"Feather-duster" Like $ZnIn_2S_4/TiO_2$ Heterostructured Nanocomposites with Enhanced Visible-light Photocatalytic Performance

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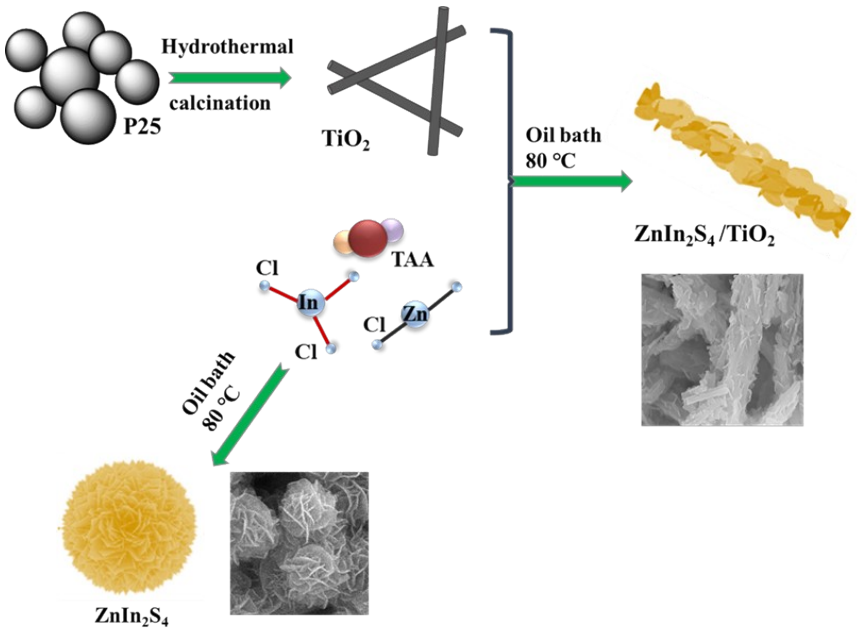

Fig. S1 Preparation process of TiO_2, $ZnIn_2S_4$ and $ZnIn_2S_4/TiO_2$ nanocomposites.

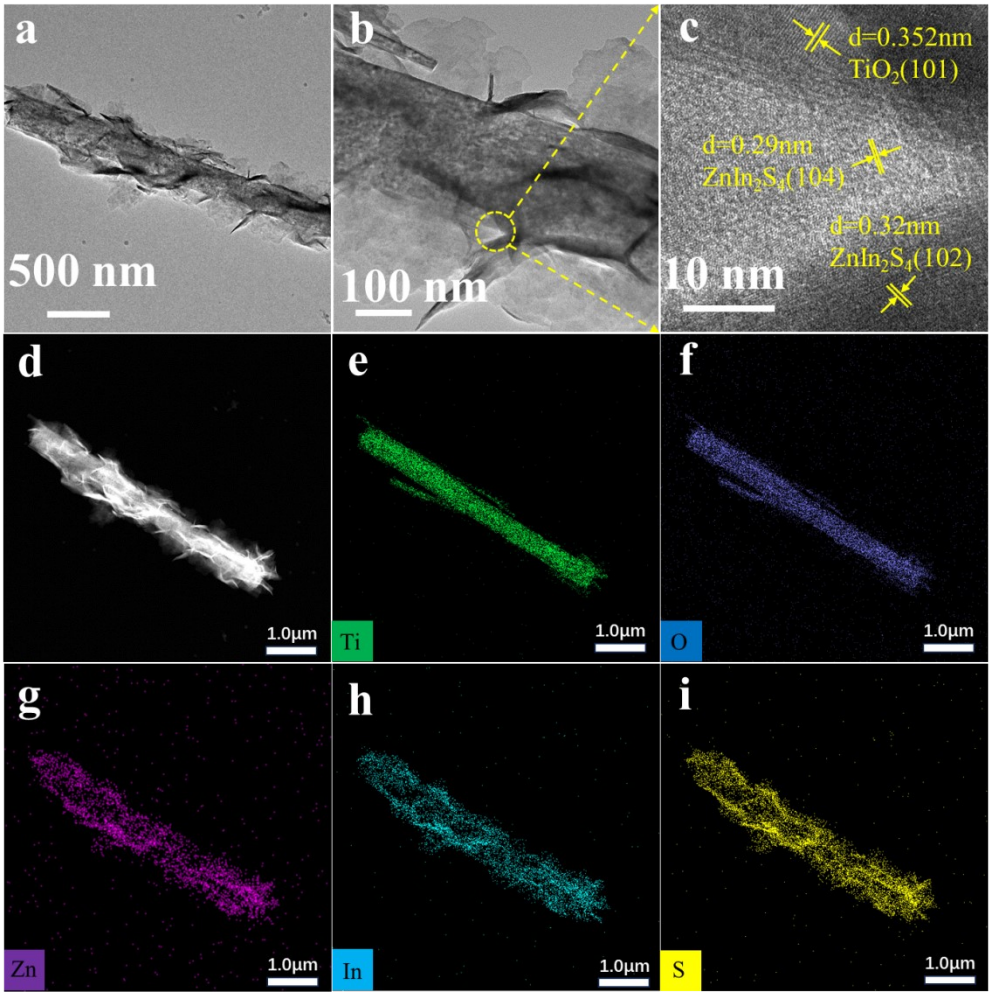

Fig. S2 (a-b) TEM images, (c) HRTEM image, (d-i) Element mappings of $0.5ZnIn_2S_4/TiO_2$.

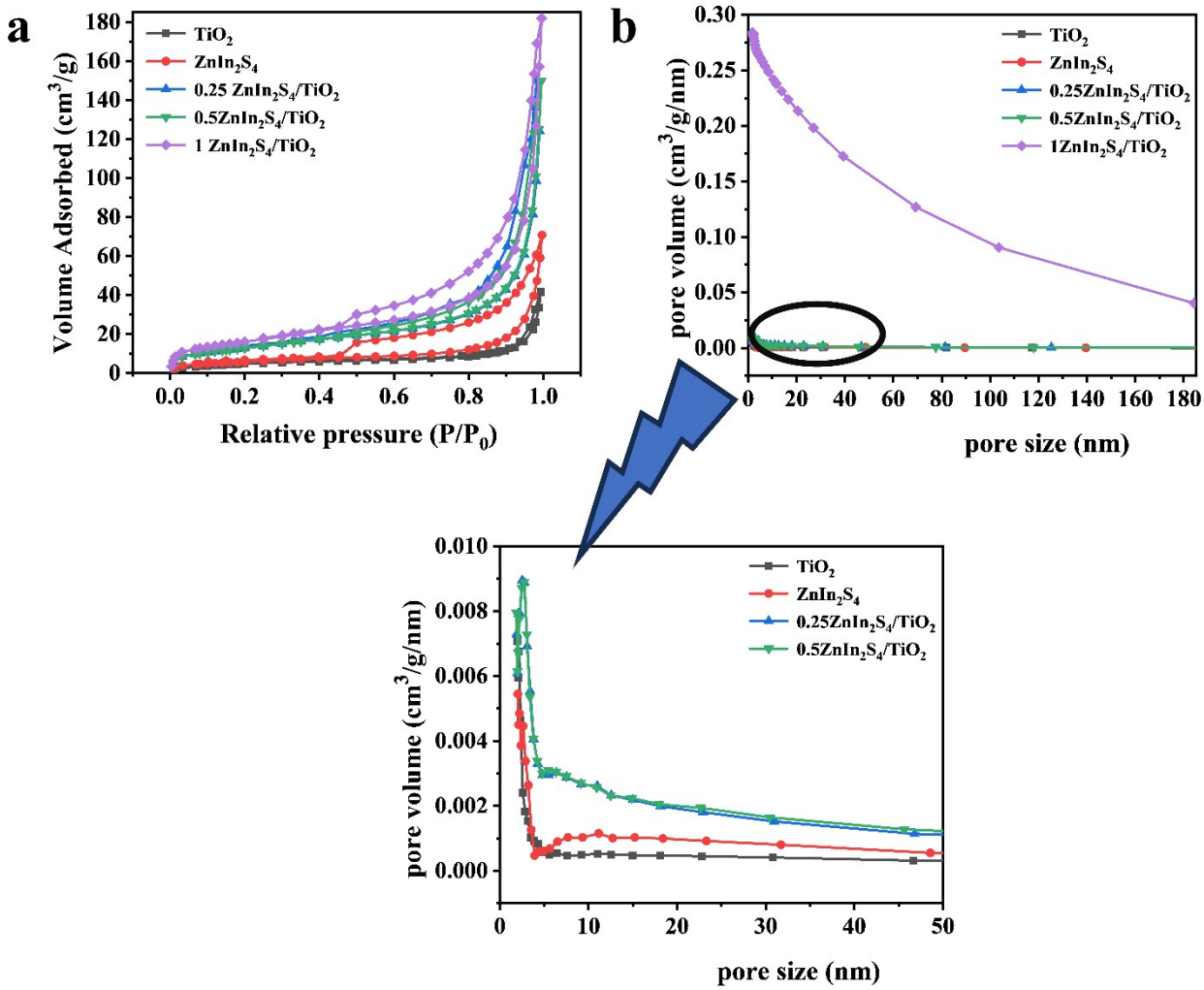

Fig. S3 (a) Nitrogen adsorption and desorption isotherms; (b) pore size distribution curve of the samples; Inset of enlarged pore size distribution curves of TiO_2, $ZnIn_2S_4$, $0.25ZnIn_2S_4/TiO_2$ and $0.5ZnIn_2S_4/TiO_2$.

Table S1. Nitrogen adsorption-desorption parameters of different samples.

Parameter	TiO_2	$ZnIn_2S_4$	$0.25ZnIn_2S_4/TiO_2$	$0.5ZnIn_2S_4/TiO_2$	$1ZnIn_2S_4/TiO_2$
Specific surface area (m^2/g)	18	21	47.334	47.179	59.01
Pore volume (cm^3/g)	0.06	0.11	0.234	0.235	0.28
Average pore size (nm)	16.9	21.5	18.6	18.2	17.6

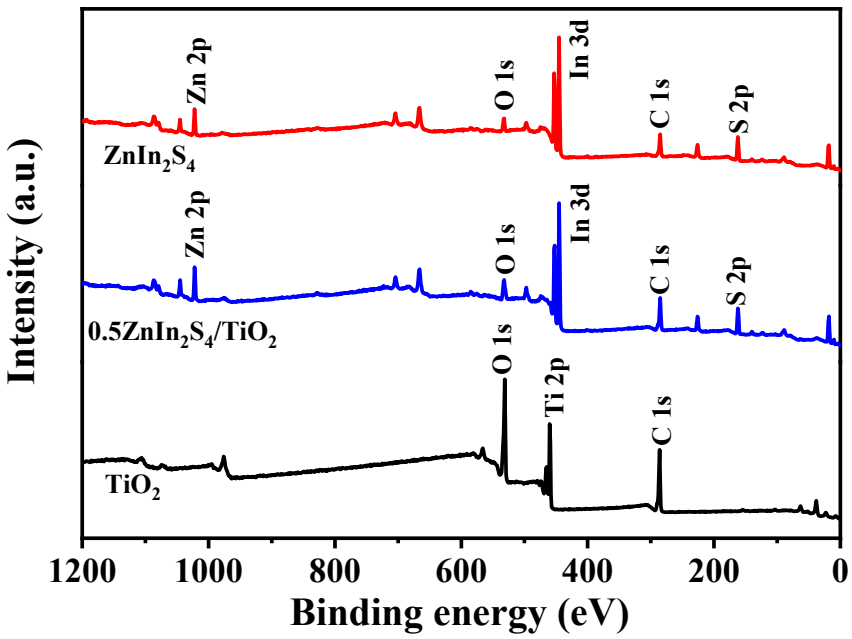

Fig. S4 XPS spectra of TiO_2, $ZnIn_2S_4$ and $0.5ZnIn_2S_4/TiO_2$.

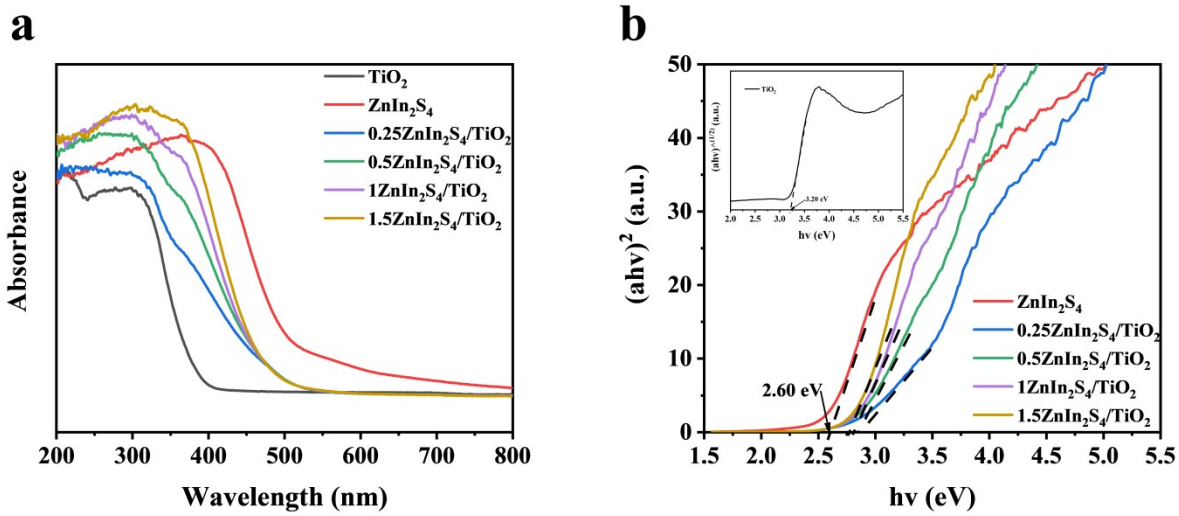

Fig. S5 (a) UV-visible diffuse reflection absorption spectra of TiO_2, $ZnIn_2S_4$ and $ZnIn_2S_4/TiO_2$; (b) Tauc plot of $ZnIn_2S_4$, $ZnIn_2S_4/TiO_2$, and TiO_2.

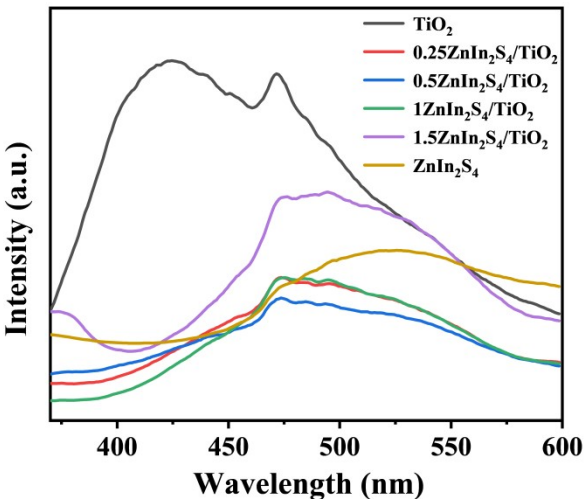

Fig. S6 PL spectra of TiO_2, $ZnIn_2S_4$ and $ZnIn_2S_4/TiO_2$ composites.

Table S2. Photocatalytic Cr(VI) photoreduction comparison of $0.5ZnIn_2S_4/TiO_2$ photocatalyst with those in previous reports.

Photocatalysts	Catalyst (mg/L)	Light source	Time(min)	Removal efficiency	References
Fe-N-C/TiO_2	20	Xe lamp	240	≈100%	1
Ag/TiO_2	10	Xe lamp	240	98%	2
N-TiO_2/g-C_3N_4	5	Xe lamp	300	≈100%	3
$MoSe_2$/ TiO_2	10	Xe lamp	180	96%	4
Ag/TiO_2/AgMIL-101(Cr)	100	Hg lamp	10	98.7%	5
CDs-N-TiO_{2-x}	10	Xe lamp	60	94%	6
NH_2-MIL-125(Ti)	2	Hg lamp	60	97%	7
NTU-9/NH_2-MIL-125(Ti)	40	Hg lamp	90	70%	8
$ZnIn_2S_4/TiO_2$	20	Xe lamp	120	98.2%	This work

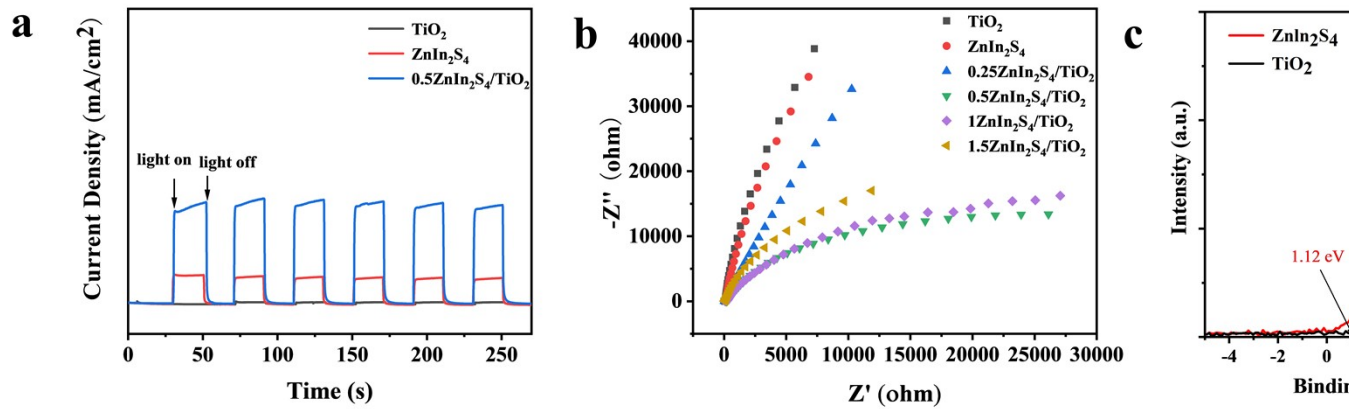

Fig. S7 (a) Transient photocurrent response diagram; (b) EIS Nyquist diagram of TiO_2, $ZnIn_2S_4$ and $ZnIn_2S_4/TiO_2$ composites; (c) VB structure diagram of TiO_2 and $ZnIn_2S_4$.

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