

Supporting information

Photocatalytic Reduction of Cr (VI) on a series

Defective $\text{Mn}_m\text{In}_2\text{S}_{3+m}$ ($m=1-5$, integer)

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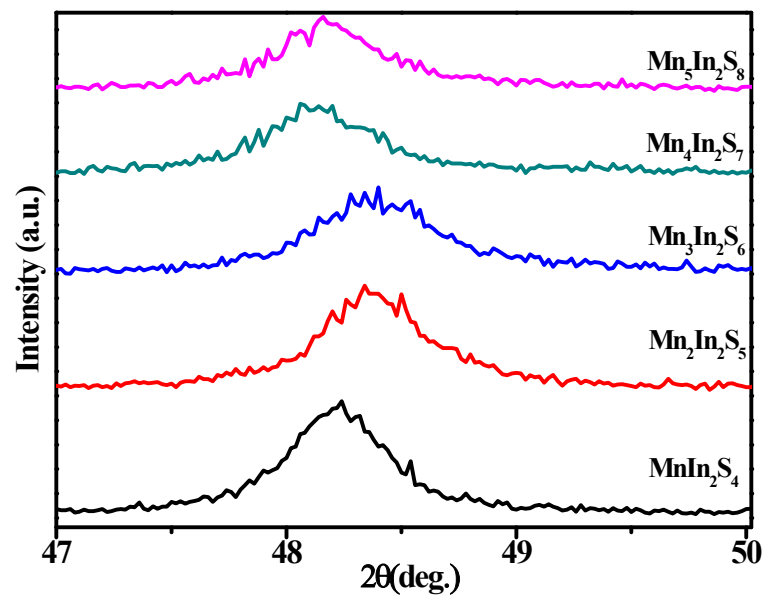


Fig. S1. The XRD pattern of the sample at an angle of 47-50°.

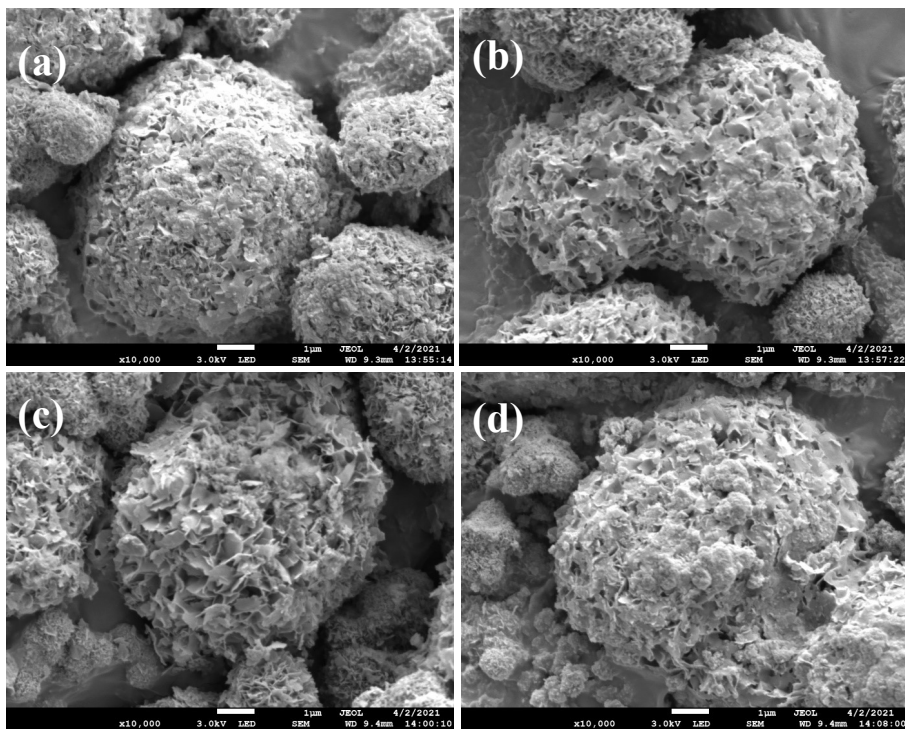


Fig. S2. SEM images of MnIn_2S_4 (a), $\text{Mn}_2\text{In}_2\text{S}_5$ (b), $\text{Mn}_3\text{In}_2\text{S}_6$ (c) and $\text{Mn}_5\text{In}_2\text{S}_8$ (d).

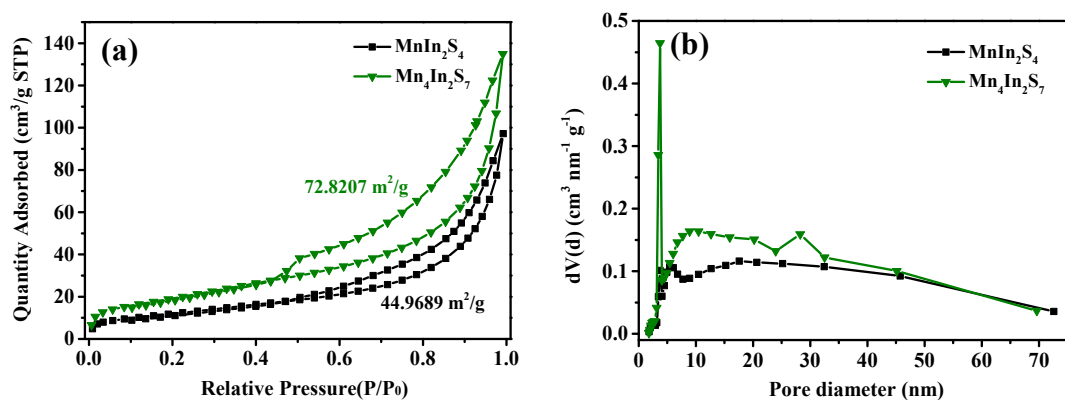


Fig. S3. (a) N₂ adsorption-desorption, and (b) the pore size distributions of MnIn₂S₄ and Mn₄In₂S₇

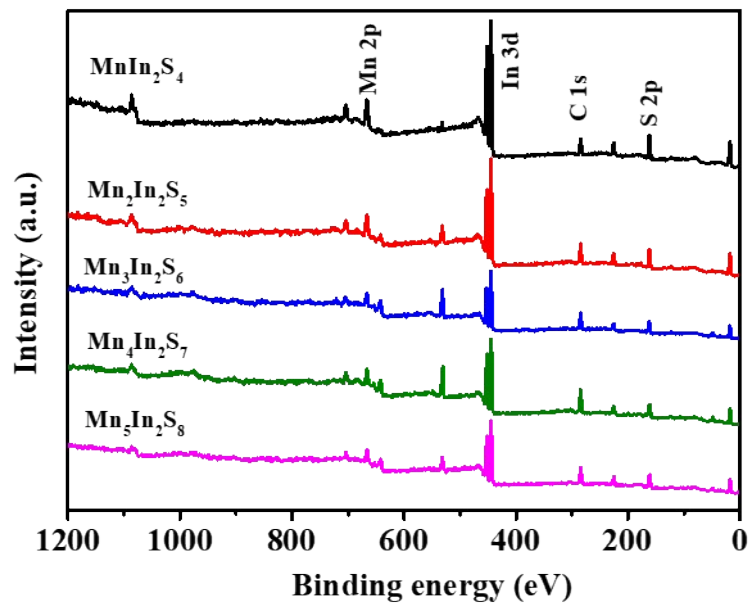


Fig. S4. XPS survey spectrum of prepared $\text{Mn}_m\text{In}_2\text{S}_{3+m}$.

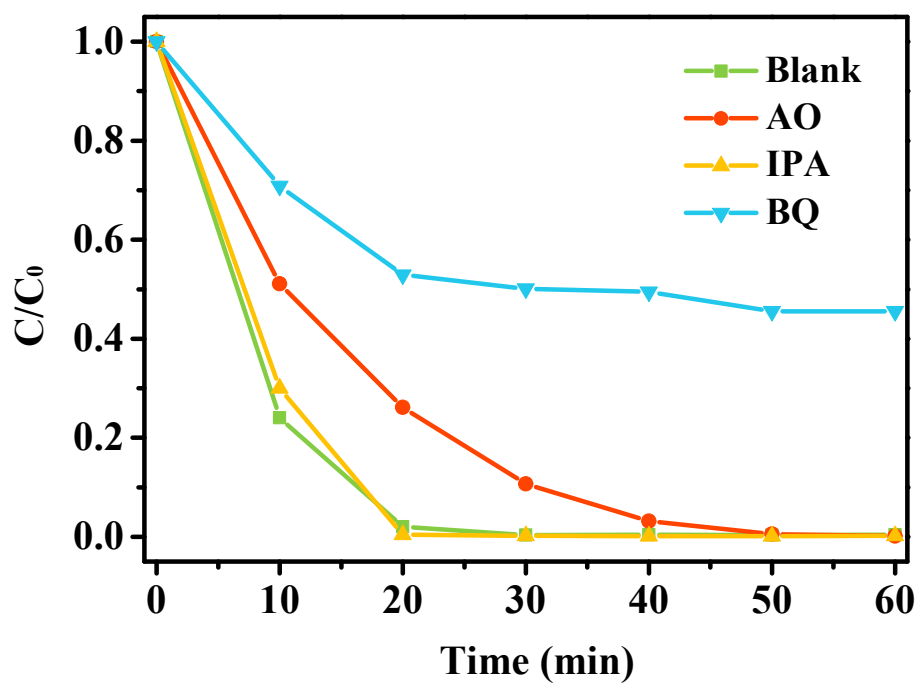


Fig. S5. Active free radical capture experiment of $\text{Mn}_4\text{In}_2\text{S}_7$

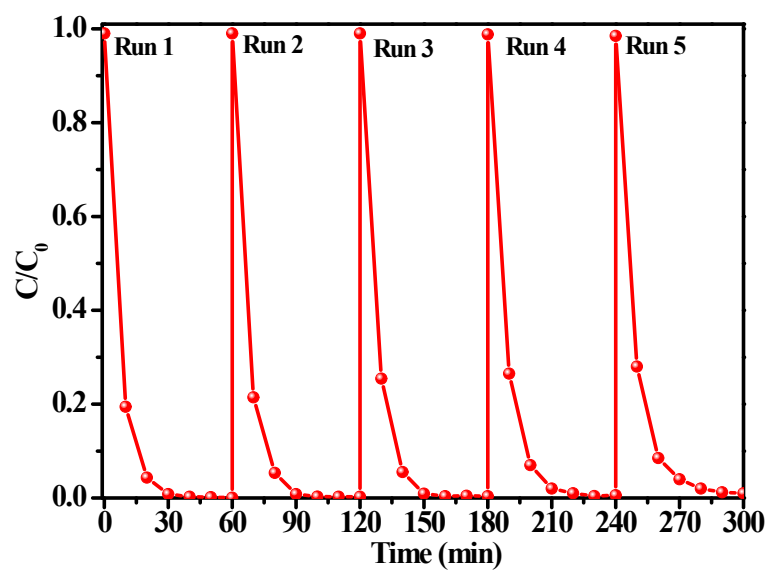


Fig. S6. Cycles of photocatalytic reduction of Cr (VI).

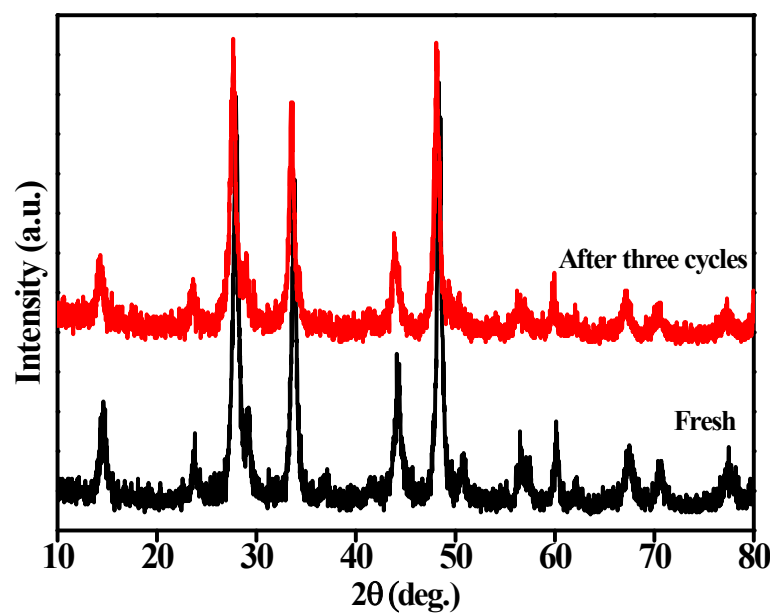


Fig. S7. XRD patterns of $\text{Mn}_4\text{In}_2\text{S}_7$ after three cycle experiments.

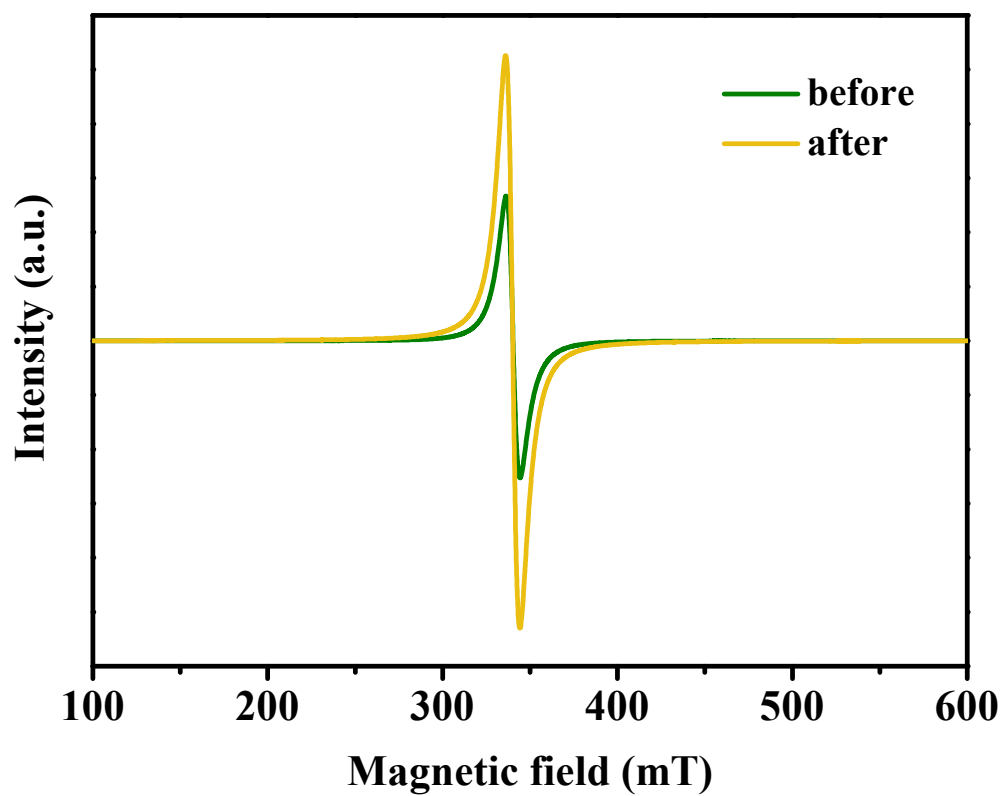


Fig. S8. EPR of $\text{Mn}_4\text{In}_2\text{S}_7$ before and after cyclic reaction

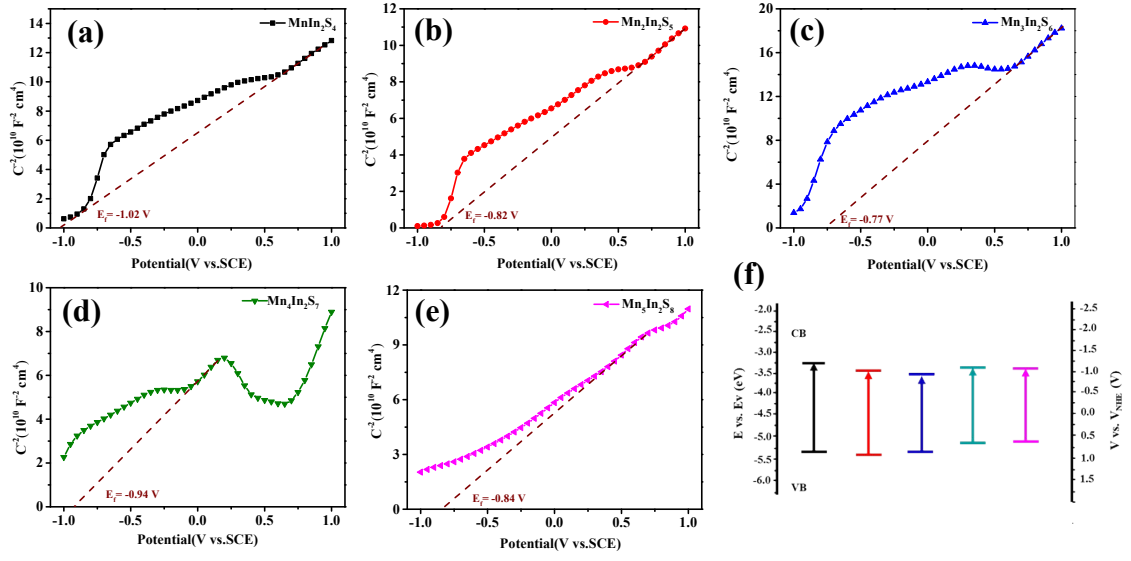


Fig. S9. (a-e) Mott-Schottky test of $\text{Mn}_m\text{In}_2\text{S}_{m+3}$, and (f) energy band scheme.

Table S1 The data of CB, VB and E_g of samples according to M-S.

Samples	VB (eV)	CB (eV)	E_g (eV)
MnIn_2S_4	-5.33	-3.28	2.05
$\text{Mn}_2\text{In}_2\text{S}_5$	-5.4	-3.48	1.92
$\text{Mn}_3\text{In}_2\text{S}_6$	-5.3	-3.53	1.77
$\text{Mn}_4\text{In}_2\text{S}_7$	-5.12	-3.36	1.76
$\text{Mn}_5\text{In}_2\text{S}_8$	-5.1	-3.46	1.64

Table S2 Inductively coupled plasma spectrum (ICP) of $\text{Mn}_m\text{In}_2\text{S}_{m+3}$

	Mn (mmol L^{-1})	In (mmol L^{-1})
MnIn_2S_4	0.025	0.078
$\text{Mn}_2\text{In}_2\text{S}_5$	0.038	0.080
$\text{Mn}_3\text{In}_2\text{S}_6$	0.054	0.070
$\text{Mn}_4\text{In}_2\text{S}_7$	0.066	0.068
$\text{Mn}_5\text{In}_2\text{S}_8$	0.080	0.052