Supporting Information

Low Cost Copper Nanostructures Impart High Efficiencies to Quantum Dot Solar Cells

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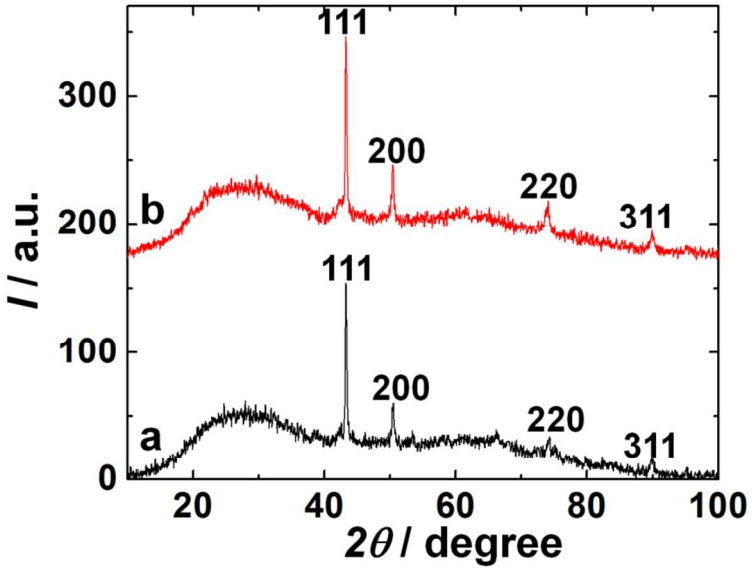

Figure S1 XRD patterns of (a) Cu NPs and (b) Cu NNs.

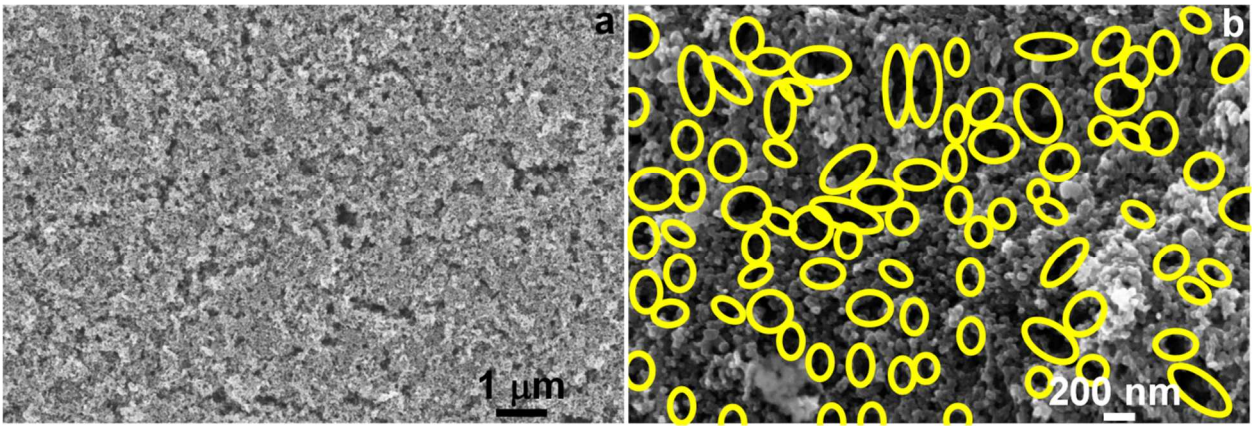

Figure S2 (a) Low and (b) high magnification FE-SEM images of a TiO_2/CdS electrode; the ellipses/circles in (b) enclose the pores present in the film.

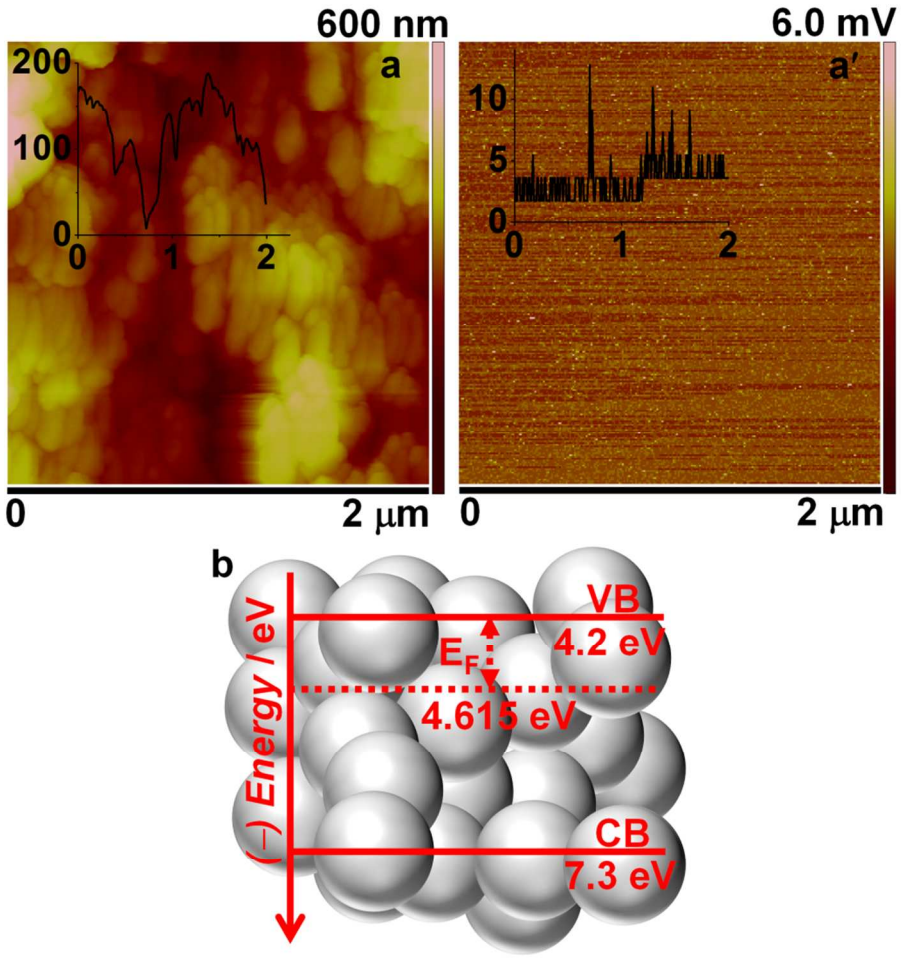

Figure S3 (a) Topography and (b) surface potential maps of a pristine TiO_2 electrode and (c) schematic of the energy levels of pristine TiO_2. Insets of (a) and (b) are the corresponding section profiles.

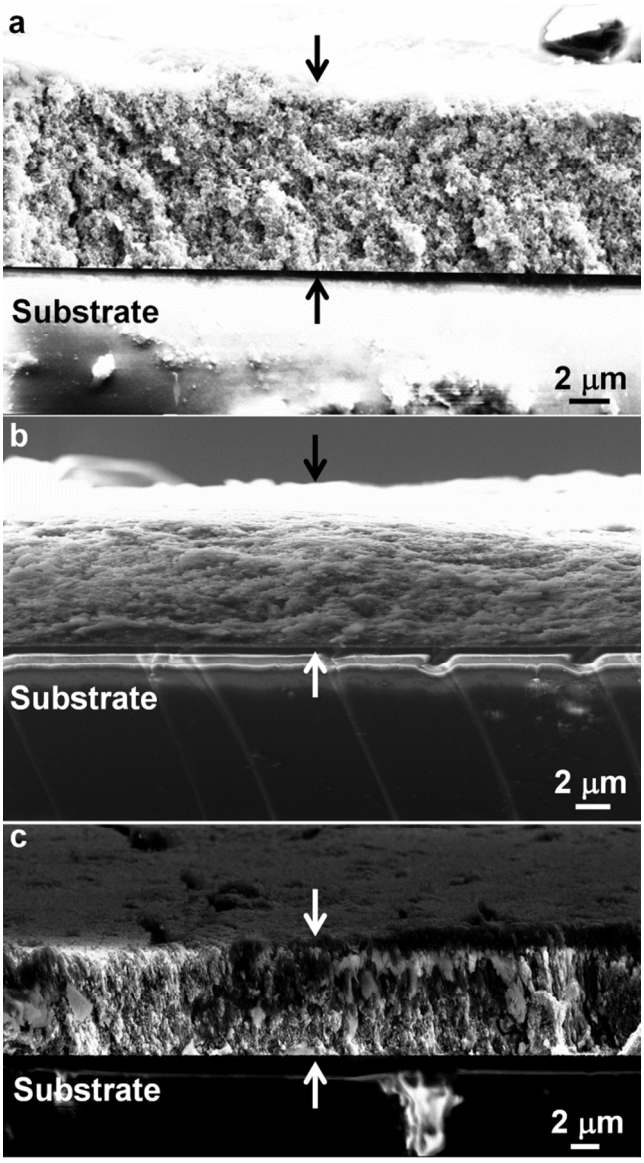

Figure S4 Cross-sectional SEM views of (a) TiO_2/CdS, (b) TiO_2/CdS/Cu NPs and (c) TiO_2/CdS/Cu NNs electrodes.

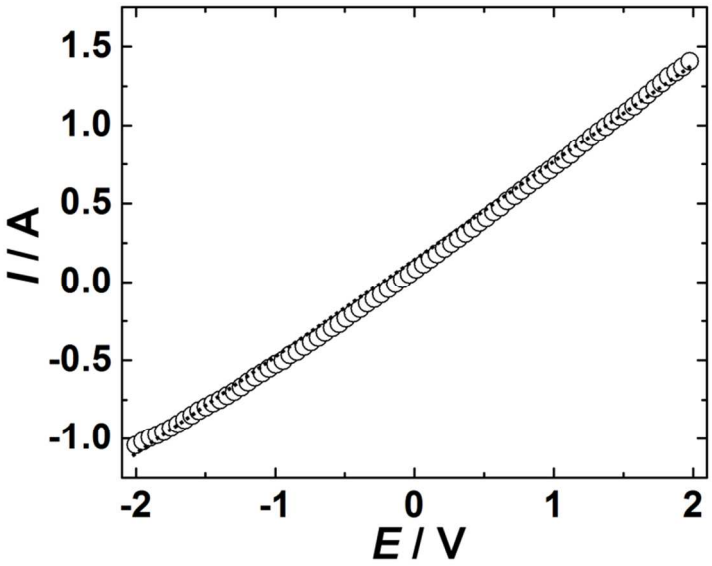

Figure S5 Linear sweep voltammogram of carbon fabric (current collector); the dotted line is the linear fit used for determining conductance (G) using G =1/R = I/V (slope).

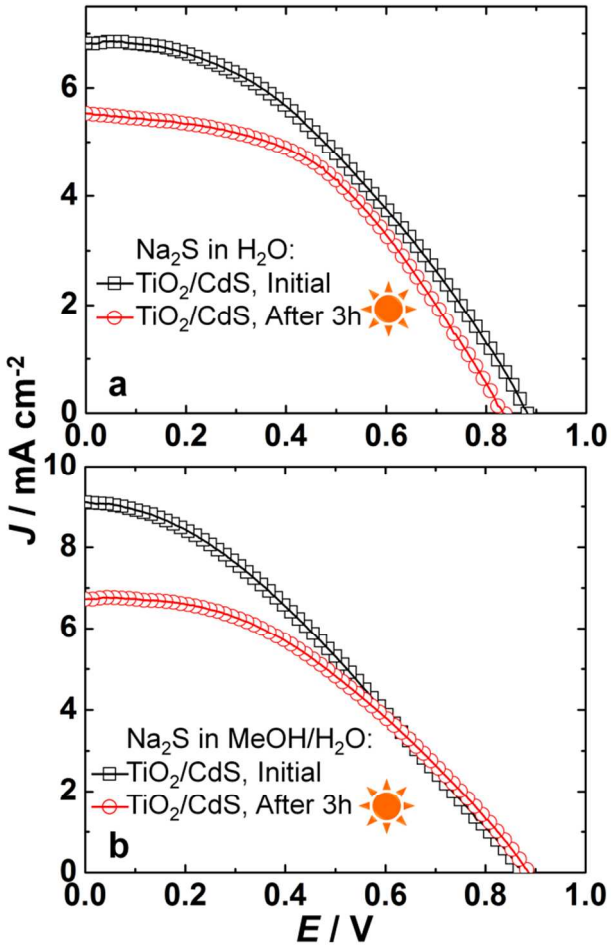

Figure S6 J-V characteristics of QDSCs with a TiO_2/CdS film as the photoanode and a carbon fabric as the counter electrode, measured under 1 sun illumination (AM 1.5G spectrum): (a) in a 0.1 M Na_2S solution in deionized water, and (b) in a 0.1 M Na_2S solution in 3:7 v/v of water: methanol.

Table S1 Solar cell parameters for QDSCs based on a TiO_2/CdS photoanode in different electrolytes.

Electrolyte type	V_{OC} (mV)	J_{SC} (mA cm^{-2})	FF	η (%)
Initial (0.1 M Na_2S/H_2O)	879	6.813	0.39	2.387
After 3 h (0.1 M Na_2S/H_2O)	836	5.532	0.46	2.146
Initial (0.1 M Na_2S in MeOH:H_2O)	869	9.06	0.33	2.67
After 3 h (0.1 M Na_2S in MeOH:H_2O)	883	6.74	0.40	2.41

Table S2 Solar cell parameters of cells by considering standard deviation using 0.1 M Na_2S electrolyte, exposed cell area: 0.12 to 0.15 cm^2, under 1 sun illumination (AM1.5G, 100 mW cm^{-2}) with the listed photoanodes; all cells with a carbon fabric as the counter electrode.

Photoanode	V_{OC} (mV)	J_{SC} (mA cm^{-2})	FF	η (%)
TiO_2/CdS	863.25 ± 13.6	8.03 ± 0.04	0.392 ± 0.001	2.715 ± 0.065
TiO_2/CdS/Cu NPs	886 ± 5.0	8.60 ± 0.06	0.415 ± 0.015	3.15 ± 0.15
TiO_2/CdS/Cu NNs	916.2 ± 3.3	9.84 ± 0.18	0.465 ± 0.0002	4.23 ± 0.13

Table S3 Stability test for cells based on TiO_2/CdS/Cu NNs containing 0.1 M Na_2S as electrolyte and a carbon fabric as the counter electrode.

Photoanode	V_{OC} (mV)	J_{SC} (mA cm^{-2})	FF	η (%)
TiO_2/CdS/Cu NNs (As-fabricated)	919.50	10.02	0.47	4.36
TiO_2/CdS/Cu NNs (As-fabricated)	913.00	9.70	0.465	4.1
TiO_2/CdS/Cu NNs (4.36% Cell: After exposure to discontinuous 1 sun illumination for 3 h)	863.25	8.625	0.45	3.345
TiO_2/CdS/Cu NNs (4.1% Cell: After storage in dark for 1 month)	868.45	9.21	0.44	3.51