

Supplementary Information of

Remarkable enhancement of photovoltaic performance of ZnO/CdTe core-shell nanorod array solar cells through interface passivation with TiO₂ layer

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Table S1. Summarized data of short-circuit current density (J_{sc}), open-circuit voltage (V_{oc}), fill factor (FF), and overall power conversion efficiency (η) of ZnO/TiO₂/CdTe core-shell nanorod array solar cells with 0, 0.5, 1, 2, 4nm TiO₂ interfacial layer.

TiO ₂ thickness (nm)	J_{sc} (mA/cm ²)	V_{oc} (mV)	FF (%)	η (%)
0	4.74±0.59	165±9	30.5±0.7	0.24±0.04
0.5	6.28±1.24	267±14	32.6±1.3	0.55±0.13
1	5.57±1.22	379±97	33.3±4.4	0.68±0.20
2	5.78±0.62	602±15	40.1±6.4	1.38±0.17
4	5.66±0.22	627±13	40.5±2.7	1.44±0.14

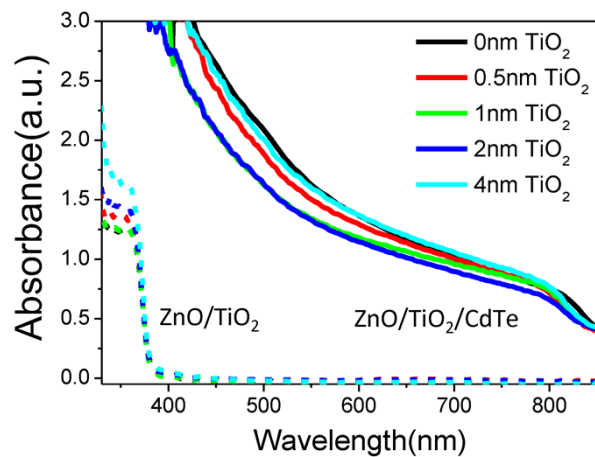


Fig. S1 UV-Vis absorbance spectra of the bare ZnO, ZnO/TiO₂ (with 0.5, 1, 2, 4nm thickness), annealed ZnO/CdTe and ZnO/TiO₂(0.5, 1, 2, 4nm)/CdTe NR arrays.

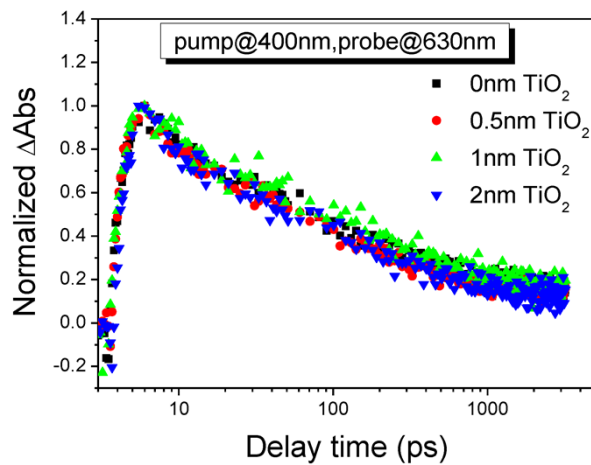


Fig. S2 Ultrafast transient absorption spectra of the annealed ZnO/TiO₂ (0, 0.5, 1, 2nm)/CdTe NR arrays.

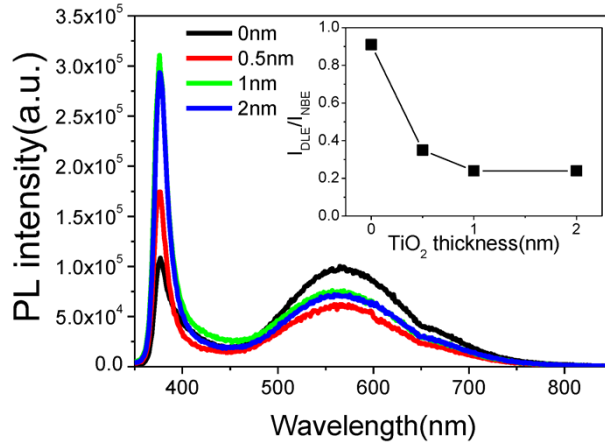


Fig. S3 Photoluminescence spectra of the bare ZnO and ZnO/TiO₂ (0.5, 1, 2nm) NR arrays.

Table S2. Series resistance R_s , shunt resistance R_{sh} , capacitance C and electron lifetime t_n were obtained from impedance spectra.

TiO ₂ thickness (nm)	R_s (ohm)	R_{sh} (ohm)	f_c (Hz)	C (nF)	t_n (ms)
0	110	54k	371.1	7.95	0.43
0.5	60	110k	69.75	20.8	2.28
1	30	220k	17.44	41.5	9.13
2	40	390k	2.55	160.1	62.4
4	1300	240k	9.8	67.7	16.2

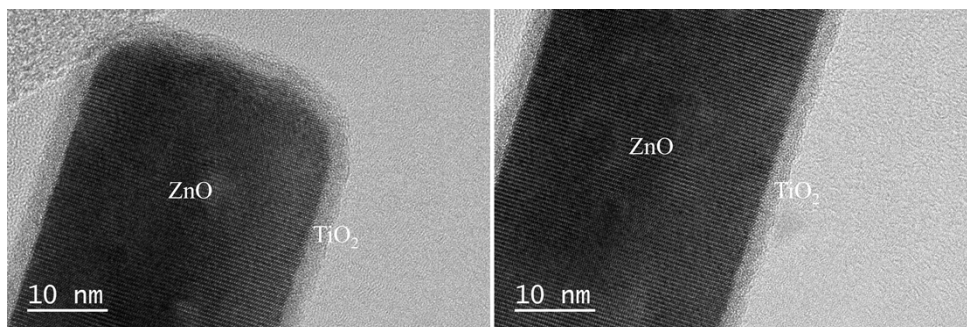


Fig. S4 High-resolution TEM images of 400°C annealed ZnO/TiO₂ NR.