Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary information

Densely packed zinc sulfide nanoparticles on TiO_2 for hindering electron recombination in dye-sensitized solar cells

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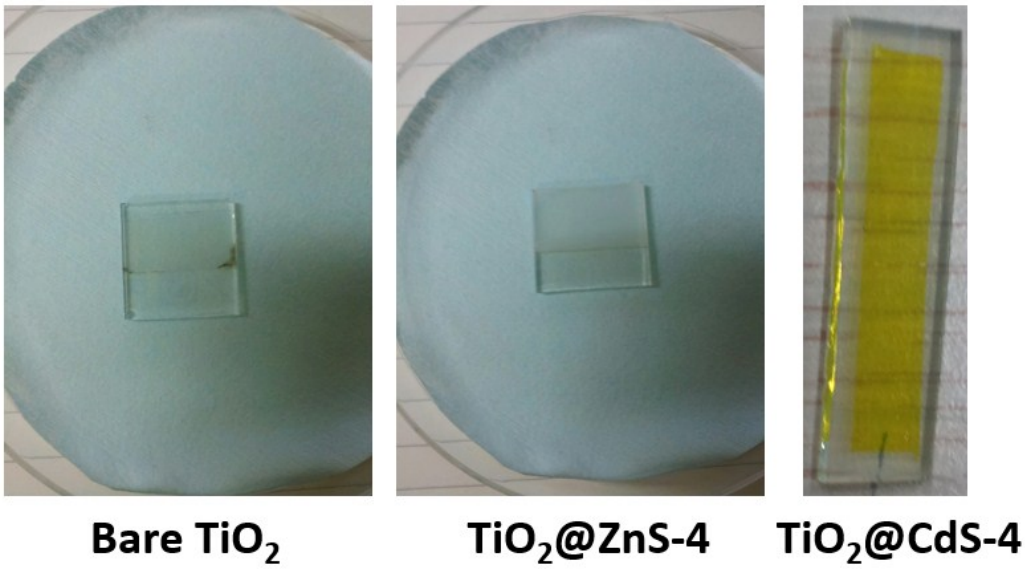

Fig. S1 Colors of the nanocrystalline TiO_2 films: (a) the bare TiO_2, (b) the TiO_2@ZnS-4 film and (c) the TiO_2@CdS-4 film.

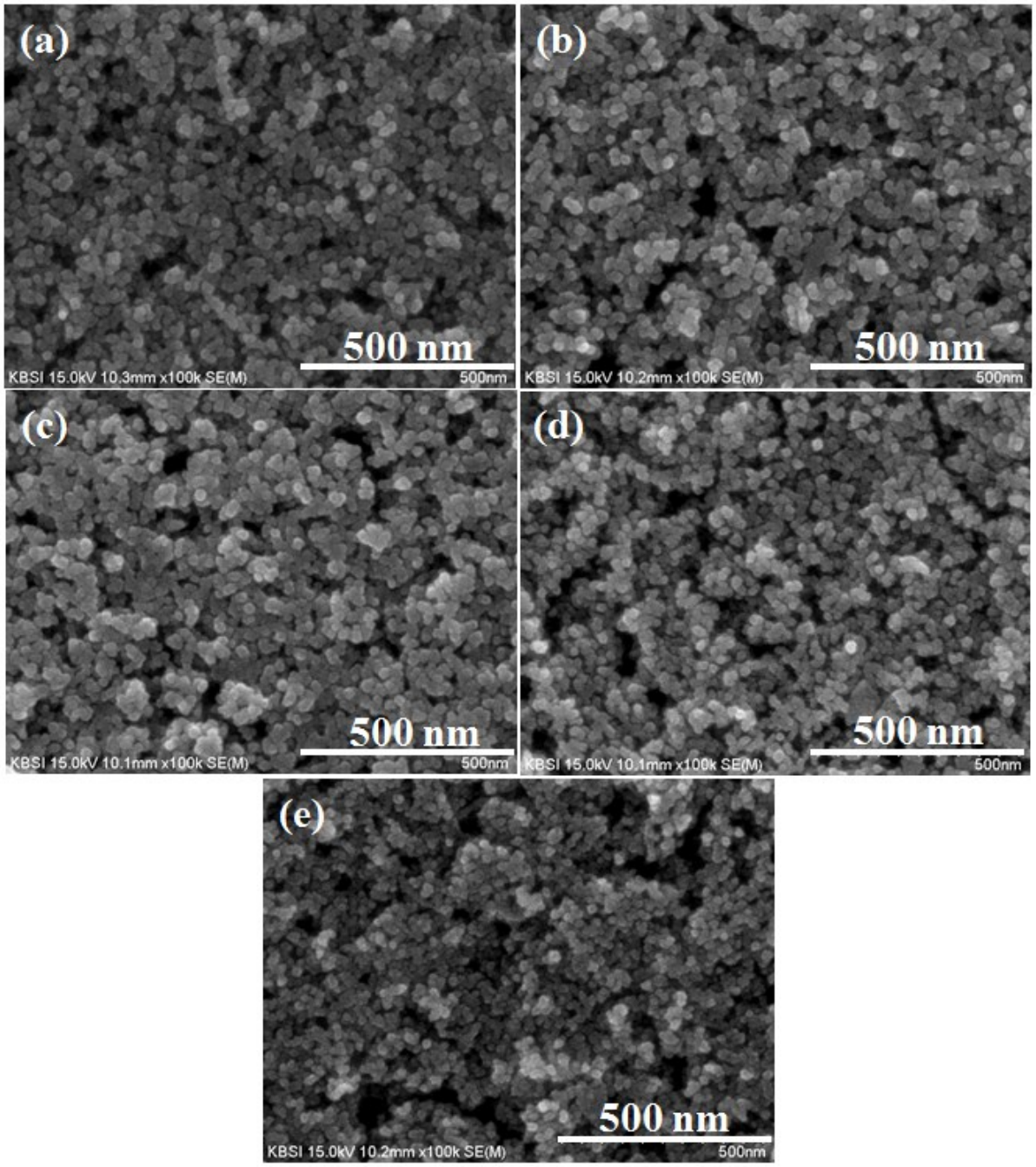

Fig. S2 SEM images of (a) TiO_2@CdS-1, (b) TiO_2@CdS-2, (c) TiO_2@CdS-3, (d) TiO_2@ZnS-1 and (e) TiO_2@ZnS-2 electrodes on FTO substrates.

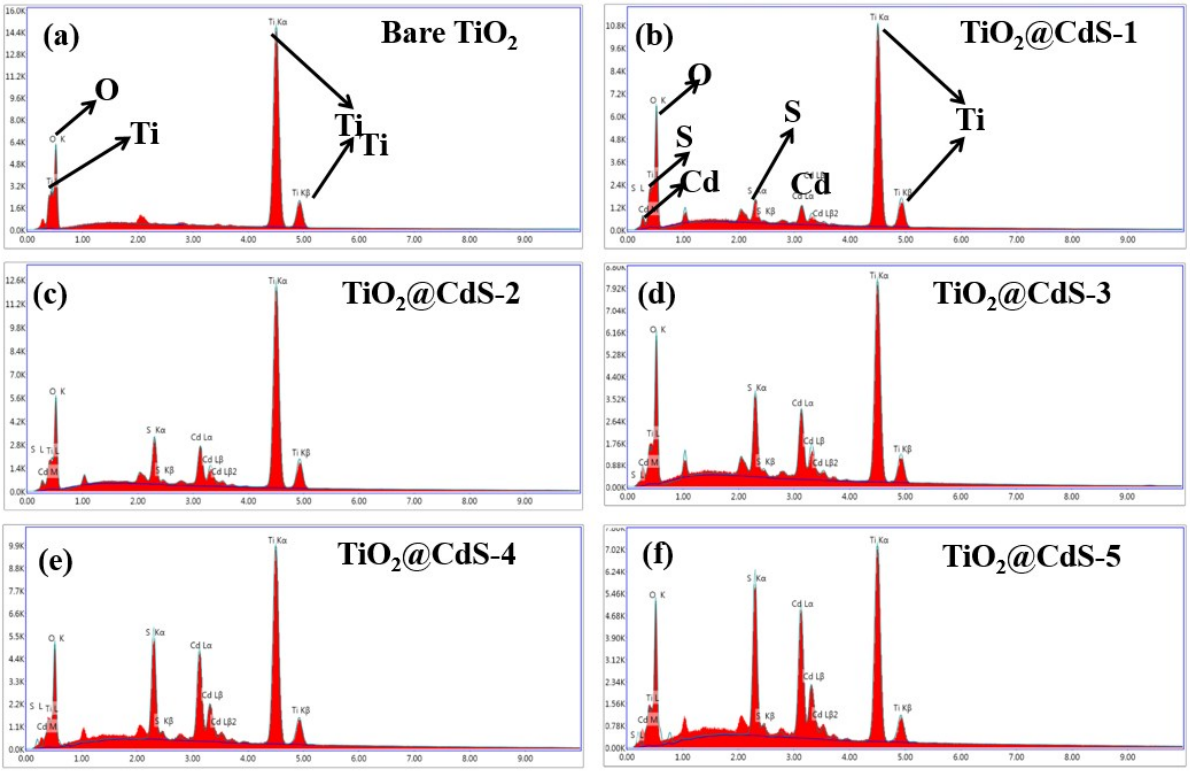

Fig. S3 Energy dispersive X-ray spectroscopy of bare TiO_2 and CdS coated TiO_2 electrodes.

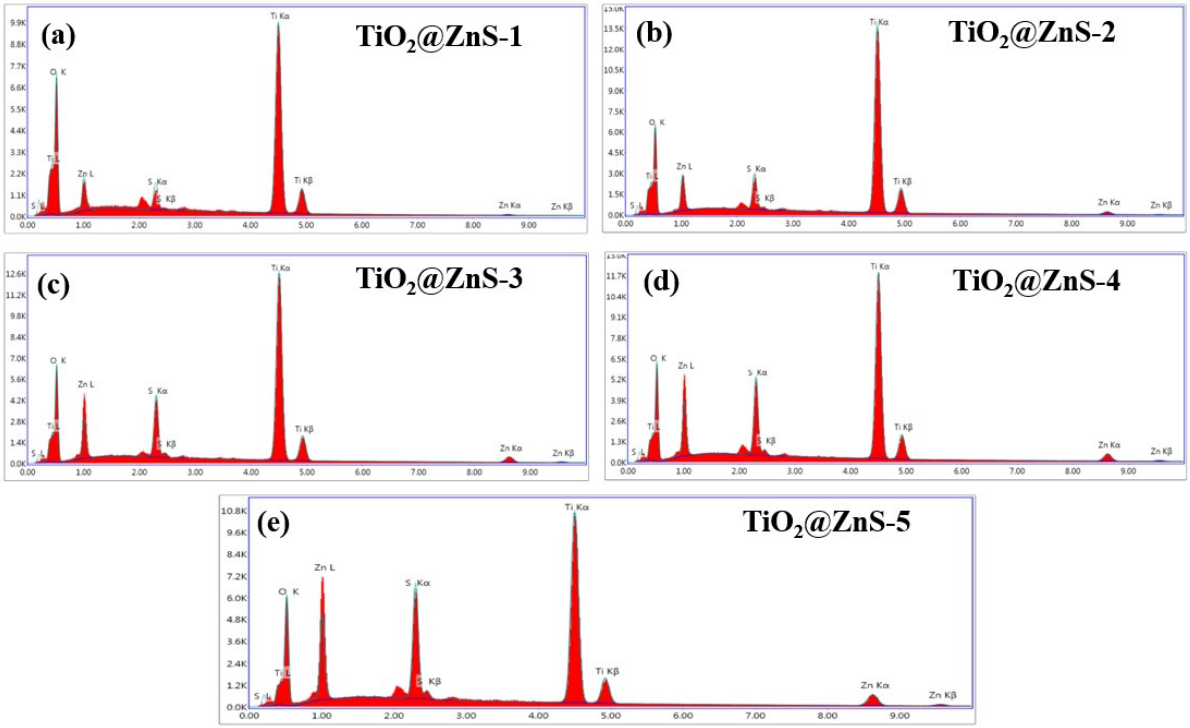

Fig. S4 Energy dispersive X-ray spectroscopy of ZnS coated TiO_2 electrodes on FTO substrate.

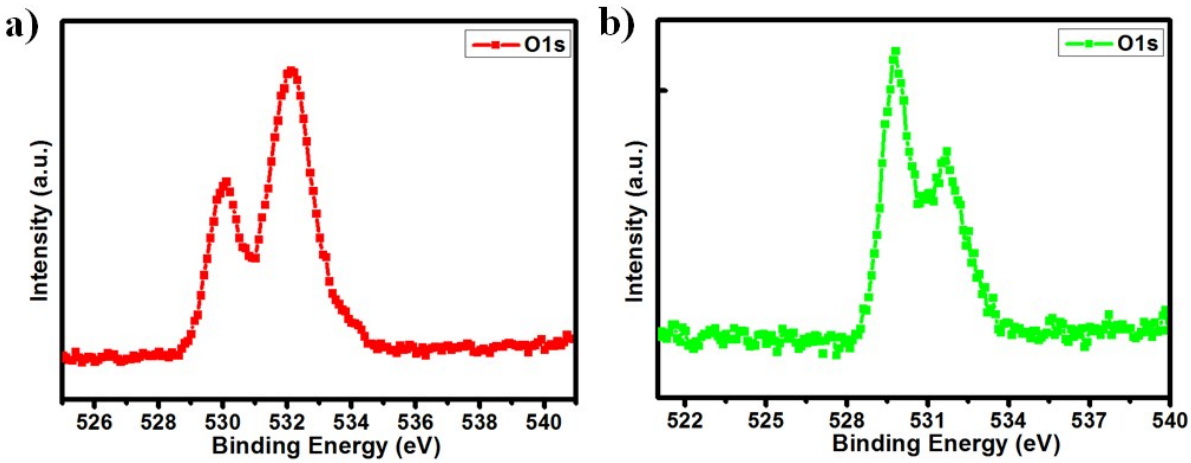

Fig. S5 X-ray photoelectron microscopy of (a) O1s of TiO_2@CdS-4 and (b) TiO_2@ZnS-4 electrode on FTO substrate.

Fig. S4 shows the binding energies of O1s and S2p for TiO_2@CdS-4 are 533 eV for O1s and 169.3 and 162.7 eV for S2p, which is consistent with the reported values (S2p in CdS is 162.7 eV).[1]

Atomic (%)	TiO_2	TiO_2@ CdS-1	TiO_2@ CdS-2	TiO_2@ CdS-3	TiO_2@ CdS-4	TiO_2@ CdS-5	TiO_2@ ZnS-1	TiO_2@ ZnS-2	TiO_2@ ZnS-3	TiO_2@ ZnS-4	TiO_2@ ZnS-5
Ti	33.8	27.36	30.66	23.07	26.84	21.7	25.08	30.9	28.91	27.9	26.24
O	66.1	69.6	63.25	65.22	61.07	63.83	72.26	63.05	60.62	58.92	56.06
Cd	-	0.97	2.24	3.24	4.87	5.8	-	-	-	-	-
Zn	-	-	-	-	-	-	0.83	2.93	5.44	6.77	9.22
S	-	2.07	3.85	5.47	7.25	8.67	1.83	3.12	5.02	6.4	8.48
Total	100	100	100	100	100	100	100	100	100	100	100

Table S1 Atomic percentage of Ti, O, Zn, S, and Cd in various SILAR cycles.

References

1 C. D. Wagner, P. Elmer, Handbook of X-ray Photoelectron Spectroscopy, (1979).