10 nm Al was evaporated on the PFN in vacuum to complete the conventional devices.