

Application of a Multifunctional Liquid Crystal Material in Colorful PEDOT:PSS/Si Heterojunction Solar Cells

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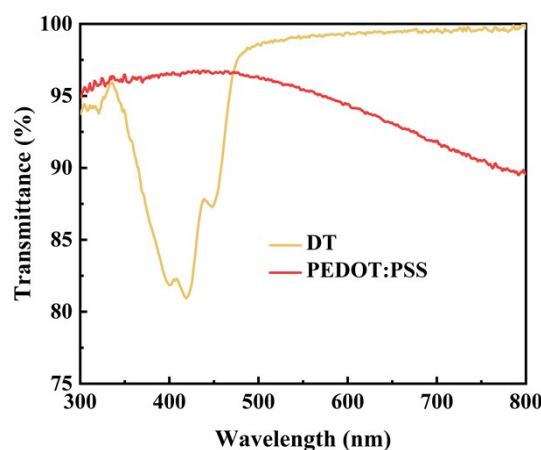


Figure S1. The transmittance spectra of DT film and PEDOT:PSS film on glass.

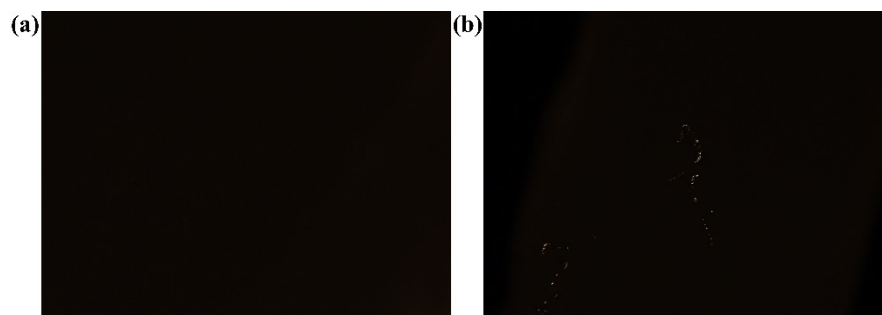


Figure S2. The images of (a) PEDOT:PSS film and (b) PEDOT:PSS+DT film by polarizing optical microscopy.

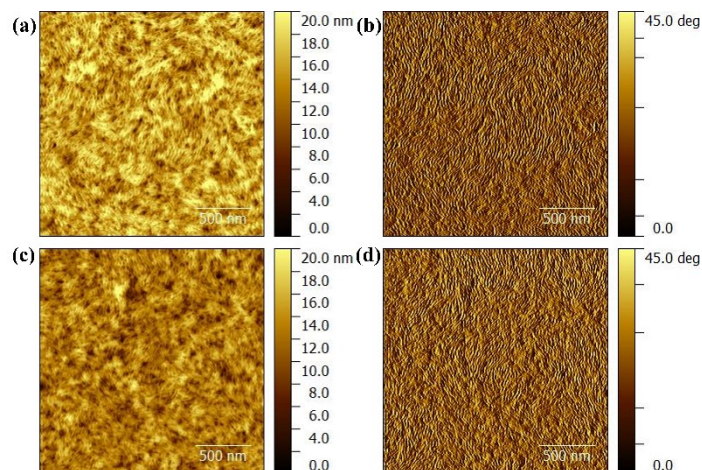


Figure S3. (a) AFM morphology and (b) phase images of PEDOT:PSS film. (c) AFM morphology and (d) phase images of PEDOT:PSS+DT film.

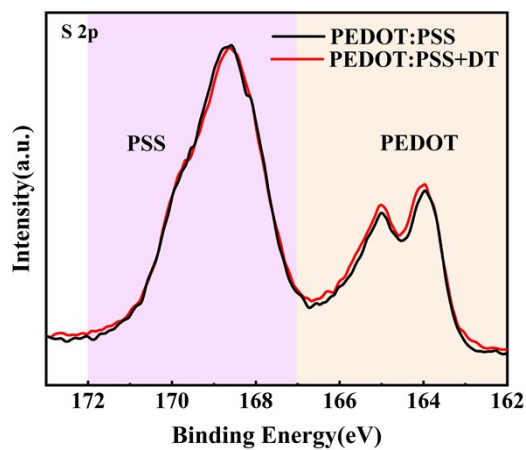


Figure S4. XPS spectra in the S 2p regions of PEDOT:PSS film and PEDOT:PSS+DT films.

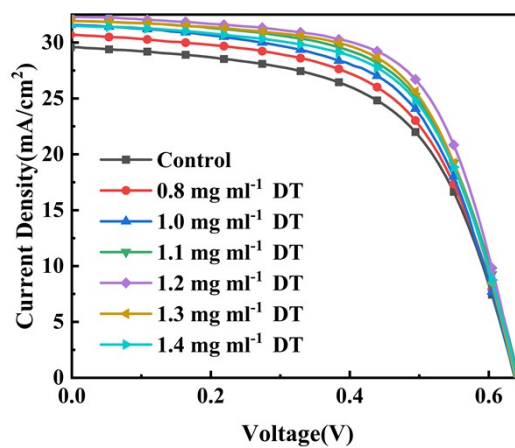
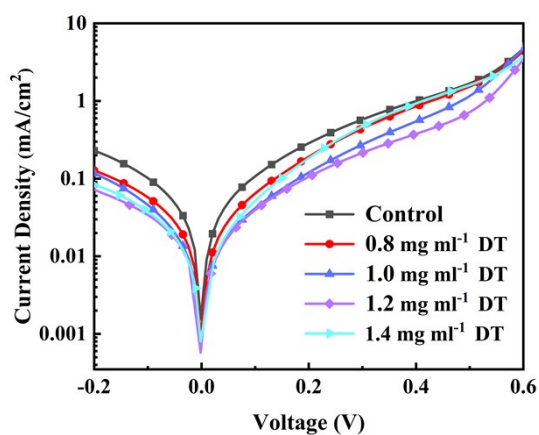


Figure S5. The J–V curves of devices with different concentrations of DT solution under 100 mW cm⁻² illumination (AM 1.5).

Table S1

Photovoltaic parameters of the champion devices with and without adding DT.

Devices	J_{SC} (mA cm ⁻²)	V_{OC} (mV)	FF (%)	PCE (%)
Control	29.59	0.638	58.45	11.03
0.8 mg ml ⁻¹	30.70	0.639	58.84	11.56
1.0 mg ml ⁻¹	31.57	0.637	59.88	12.05
1.1 mg ml ⁻¹	31.94	0.643	61.38	12.61
1.2 mg ml ⁻¹	32.28	0.640	64.11	13.24
1.3 mg ml ⁻¹	31.93	0.638	62.85	12.81
1.4 mg ml ⁻¹	31.50	0.641	61.55	12.42

**Figure S6.** The dark J–V curves of devices with different concentrations of DT solution.**Table S2**The n and J_0 of optimized control device and DT-added device.

Samples	n	J_0 (A cm ⁻²)
Control device	2.59	5.73×10^{-4}
DT-added device	1.87	8.04×10^{-6}

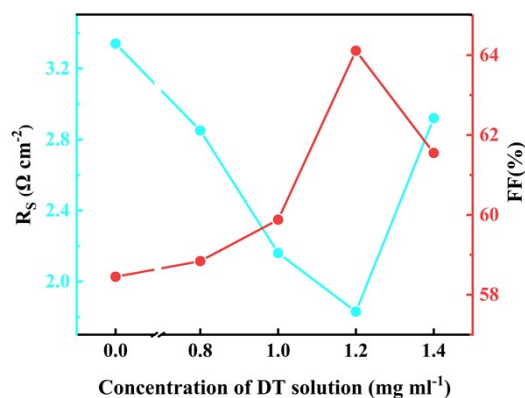


Figure S7. The R_s and FF of devices with different concentrations of DT solution.

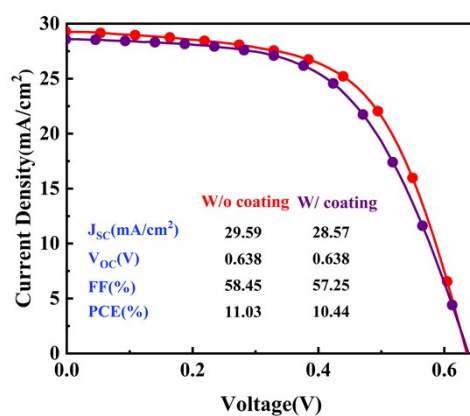


Figure S8. J–V curves of the devices with a configuration of Al/Si/PEDOT:PSS/Ag/DT (W/ coating) and Al/Si/PEDOT:PSS/Ag (W/o coating) .

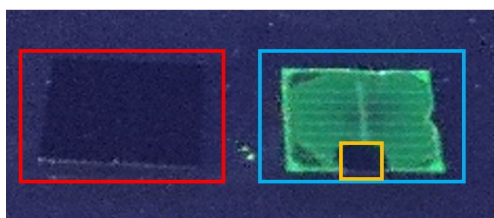


Figure S9. The image of devices without (red line) and with (cyan line) DT coating irradiated under UV lamp. The DT film covered on the square electrode of Ag-grids (yellow line) was erased with THF for testing performance of devices.