Electronic Supplementary Information for a paper in New Journal of Chemistry

Efficient and stable planar perovskite solar cells with carbon quantum dots doped PCBM electron transport layer

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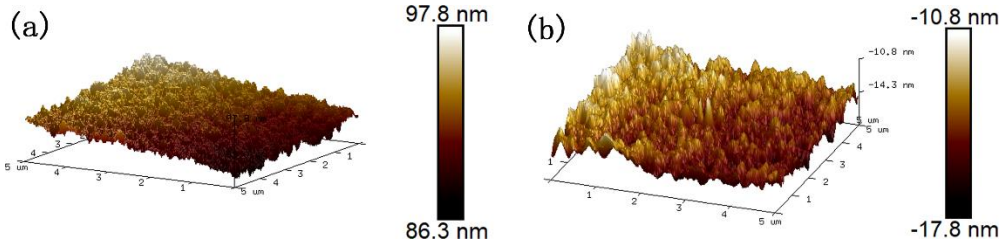

Figure S1. AFM images of (a) ITO/PCBM and (b) ITO/PCBM: CQDs film respectively.

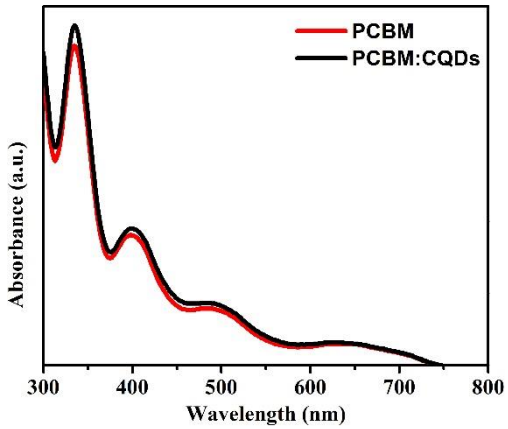

Figure S2. The UV-vis absorption spectra of PCBM and PCBM:CQDs films respectively.

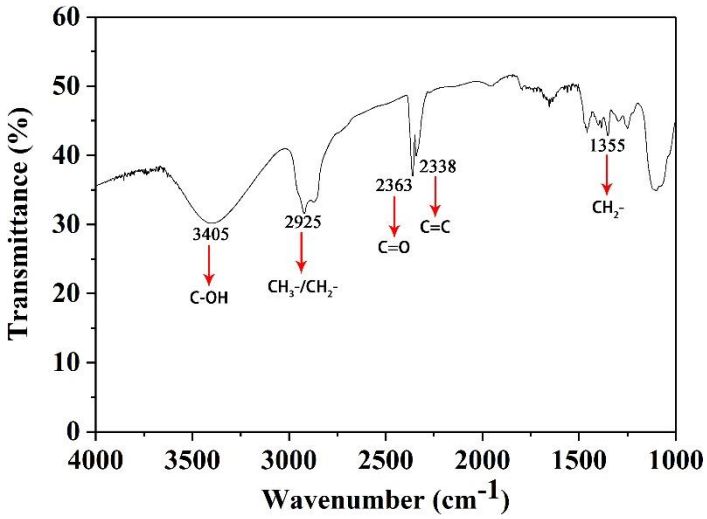

Figure S3. FT-IR spectrum of CQDs.

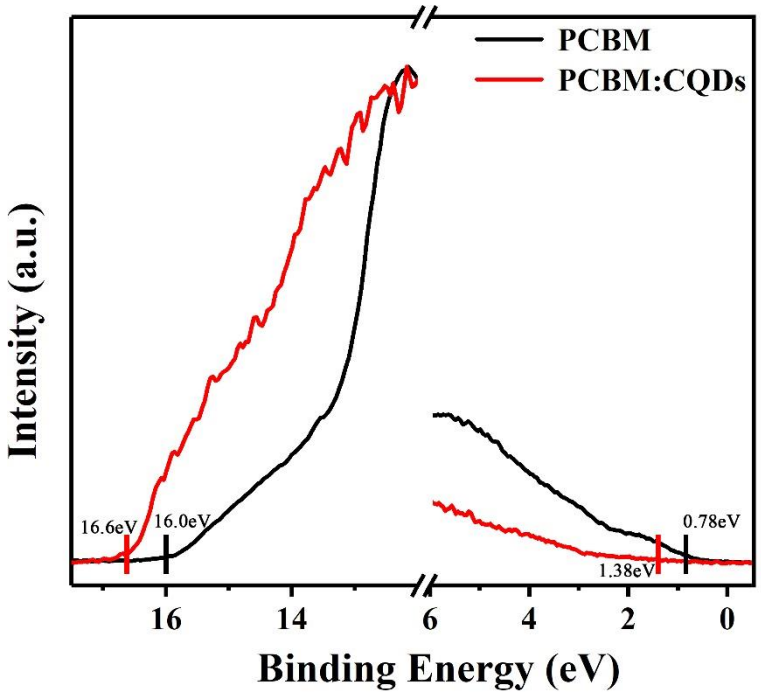

Figure S4. UPS spectra of PCBM and PCBM:CQDs films respectively.

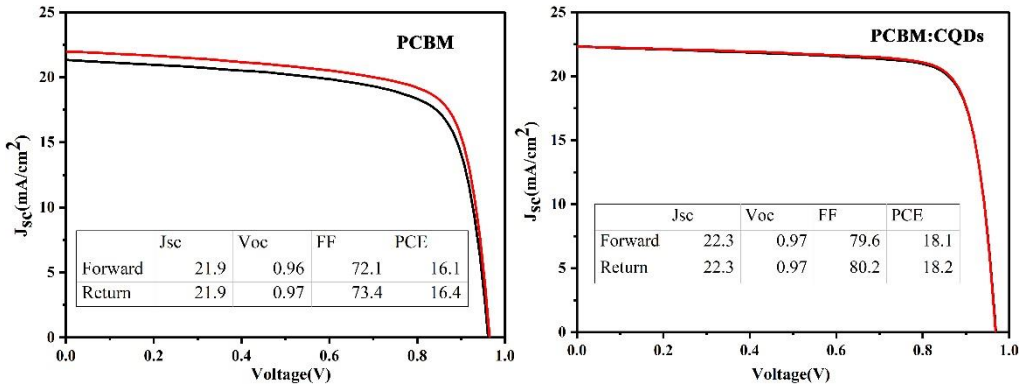

Figure S5. J-V curves of pure PCBM and PCBM: CQDs based solar cells respectively.

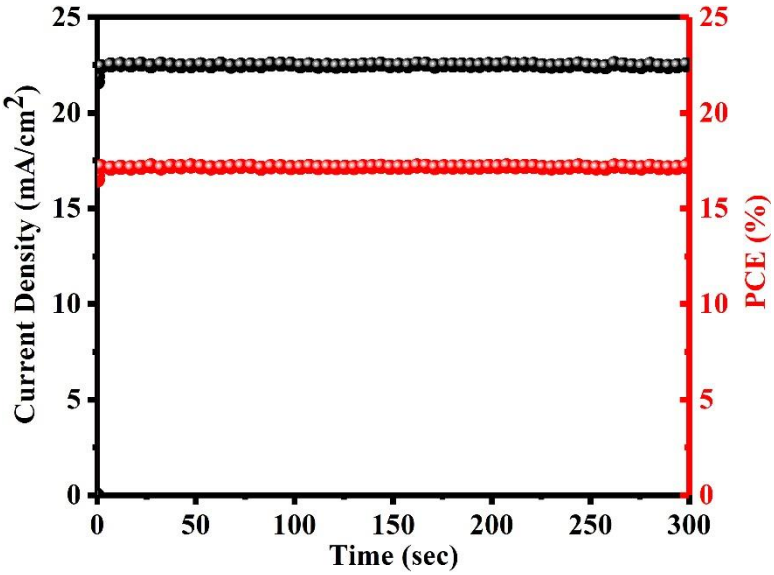

Figure S6. The steady-state photocurrent and output PCE of solar cells under one-sun illumination.

Table S1. The key parameters of TRPL spectra fitting.

	τ_1/ns	A_1/%	τ_2/ns	A_2/%	τ_{avg}/ns
PCBM	14.61	24.51	128.63	75.49	100.70
PCBM:CQDs	10.04	20.35	20.89	79.65	18.72
Perovskite	245.46	21.60	1308.38	78.4	1078.78

Table S2. The fitted parameters of EIS measurements.

	PCBM	PCBM:CQDs
R_s/Ω	7.06	5.31
R_{rec}/Ω	1765	2326