

Supplementary Information

Enhanced Photocatalytic Activity of Novel CdS/Pt/Mo₂C Heterostructure for Visible-Light-Driven Hydrogen Evolution

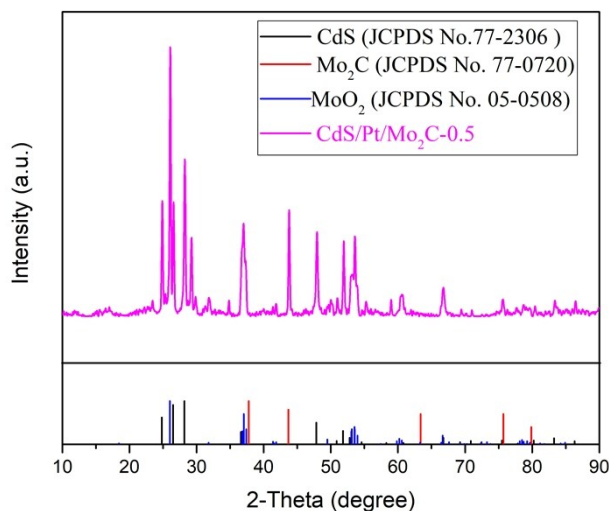


Fig. S1 XRD patterns of CdS/Pt/Mo₂C-0.5 samples.

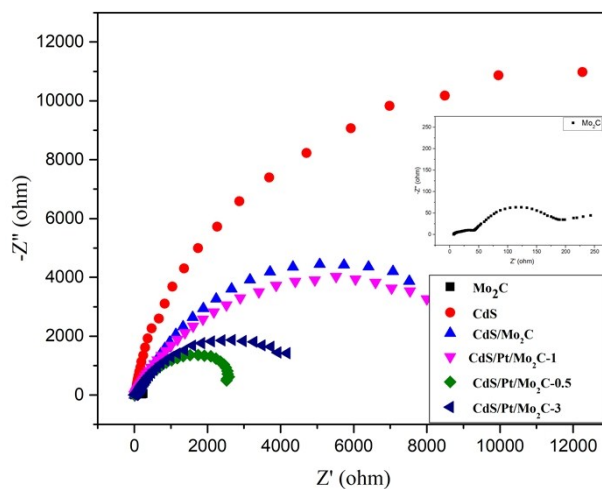


Fig. S2 EIS Nyquist plots of CdS, Mo₂C, CdS/Mo₂C, CdS/Pt/Mo₂C-0.5, CdS/Pt/Mo₂C-1 and CdS/Pt/Mo₂C-3 samples coated on ITO measured at 0.5 V vs. SCE in a 0.5 M Na₂SO₄ aqueous solution

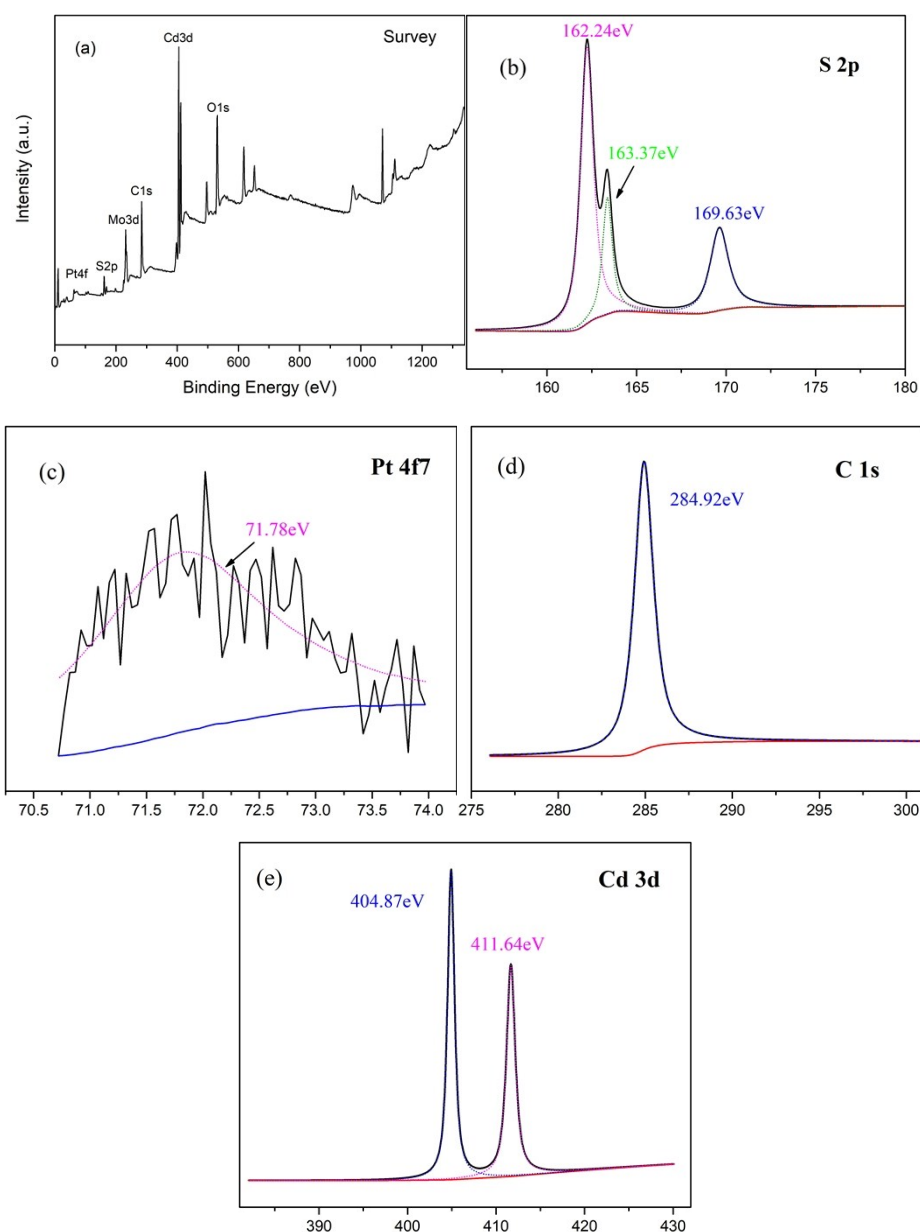


Figure S3 XPS survey spectrum (a), high-resolution spectra of the S 2p (b), Pt 4f7 (c), C 1s (d) and Cd 3d (e) for the CdS/Pt/Mo₂C-0.5 heterostructure system.

samples	Pt (%)	S (%)	Mo (%)	C (%)	Cd (%)
Mo ₂ C	0	0	13.494	86.506	0
CdS	0	74.88	0	0	25.12
CdS/Mo ₂ C	0	10.861	7.583	72.087	9.469
CdS/Pt/Mo ₂ C-0.5	0.091	13.652	7.083	68.007	11.166
CdS/Pt/Mo ₂ C-1	0.135	12.025	5.935	71.331	10.574
CdS/Pt/Mo ₂ C-3	0.769	12.233	6.234	70.504	10.26

Table S1. The chemical composition of different samples measured by XPS

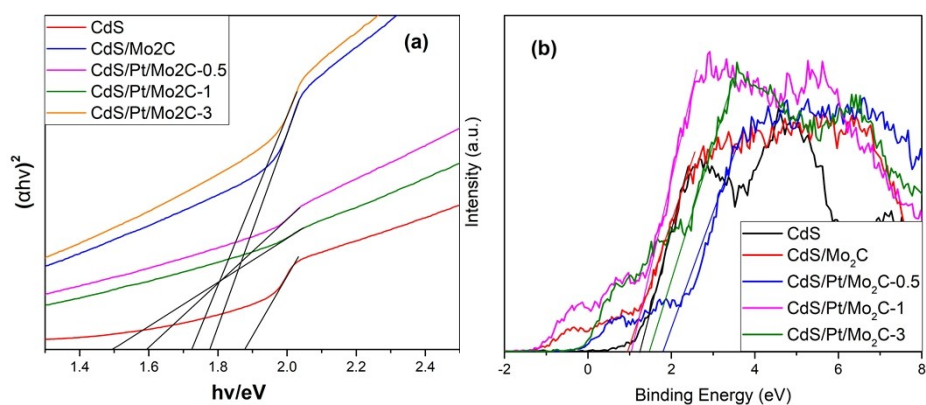
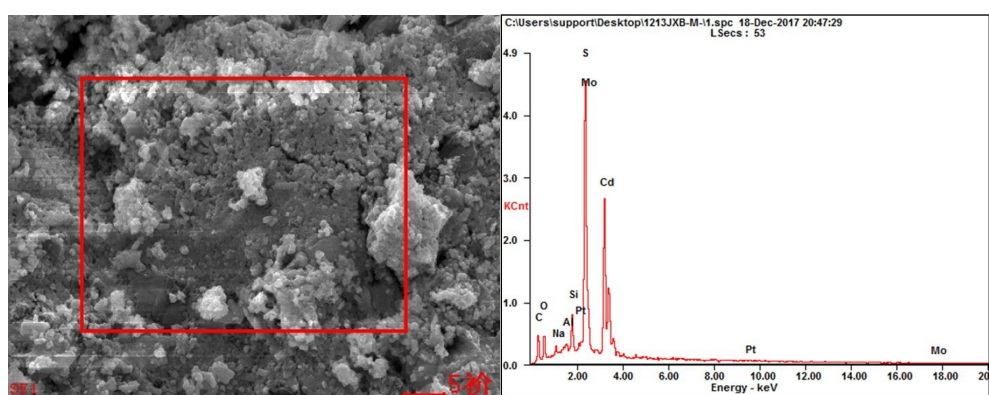


Fig. S4 (a) Tauc plot curves of the different samples. (b) valence band spectra of CdS, CdS/Mo₂C, CdS/Pt/Mo₂C-0.5, CdS/Pt/Mo₂C-1 and CdS/Pt/Mo₂C-3.



Element	Wt%	At%
CK	06.09	20.22
OK	12.77	31.84
NaK	01.36	02.36
AlK	00.79	01.17
SiK	06.47	09.20
MoL	28.47	11.84
SK	09.29	11.56
CdL	31.38	11.14
PtL	03.37	00.69
Matrix	Correction	ZAF

Fig. S5 EDS of CdS/Pt/Mo₂C-0.5 sample.

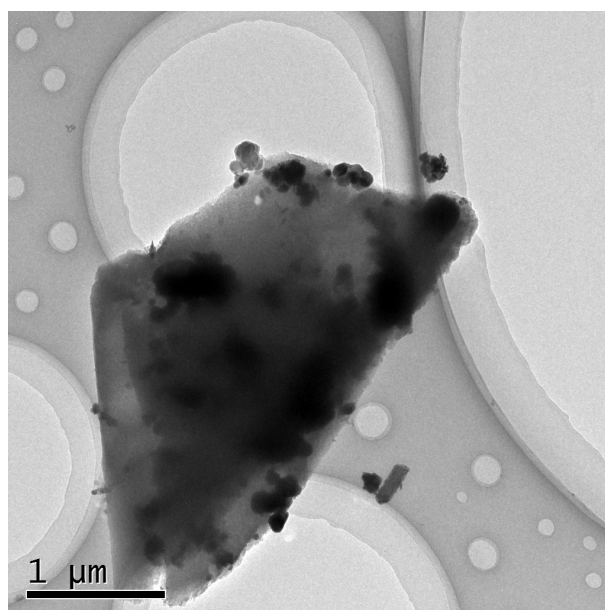


Fig. S6 TEM of CdS/Pt/Mo₂C-0.5 sample.

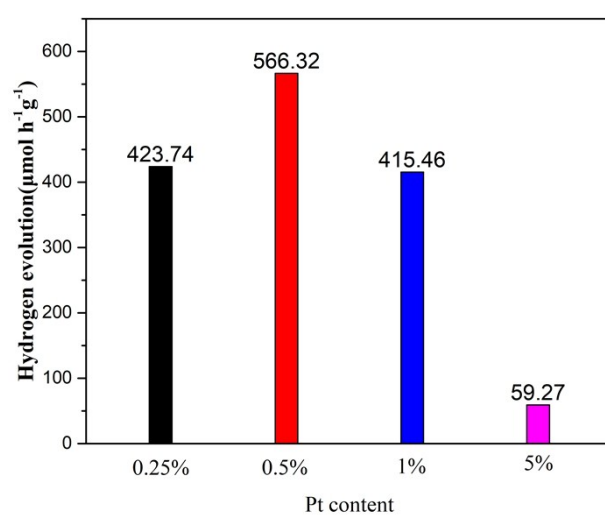


Fig. S7 H₂ evolution rates on the CdS/Pt photocatalysts with different Pt content.

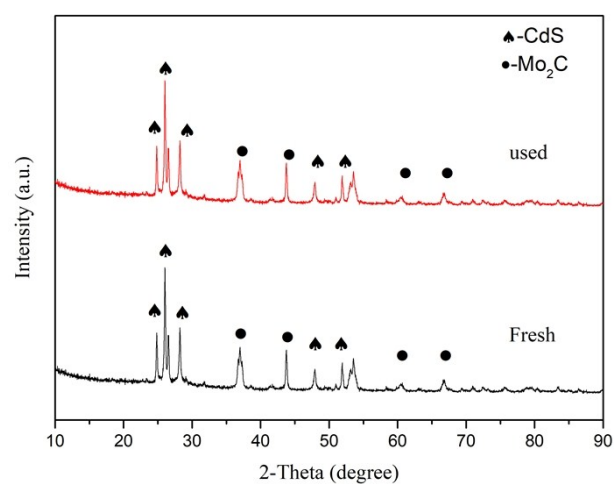


Fig. S8. Comparison on the XRD patterns of the fresh and used CdS/Pt/Mo₂C-0.5 after 4 runs of cycling test.

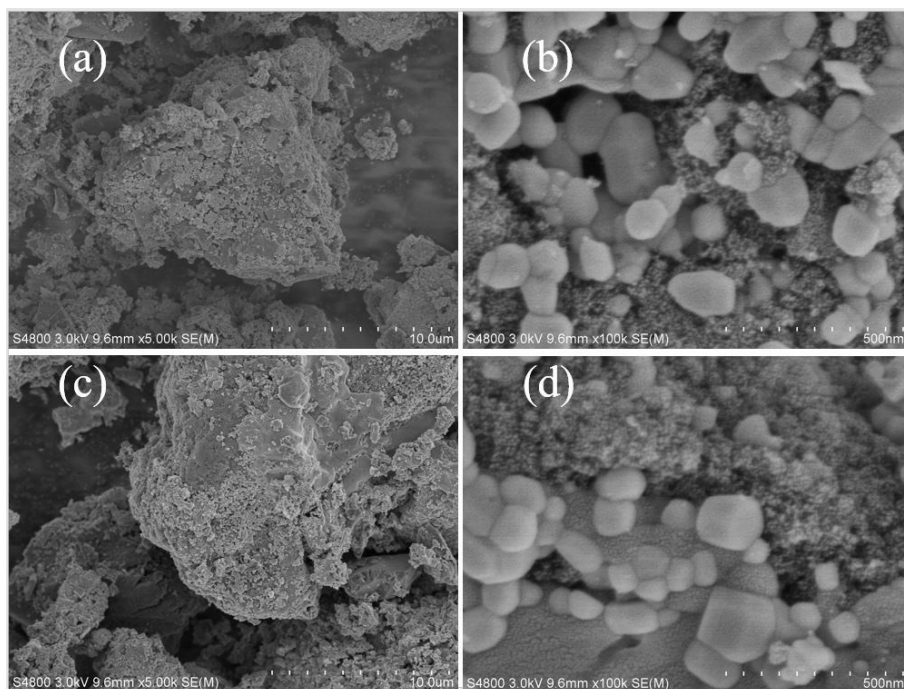


Fig. S9. Comparison on SEM images of the fresh (a and b), and used CdS/Pt/Mo₂C-0.5 after 4 (c and d) runs of cycling tests