Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supporting Information

Hexagonal $Zn_{1-x}Cd_xS$ ($0.2 \leq x \leq 1$) solid solution photocatalysts for H_2 generation from water

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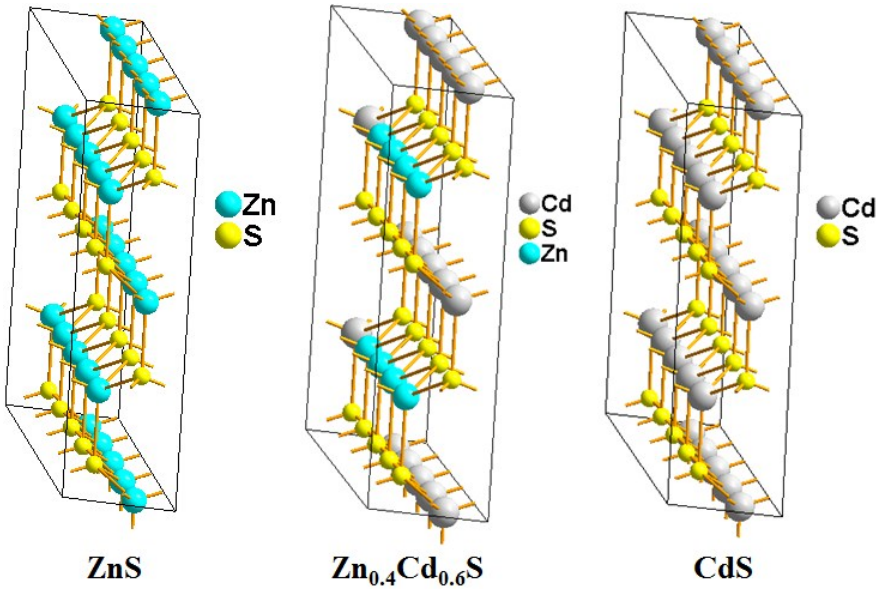

Fig. S1 Atomic models of ZnS, $Zn_{0.4}Cd_{0.6}S$ and CdS, respectively. Every supercell includes 20 metal atoms and 20 S atoms.

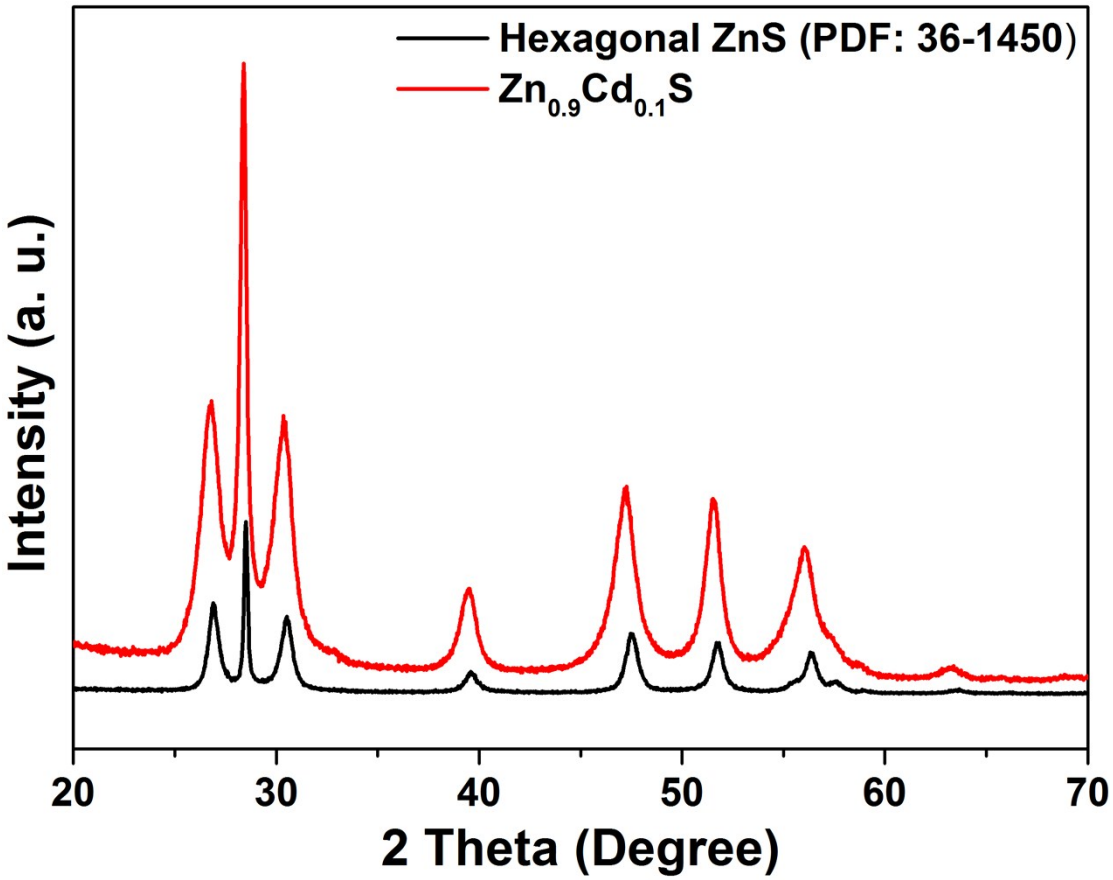

Fig. S2 XRD patterns of powdered ZnS and $Zn_{0.9}Cd_{0.1}S$ samples.

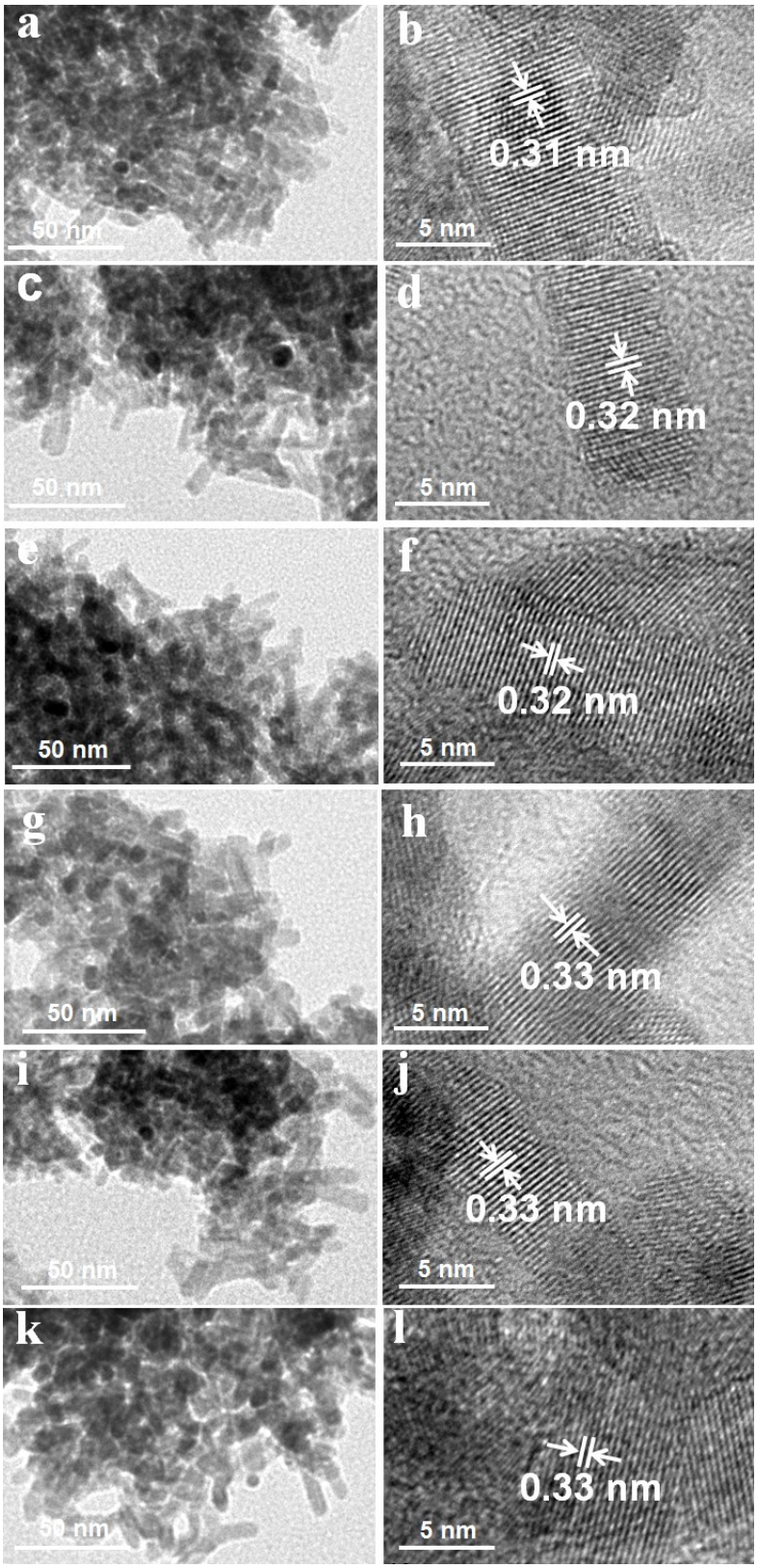

Figure S3. TEM (left column) and HRTEM (right column) images of (a), (b) $Zn_{0.7}Cd_{0.3}S$; (c), (d) $Zn_{0.6}Cd_{0.4}S$; (e), (f) $Zn_{0.5}Cd_{0.5}S$; (g), (h) $Zn_{0.3}Cd_{0.7}S$; (i), (j) $Zn_{0.2}Cd_{0.8}S$; and (k), (l) $Zn_{0.1}Cd_{0.9}S$, respectively.

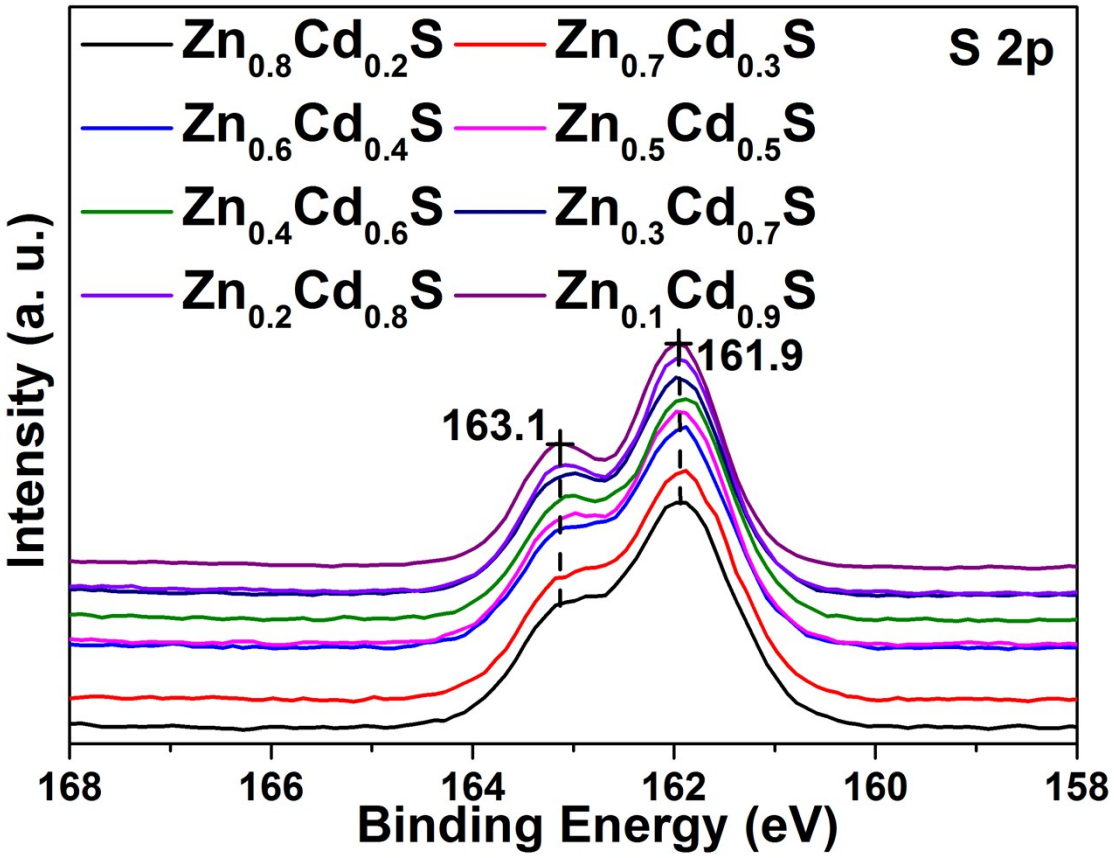

Figure S4. S 2p XPS spectra of $Zn_{1-x}Cd_xS$ ($0.2 \leq x \leq 0.9$)

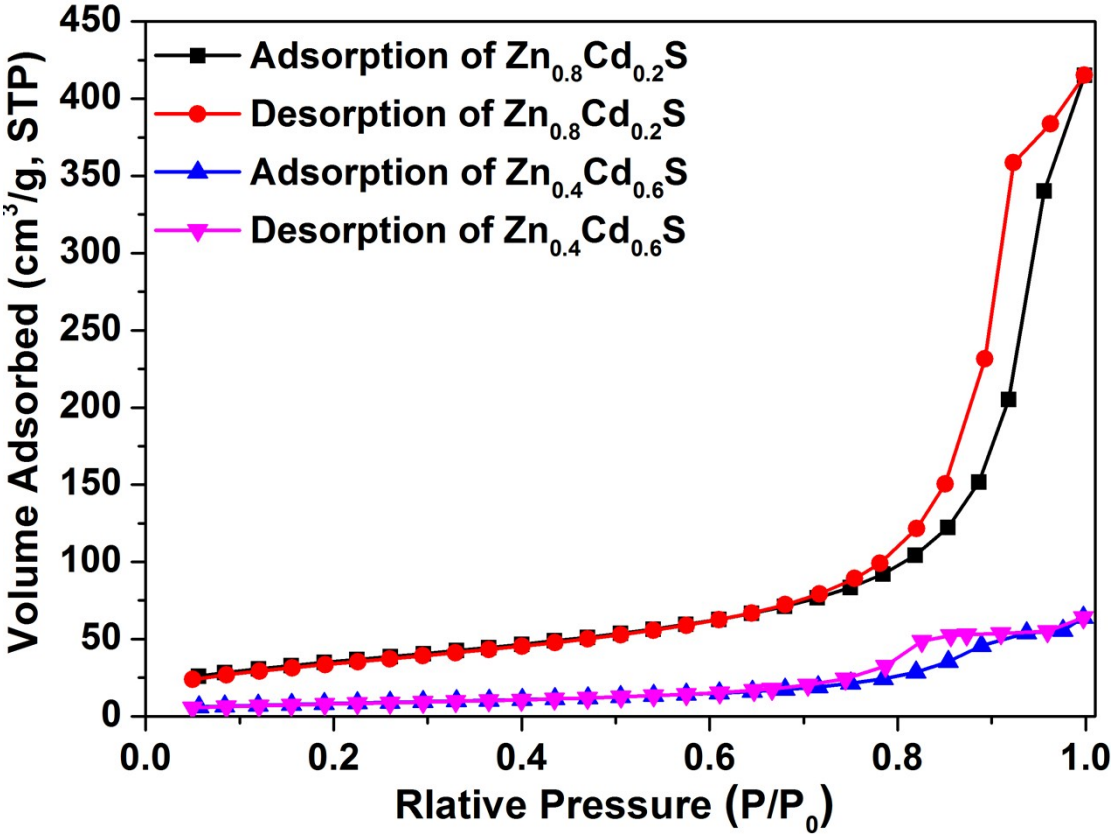

Fig. S5 N_2 adsorption-desorption isotherms of $Zn_{0.8}Cd_{0.2}S$ and $Zn_{0.4}Cd_{0.6}S$.

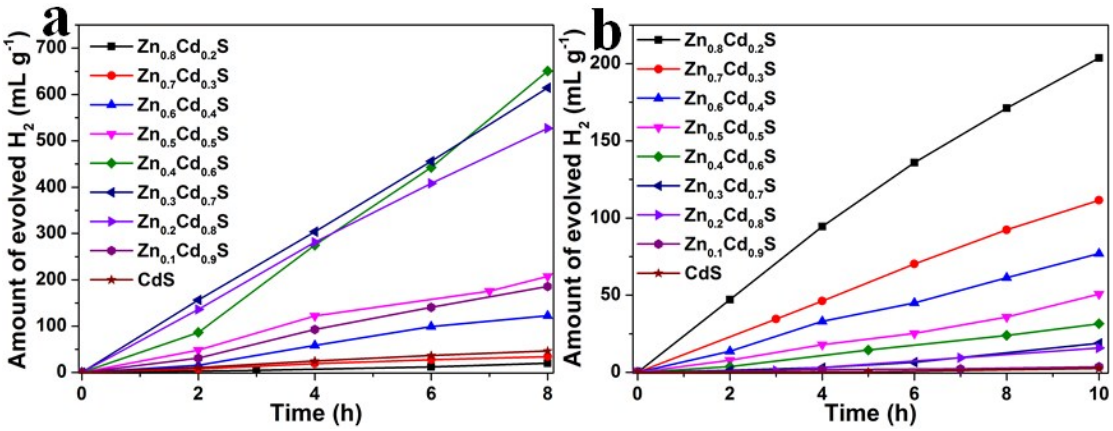

Fig. S6 Time course of evolved H_2 from $Zn_{1-x}Cd_xS$ ($0.2 \leq x \leq 1$) solid solution under (a) visible-light irradiation ($\lambda \geq 420$ nm) and (b) 368 nm LED using Na_2S (0.35 M)/Na_2SO_3 (0.25 M) as sacrificial holes scavengers.

Table S1. The H_2-production rates per unit area of the samples

Sample	H_2-production rate per unit area (mL h^{-1} g^{-1} m^{-2})
$Zn_{0.8}Cd_{0.2}S$	0.145
$Zn_{0.7}Cd_{0.3}S$	0.072
$Zn_{0.6}Cd_{0.4}S$	0.052
$Zn_{0.5}Cd_{0.5}S$	0.035
$Zn_{0.4}Cd_{0.6}S$	0.023
$Zn_{0.3}Cd_{0.7}S$	0.015
$Zn_{0.2}Cd_{0.8}S$	0.014
$Zn_{0.1}Cd_{0.9}S$	0.004
CdS	0.003