

Supplementary Information

Light-induced Degradation of Fullerene in Organic Solar Cells:

A Case Study On TQ1:PC₇₁BM

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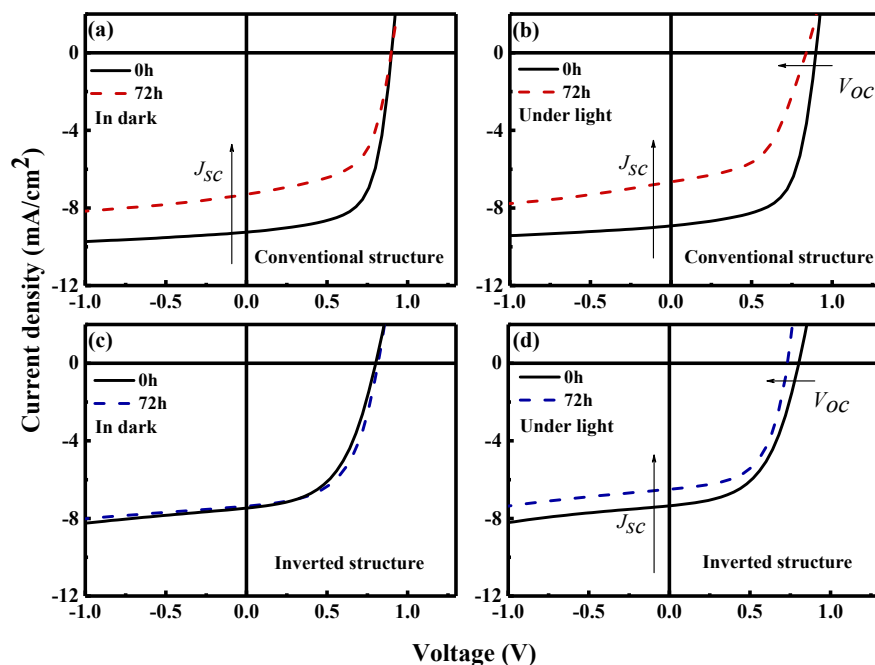


Fig. S1 Variation of I-V curve of the conventional structured device (a) in dark; (b) under light and inverted structured device (c) in dark; (d) under illumination after 72 h. The variation of respective parameters are as shown in **Table S1-4**.

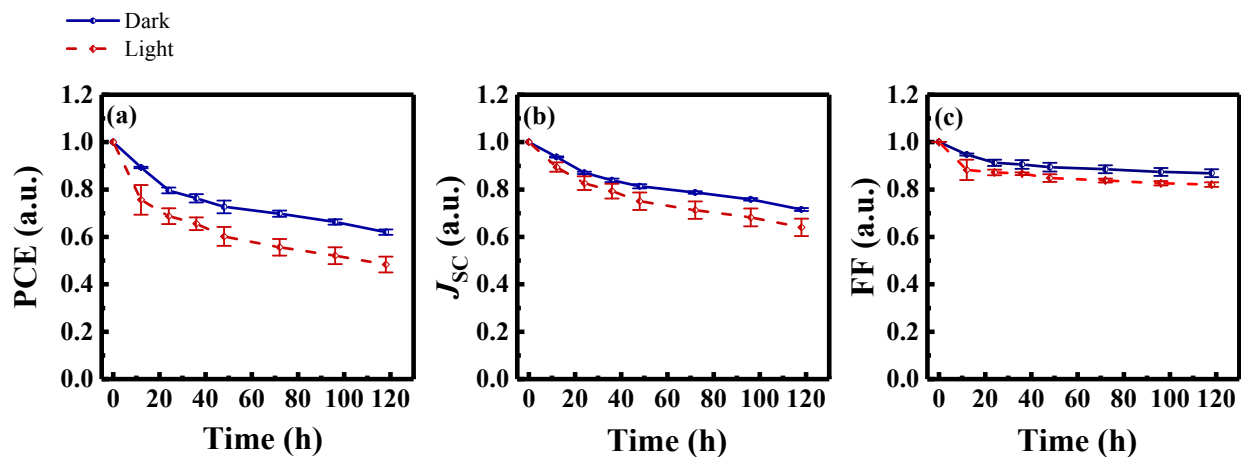


Fig. S2 Evolution of the PCE , J_{SC} and FF of the devices with conventional structure under light (dash lines) and in dark (solid lines) versus time. All the parameters are normalized to their initial values.

Table S1 Variation of aspect parameters of the conventional structured device in dark

Time (h)	J_{sc} (mA/cm ²)	FF	V_{oc} (V)	PCE (%)
0	9.24	0.654	0.90	5.44
72	7.30	0.592	0.90	3.88

Table S2 Variation of aspect parameters of the conventional structured device under light

Time (h)	J_{sc} (mA/cm ²)	FF	V_{oc} (V)	PCE (%)
0	9.21	0.636	0.90	5.26
72	6.20	0.523	0.84	2.72

Table S3 Variation of aspect parameters of the inverted structured device in dark

Time (h)	J_{sc} (mA/cm ²)	FF	V_{oc} (V)	PCE (%)
0	7.47	0.518	0.80	3.14
72	7.36	0.555	0.82	3.34

Table S4 Variation of aspect parameters of the inverted structured device under light

Time (h)	J_{sc} (mA/cm ²)	FF	V_{oc} (V)	PCE (%)
0	7.35	0.526	0.80	3.11
72	6.50	0.566	0.73	2.75

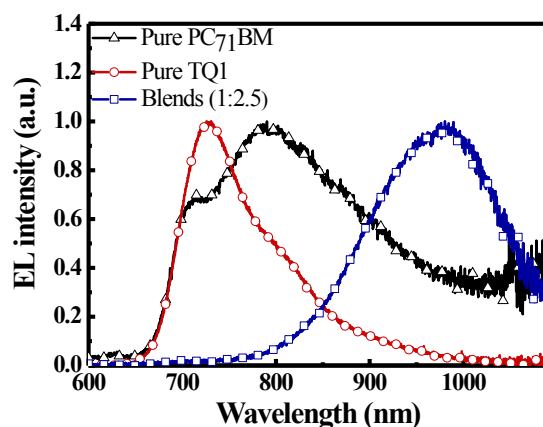


Fig. S3 EL spectrum of the devices based on pure PC₇₁BM film, pure TQ1 film and TQ1:PC₇₁BM blends film. The EL peak of TQ1:PC₇₁BM demonstrates significant red shift compared to peaks of pure TQ1 and pure PC₇₁BM, indicating that the EL of the TQ1:PC₇₁BM blends is dominated by the CT state emission.

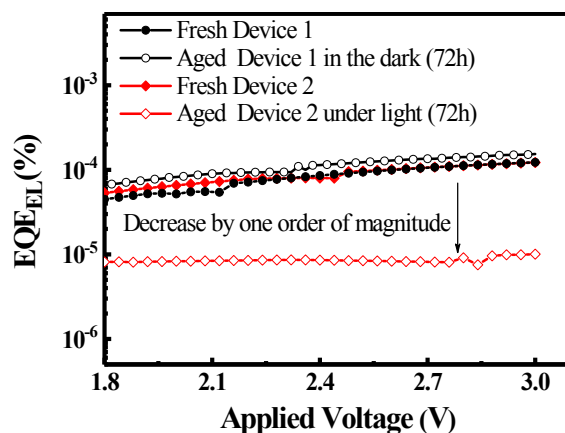


Fig. S4 Variation of EQE_{EL} curves versus applied voltage of the inverted structured devices, respectively for fresh devices (line + solid symbols), the device after 72 h storage in dark (line + black hollow symbols) and the device after 72 h illumination (line + red hollow symbols).

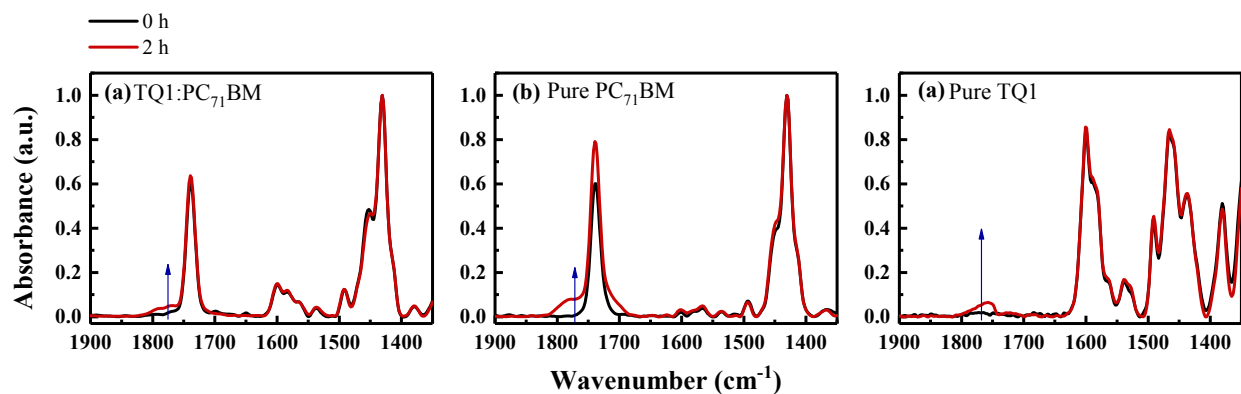


Fig. S5 FTIR measurements of the films based on (a) TQ1:PC₇₁BM (1:2.5); (b) Pure PC₇₁BM; (c) Pure TQ1; All the films are stored in the air when exposed to light; Blue arrows indicate carbonyl bands emerging due to oxidation.

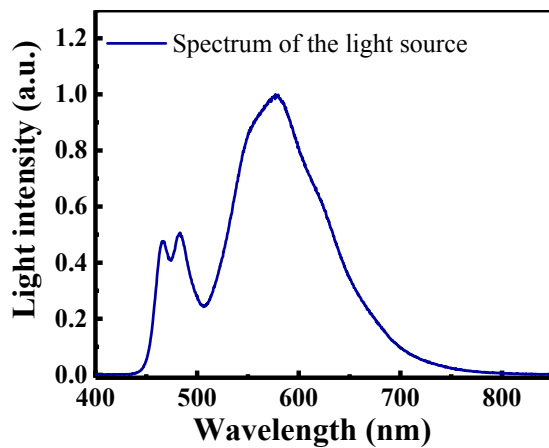


Fig. S6 Spectrum of the white LED source. It is obvious that there is no Ultraviolet light in the spectrum.