

Supporting Information for

MOF-derived sulfur vacancies rich CdS nanoparticles in situ growth on 2D polymer for highly efficient photocatalytic hydrogen generation

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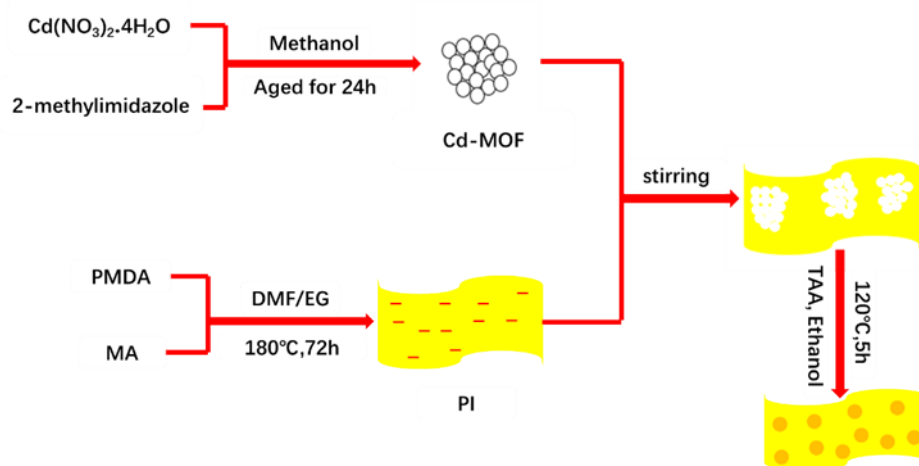


Fig. S1 Schematic illustration of the formation process of 18%CdS(MOF)/PI structures

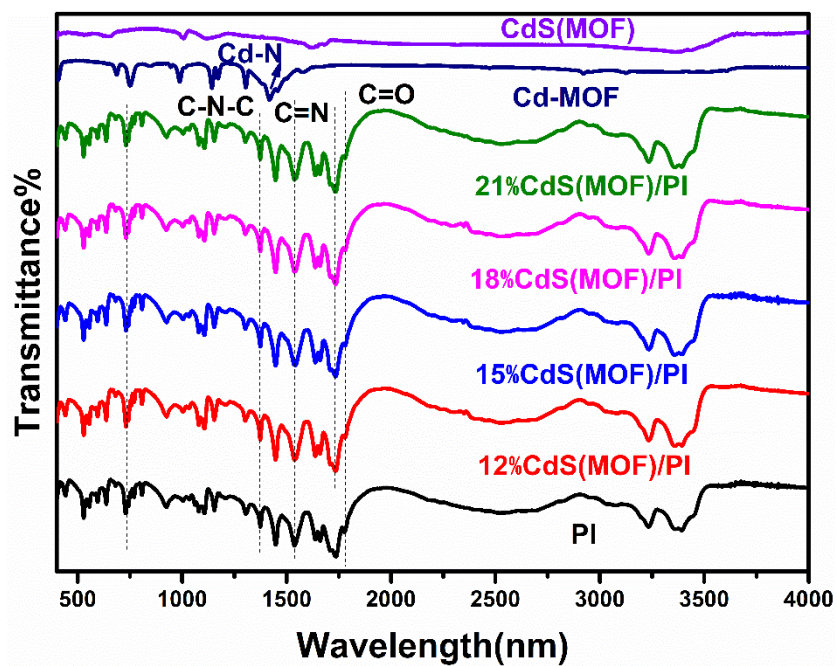


Fig. S2 FT-IR spectra of PI and CdS(MOF)/PI samples

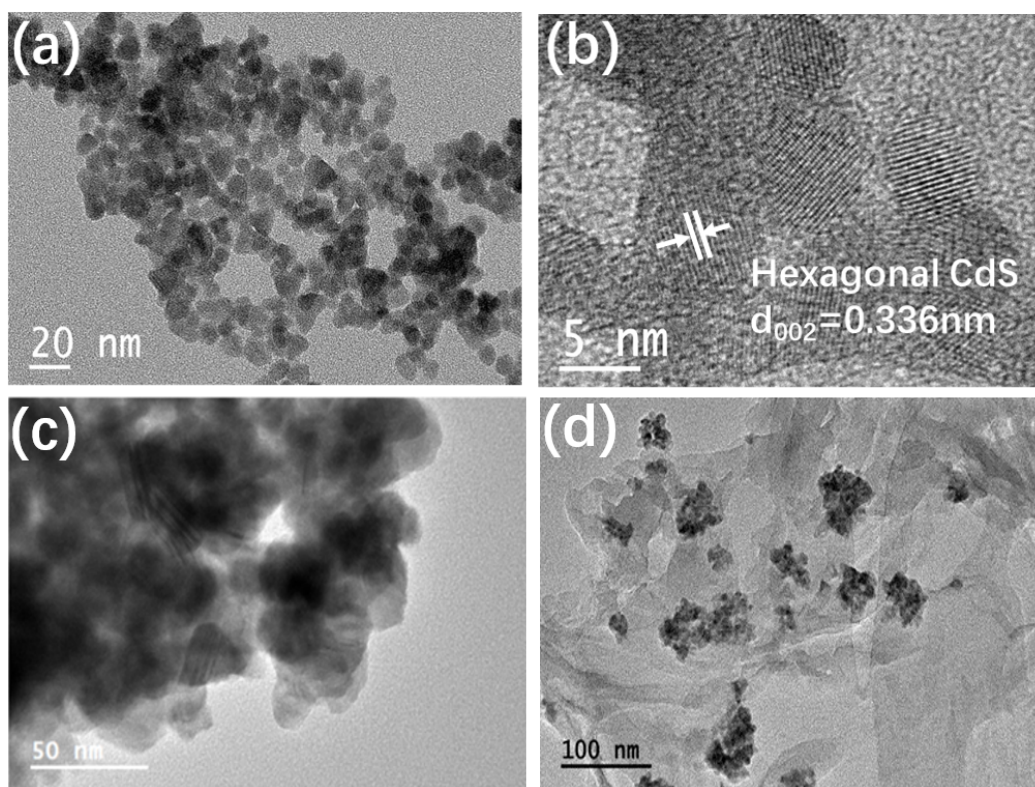


Fig. S3 TEM and HRTEM of (a-b) CdS (MOF), (c) CdS and (d)18%CdS/PI

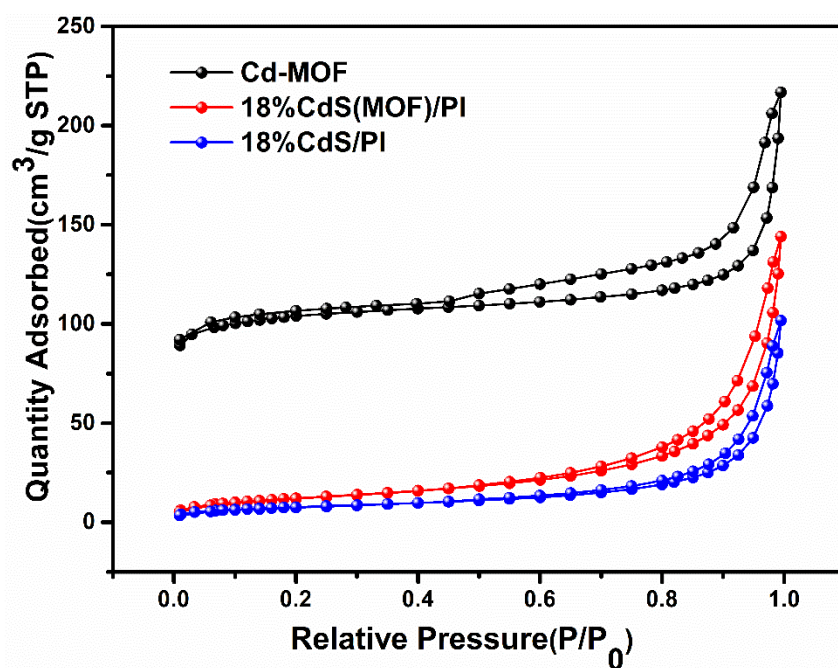


Fig. S4 N₂ adsorption/desorption isotherms of Cd-MOF, 18%CdS/PI-MOF and CdS/PI

Table S1 Structural parameters obtained from N₂ adsorption isotherms analysis

Samples	S_{BET} ($\text{m}^2 \cdot \text{g}^{-1}$)	Pore volume ($\text{cm}^3 \cdot \text{g}^{-1}$)	Average pore size (nm)
PI	20.1	0.08	21.66
Cd-MOF	350.8	0.24	27.06
18% CdS(MOF)/PI	44.9	0.14	12.46
18%CdS/PI	27.9	0.10	13.05

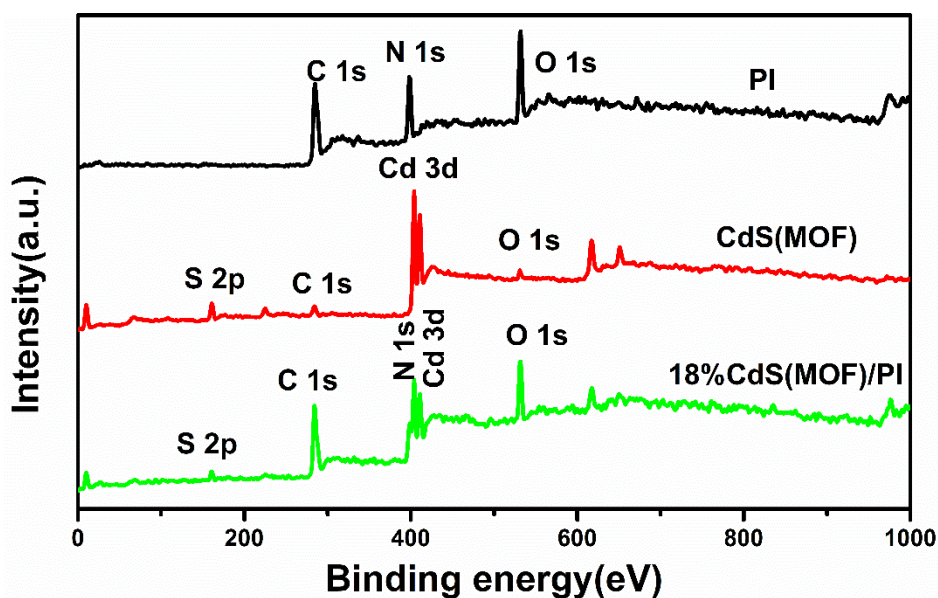


Fig. S5 XPS survey spectra of PI, CdS-MOF and 18%CdS/PI-MOF samples.

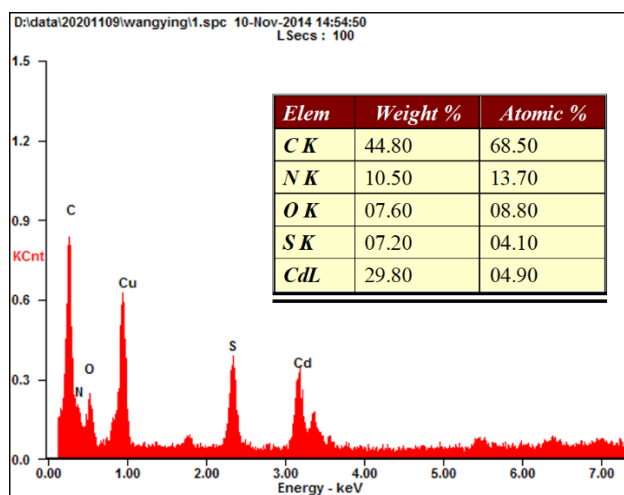


Fig. S6 energy-dispersive X-ray spectroscopy (EDS) of the 18%CdS (MOF)/PI

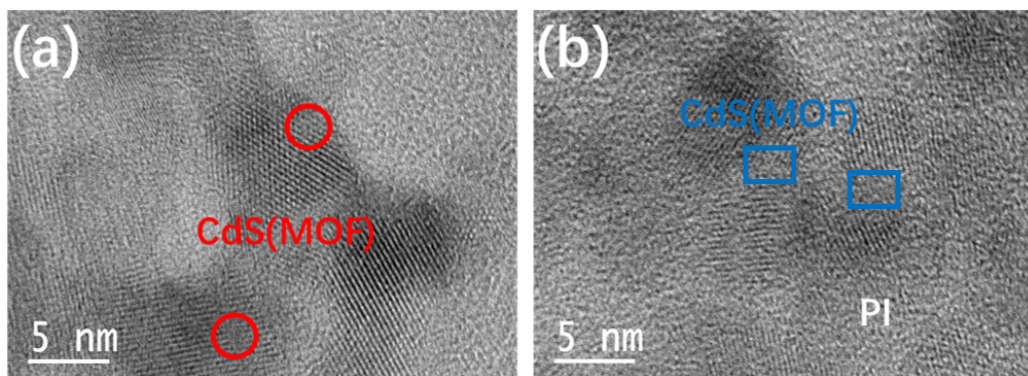


Fig. S7 HRTEM of (a) CdS (MOF) and (b) 18%CdS(MOF)/PI

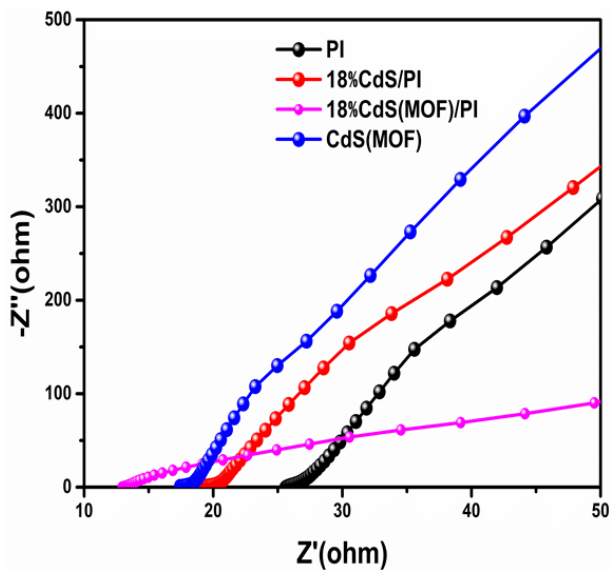


Fig. S8 Amplified pattern of high-frequency range of EIS spectra.

Table S2 Comparison of the H₂-production rates of CdS-polymer composite photocatalysts for water splitting.

Photocatalyst	Light source	Sacrificial agent	Noble metal cocatalyst	Activity $\mu\text{mol}\cdot\text{g}^{-1}\cdot\text{h}^{-1}$	Ref
N-GR/CdS	(300W Xe) >420nm	Na ₂ S/Na ₂ SO ₃	none	1050	[1]
RGO-ZnCdS	Solar simulator	Na ₂ S/Na ₂ SO ₃	none	1820.4	[2]
CdS/TNT	(500W Xe) >430nm	Na ₂ S/Na ₂ SO ₃	Pt	1760.7	[3]
CdS/CNTs	(350W Xe) >420nm	Na ₂ S/Na ₂ SO ₃	none	794.6	[4]
GO/CdS	(350W Xe) >420nm	-	Pt	1120	[5]
CdS/g-C ₃ N ₄	(300W Xe) >420nm	Na ₂ S/Na ₂ SO ₃	Pt	4152	[6]
Ni(OH) ₂ -CdS/g-C ₃ N ₄	(300W Xe) >420nm	Na ₂ S/Na ₂ SO ₃	Ni	115.18	[7]
CdS/PANI	(300W Xe) >420nm	Na ₂ S/Na ₂ SO ₃	none	310	[8]
This work	(300W Xe) >420nm	Lactic acid	none	2160	/

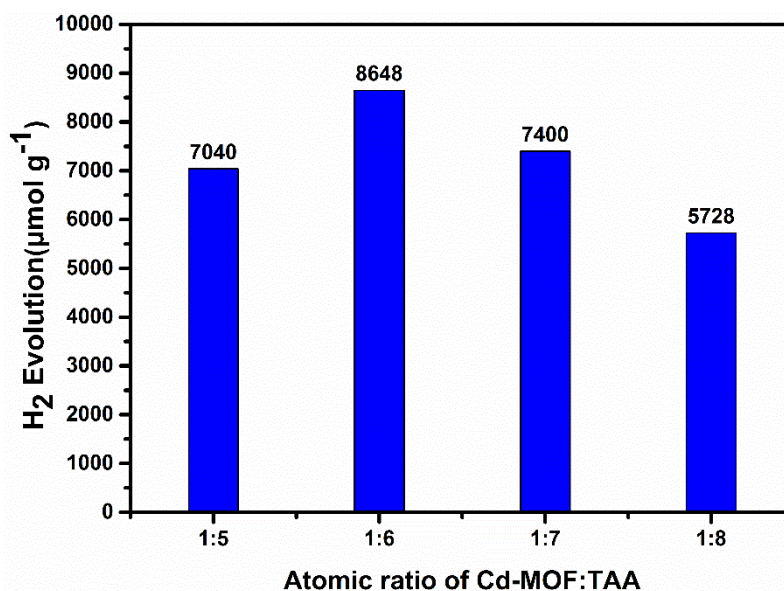


Fig. S9 The photocatalytic H₂ production of 18%CdS (MOF)/PI photocatalysts synthesized from different atomic ratio of Cd-MOF: TAA after 4 hours of illumination

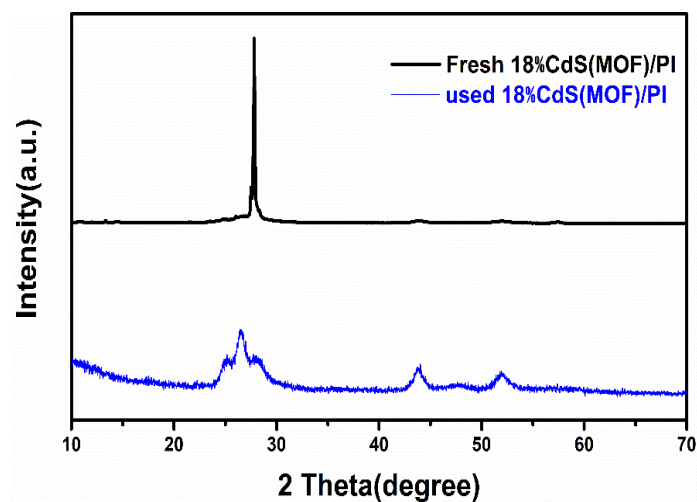


Fig. S10 XRD patterns of fresh and used 18%CdS(MOF)/PI samples.

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