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Supplementary Information to

Enhanced solar absorption and photoelectrochemical properties of Al-reduced TiO_2/TiO_{2-x}/CdS heterojunction nanorods

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Fig. S1 (a) EDS results for TiO_2/TiO_{2-x}/CdS composite film. (b) Elemental mapping images of Cd, O, S, and Ti elements.

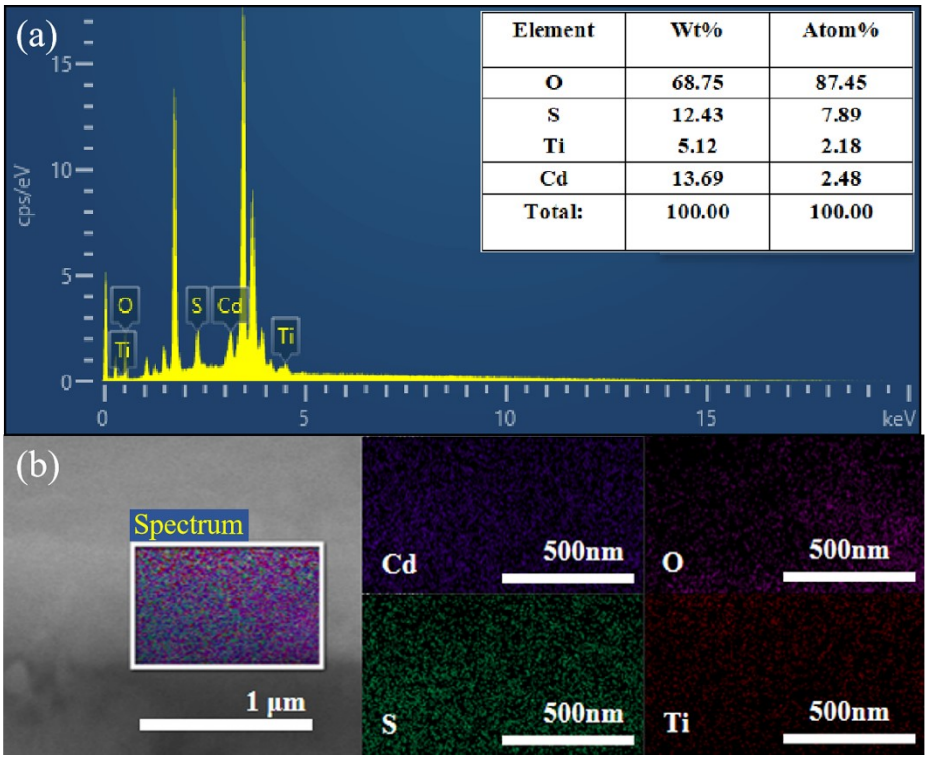

Fig. S2 Optical photographs of film electrodes.

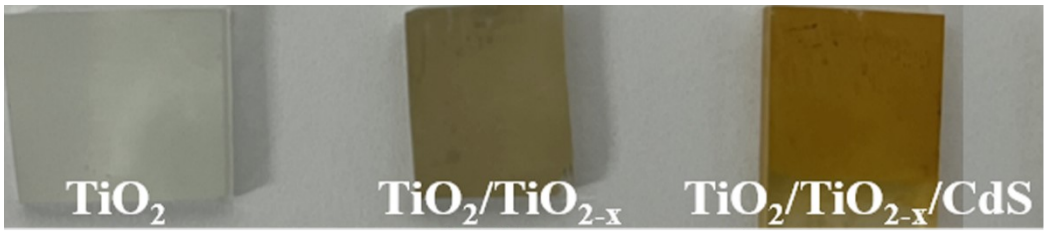

Fig. S3 The optical bandgaps of TiO_2/TiO_{2-x} film samples prepared at different Al-reduction temperatures.

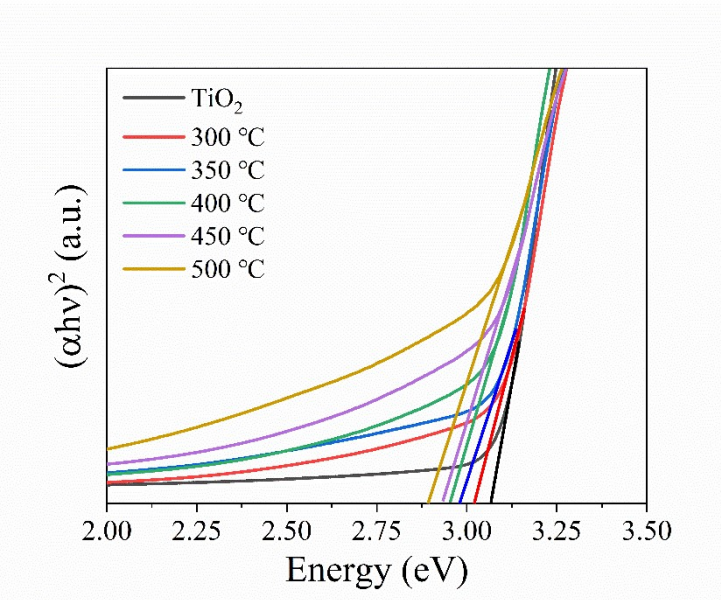

Fig. S4 Resistance value of FTO conductive glass annealed at different Al-reduction temperatures.

Fig. S5 Photocurrent densities of TiO_2/TiO_{2-x}/CdS after exposing to air for six months (a) and the XRD patterns of TiO_2/TiO_{2-x}/CdS before and after photostability test (b).

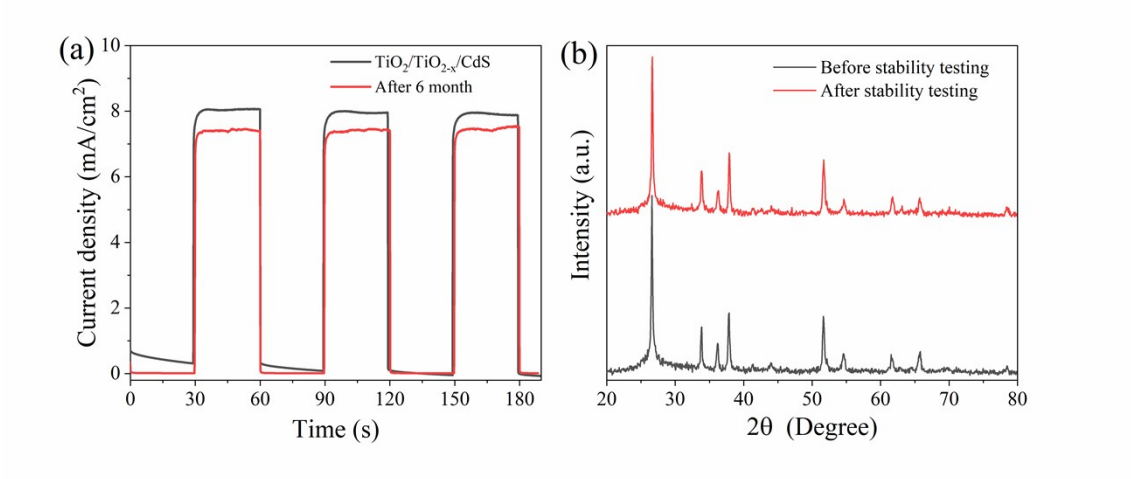

Fig. S6 The Mott-Schottky plots of TiO_2/TiO_{2-x} and CdS.

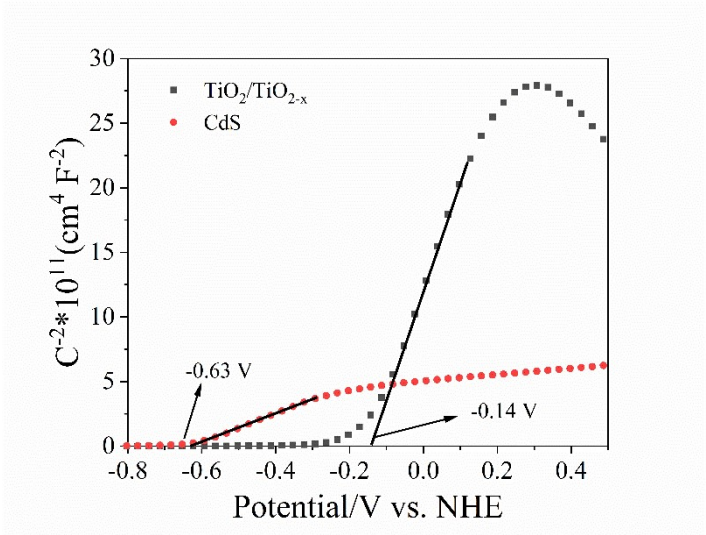

Table S1 PEC performances of the TiO_2/CdS related photoanodes.

photoanodes	photocurrent density (bias)	light and intensity (100 mW/cm^2)	electrolyte	ref
(nanoparticles)			1 M Na_2S	1
TiO_2/CdS	4.63 mA/cm^2 (-0.2V vs. Ag/AgCl)			
(nanosheet arrays)		simulated light 500 W	0.25 M Na_2S +	2
TiO_2/CdS	3.24 mA/cm^2 (0V vs. Ag/AgCl)	Xe lamp	0.35 M Na_2SO_3	
(nanorod arrays)		simulated light 500 W	1 M Na_2S	3
TiO_2/CdS	5.778 mA/cm^2 (0V vs. Ag/AgCl)	Xe lamp		
(nanotube arrays)		simulated light 500 W	0.25 M Na_2S +	4
H:TiO_2/CdS	2.0 mA/cm^2 (-0.43V vs. Ag/AgCl)	Xe lamp	0.35 M Na_2SO_3	
(nanobullet arrays)			0.25 M Na_2S +	5
H:TiO_2/CdS	0.5 mA/cm^2 (0 V vs Ag/AgCl)		0.35 M Na_2SO_3	
(nanowire arrays）		simulated light 150 W	0.25 M Na_2S +	6
H:TiO_2/CdS	4.0 mA/cm^2 (0.5 V vs. RHE)	Xe lamp	0.35 M Na_2SO_3	
H:CdS/TiO_2	7.2 mA/cm^2 (0.5 V vs. RHE)			

Notes and references

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Table S2 Parameters obtained from time-resolved PL decay curves according to a double-exponential decay.

Sample	A_1	τ_1 (μs)	A_2	τ_2 (μs)	τ (μs)
TiO_2	0.58898	0.19513	0.19837	1.09393	0.78
CdS	0.71859	0.23258	0.17371	1.32039	0.86
TiO_2/TiO_{2-x}	0.40952	0.19322	0.19627	1.22371	0.96
TiO_2/TiO_{2-x}/CdS	0.46588	0.21779	0.25027	1.5294	1.25