Electronic Supplementary Material (ESI) for Photochemical & Photobiological Sciences.

Supporting Information

Efficient visible-light-driven photocatalytic hydrogen production over direct Z-schemesystemTaON/$Zn_{0.5}Cd_{0.5}S$ with NiS cocatalyst

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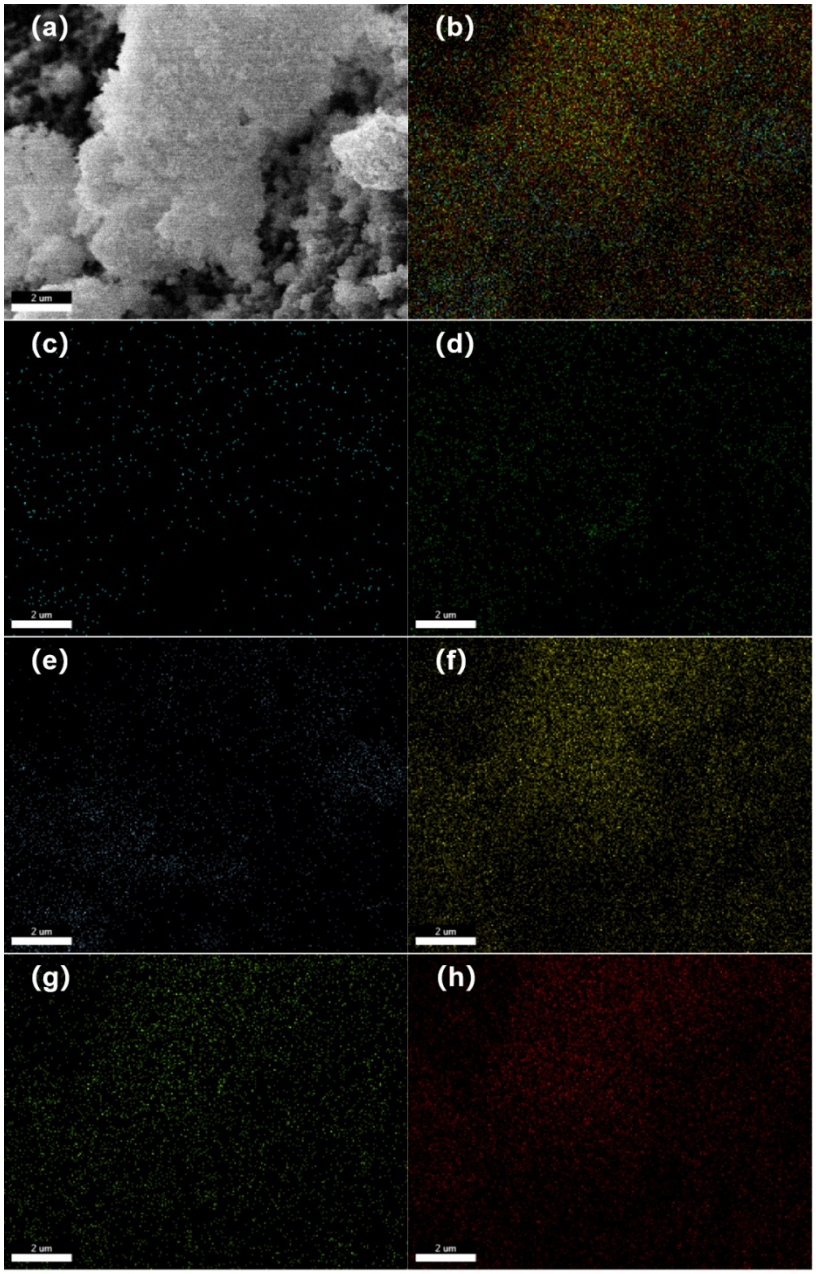

Fig. S1.SEM image (a) and the overlay image (b) of T30-ZCS; the corresponding SEM mapping images of (c) N (d) O (e) Ta (f) Zn (h)Cd (i) S.

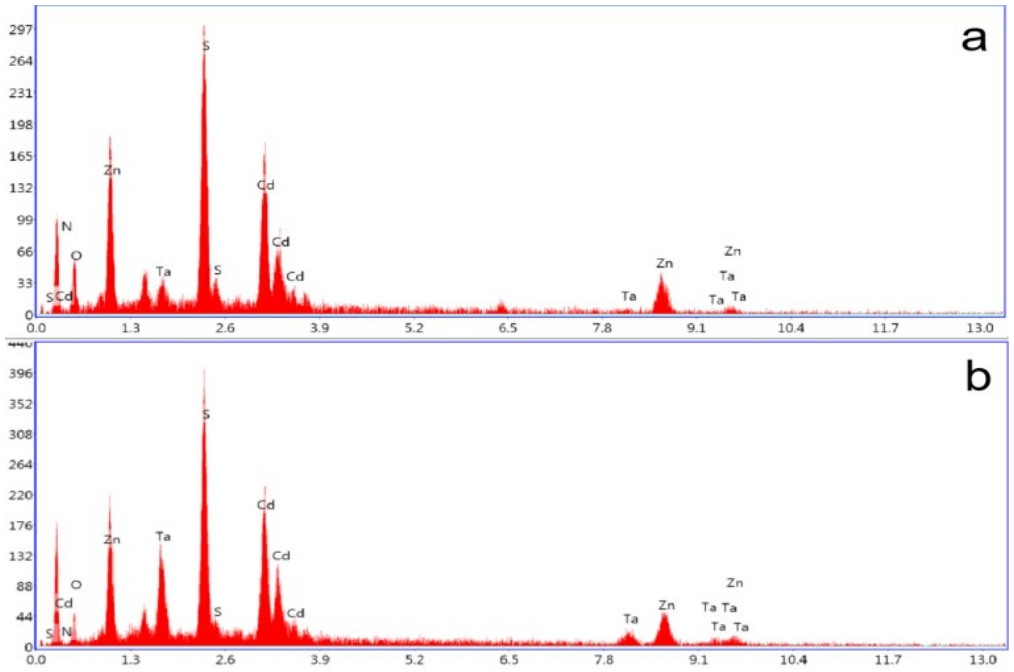

Fig. S2. EDS spectrum of (a) T4-ZCS and (b) T30-ZCS.

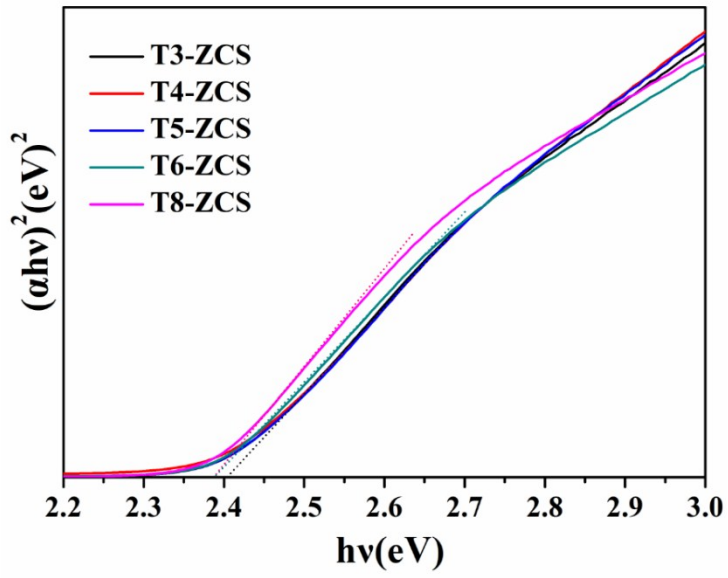

Fig. S3 The plots of $(\alpha h\nu)^2$ versus hν of the TaON-ZCS photocatalysts.

Table S1. Surface area and pore size parameters for ZCS, TaON and T4-ZCS.

Sample	BET(m^2/g)	BJH pore size (nm)
ZCS	49.2493	19.60
TaON	4.9273	10.59
T4-ZCS	38.3013	18.99

Table S2. Typical earth-abundant NiS co-catalysts and other systems consisted of NiS-MoS_2, CoP and Co_3N co-catalystsfor photocatalytic hydrogen evolution.

Photocatalyst	Amountof catalyst (mg)	Activity (the value reported in literature)	Activity (× 1000 μmol h^{-1} g^{-1})	A.Q.Y. (%)	Reference
NiS/TaON-$Zn_{0.5}Cd_{0.5}S$	50	1740μmol·h^{-1}	34.8	25.5	This work
NiS/$Zn_xCd_{1-x}S$-MOF	50	839μmol·h^{-1}	16.78	---	1
1T-1Li_xMoS_2/$Cd_{0.5}Zn_{0.5}S$	100	769.9μmol·h^{-1}	7.699	---	2
NiS/g-C_3N_4 -$SrTiO_3$	50	86.13μmol·h^{-1}	1.7227	---	3
NiS-MoS_2/CNTs/CN	20	6.198μmol·h^{-1}	0.3099	---	4
NiS_x/$Zn_{0.8}Cd_{0.2}S$/rGO	50	392μmol·h^{-1}	7.84	20.88	5
$Zn_{0.5}Cd_{0.5}S$/CoP	50	734μmol·h^{-1}	14.68	---	6
Co_3N/ CdS	1	137.3μmol·h^{-1}	137.33	14.9	7
CdS nanorod/CoP	1	500μmol·h^{-1}	500	35	8
CdS/CoP	1	254μmol·h^{-1}	254	25.1	9

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