Short Communication

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D18, an eximious solar polymer!

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SUPPORTING INFORMATION

1. Device fabrication and measurements

A 30 nm thick PEDOT:PSS layer was made by spin-coating an aqueous dispersion onto ITO glass (4000 rpm for 30 s). PEDOT:PSS substrates were dried at 150 °C for 10 min. A D18:N3 (1 : 1.6, 12.5 mg/mL) blend in chloroform (CF) with 0.15 vol% CN additive was spin-coated onto PEDOT:PSS layer. PDIN (2 mg/mL) in MeOH:AcOH (1000 : 3) was spin-coated onto active layer (5000 rpm for 30 s). Ag (~80 nm) was evaporated onto PDIN through a shadow mask (pressure ca. 10^{-4} Pa). The effective area for the devices is 4 mm^2. The thicknesses of the active layers were measured by using a KLA Tencor D-120 profilometer. *J–V* curves were measured by using a computerized Keithley 2400 SourceMeter and a Xenon-lamp-based solar simulator (Enli Tech, AM 1.5G, 100 mW/cm^2). The illumination intensity of solar simulator was determined by using a monocrystalline silicon solar cell (Enli SRC2020, 2 × 2 cm^2) calibrated by the National Institute of Metrology (NIM). The external quantum efficiency (EQE) spectra were measured by using a QE-R3011 measurement system (Enli Tech). The best cells were further tested at NIM for certification. A metal mask with an aperture (2.580 mm^2) was used to define the effective area.

2. Optimization of device performance

Table S1. Optimization of D/A ratio for D18:N3 solar cells[a].

D/A (w/w)	V_{oc} (V)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)
1 : 0.8	0.855	25.90	71.9	15.93 (15.49)[b]
1 : 1.2	0.854	26.64	75.6	17.21 (17.13)
1 : 1.6	0.854	26.52	77.4	17.53 (17.45)
1 : 2	0.855	26.23	74.4	16.68 (16.58)

[a]Blend solution: 12.5 mg/mL in CF; spin-coating: 4500 rpm for 30 s.
[b]Data in parentheses stand for the average PCEs for 10 cells.

Table S2. Optimization of the active layer thickness for D18:N3 solar cells[a].

Thickness (nm)	V_{oc} (V)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)
143	0.847	27.21	76.2	17.56 (17.51)[b]
121	0.848	27.35	76.9	17.83 (17.78)
112	0.849	26.59	78.1	17.62 (17.46)
105	0.853	26.52	77.4	17.53 (17.45)
95	0.855	26.18	77.5	17.36 (17.09)

[a]D/A ratio: 1:1.6 (w/w); blend solution: 12.5 mg/mL in CF.
[b]Data in parentheses stand for the average PCEs for 10 cells.

Table S3. Optimization of CN content for D18:N3 solar cells[a].

CN (vol%)	V_{oc} (V)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)
0	0.848	27.35	76.9	17.83 (17.78)[b]
0.1	0.859	27.34	77.5	18.21 (18.06)
0.15	0.862	27.44	78.5	18.56 (18.30)
0.2	0.869	26.49	78.4	18.05 (17.97)
0.25	0.876	25.96	77.9	17.70 (17.62)

[a]D/A ratio: 1 : 1.6 (w/w); blend solution: 12.5 mg/mL in CF; spin-coating: 3500 rpm for 30 s.
[b]Data in parentheses stand for the average PCEs for 10 cells.

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3. *J–V*

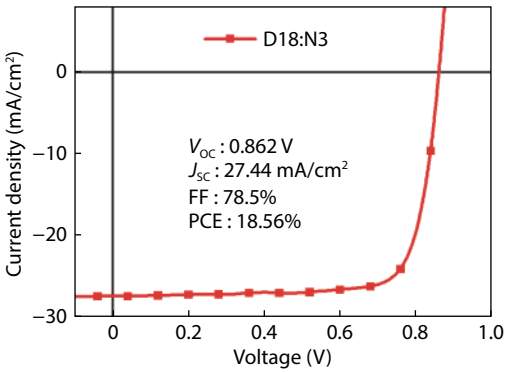

Fig. S1. The *J–V* curve for D18:N3 solar cells.

4. EQE

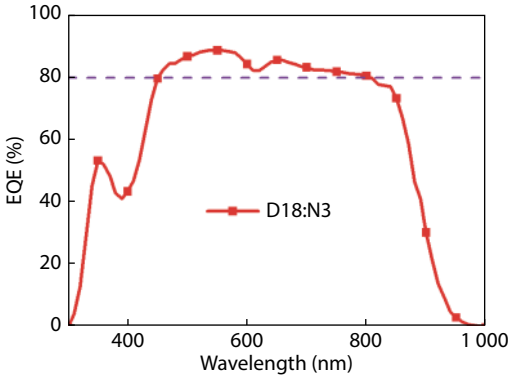

Fig. S2. The EQE spectrum for D18:N3 solar cells.