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Electronic Supplementary Information

Highly efficient visible-light-driven photocatalytic hydrogen production from water using $Cd_{0.5}Zn_{0.5}S$/TNTs (titanate nanotubes) nanocomposites without noble metals

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Table S1 The annual production and price of different metallic elements.

Element	Cu	Nb	V	Ta	W	Ni	Ti	Ga	In
Annual production (t)	15,000,000	15,000	7,000	840	45,100	1,300,000	99,000	30	75
Price (USD/lb*)	3.3	43	179	60	18	8.5	7.7	229	297
Element	Zn	Cd	Bi	Ru	Rh	Pd	Ag	Pt	Au
Annual production (t)	12,500,000	23,000	6,000	12	4.5	24	23,000	30	800
Price (USD/lb*)	1.2	3.1	6.1	6,080	109,600	9,664	512	24,456	26,496

*1 lb (pound) = 453.6 g

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Table S2 High efficiencies reported for hydrogen production using noble-metal-free photocatalysts

Photocatalyst	Apparent quantum yield (AQY)
$Cd_{1-x}Zn_xS$ with nano-twin structure[1]	43% at 425 nm
$ZnS\text{-}In_2S_3\text{–}CuS$[2]	22.6% at 420 nm
NiS/CdS[3]	51.3% at 420 nm
$Zn_xCd_{1-x}S$[4]	30.4% at 420 nm
CuS/ZnS[5]	20% at 420 nm
$MWCNTs/ZnIn_2S_4$[6]	23.3% at 420 nm

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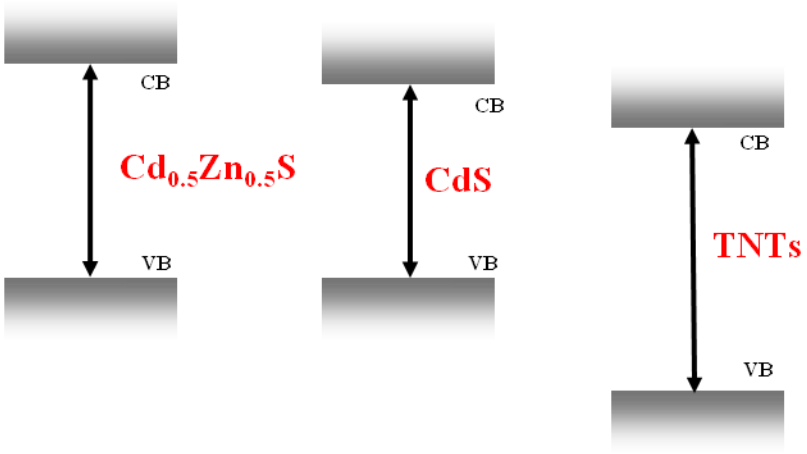

Fig. 1S Schematic diagram of the band positions of $Cd_{0.5}Zn_{0.5}S$, CdS and TNTs.

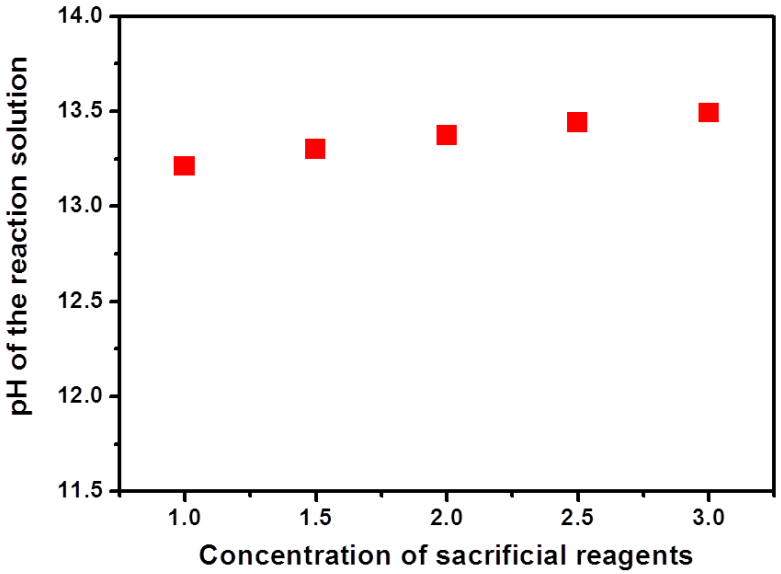

Fig. 2S Influence of the concentration of sacrificial reagents on the pH of the reaction solution. The abscissa denotes the multiple of used sacrificial reagent concentration compared to 0.25 M Na_2SO_3/0.35 M Na_2S. For example, when the abscissa was 2.0, 0.50 M Na_2SO_3/0.70 M Na_2S were used.

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