Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary information

In situ Constructed Oxygen-vacancy-rich MoO_{3-x}/Porous *g*-C_3N_4 Heterojunction for Synergistically Enhanced Photocatalytic H_2 Evolution

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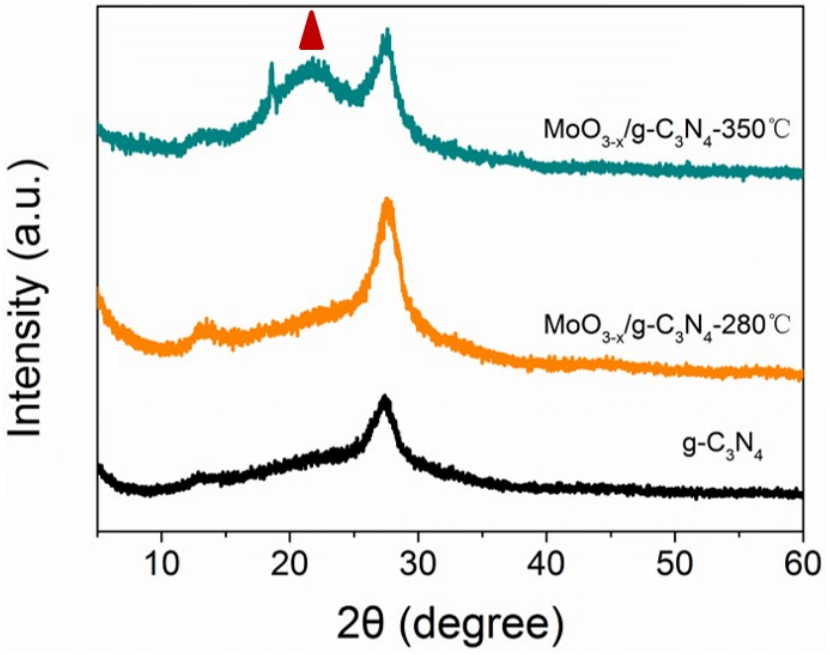

Figure S1 XRD patterns of *g*-C_3N_4, MoO_{3-x}/*g*-C_3N_4 (calcination at 280 ℃), and MoO_{3-x}/*g*-C_3N_4 (calcination at 350 ℃).

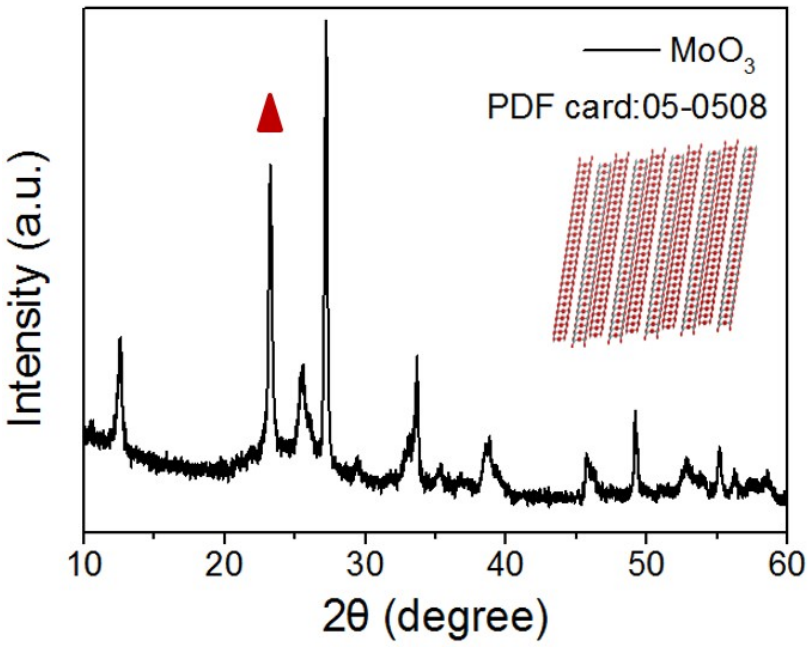

Figure S2 XRD pattern of MoO_3 (The Mo $(OH)_6$ precursor was calcined at 400 ℃), the illustration shows the crystal structure of MoO_3.

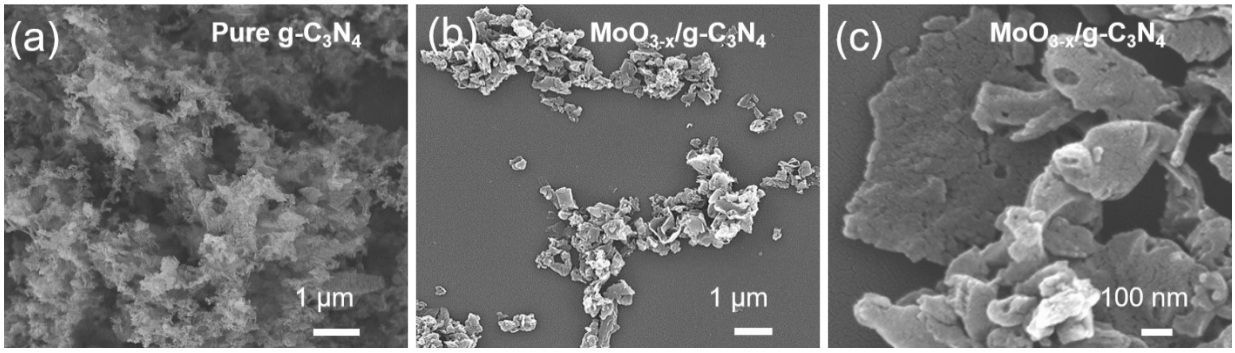

Figure S3 SEM images of pure *g*-C_3N_4 and MoO_{3-x}/*g*-C_3N_4.

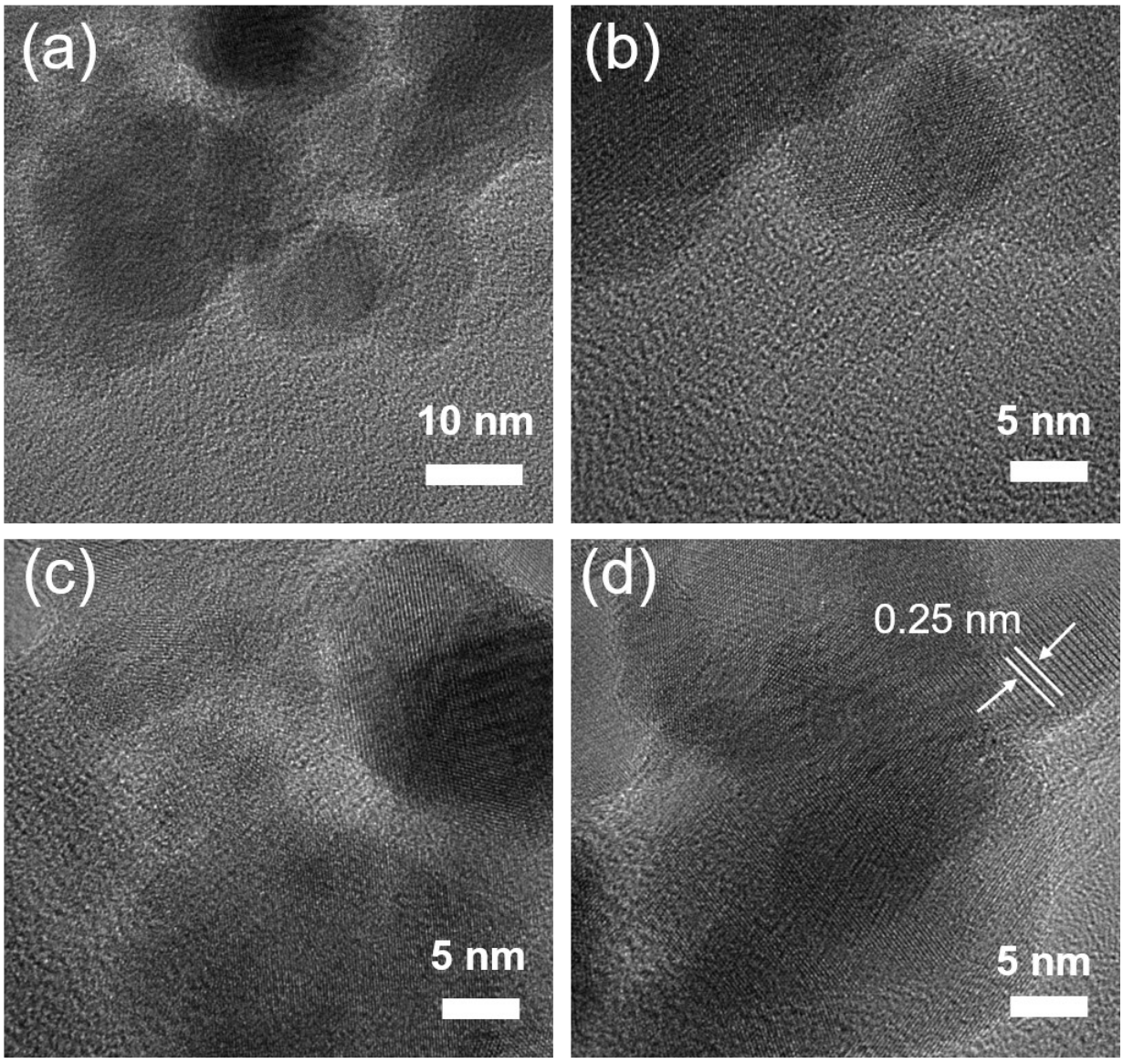

Figure S4 HR-TEM images of MoO_{3-x}/*g*-C_3N_4.

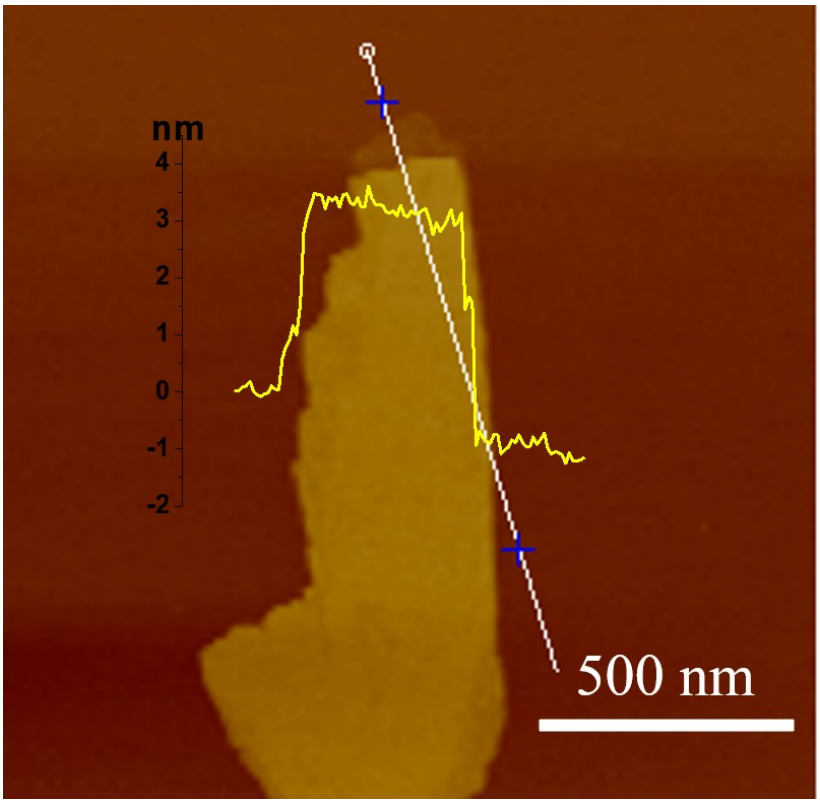

Figure S5 AFM image of pure *g*-C_3N_4 nanosheets.

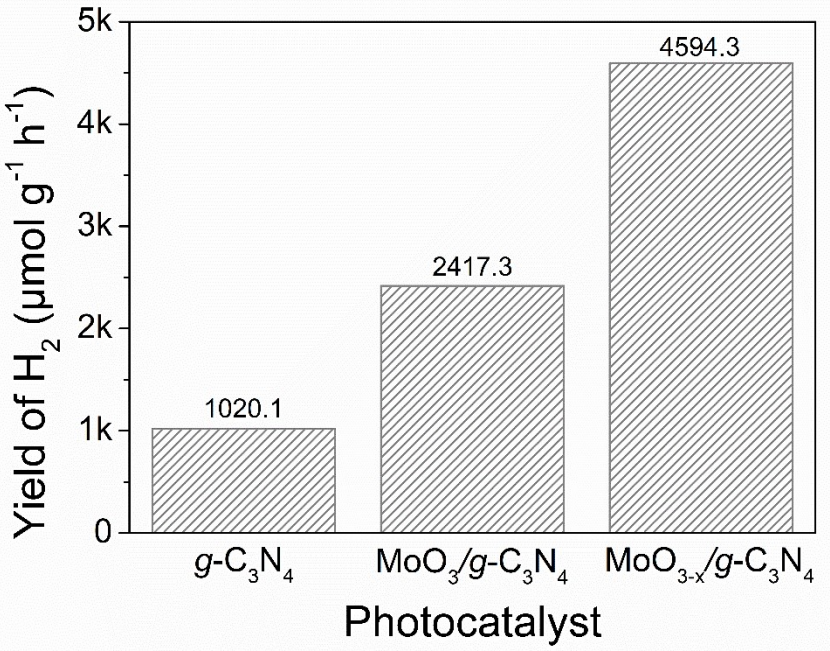

Figure S6 Photocatalytic hydrogen production rates of g-C_3N_4, 5% MoO_3/g-C_3N_4 and 5% MoO_{3-x}/g-C_3N_4.

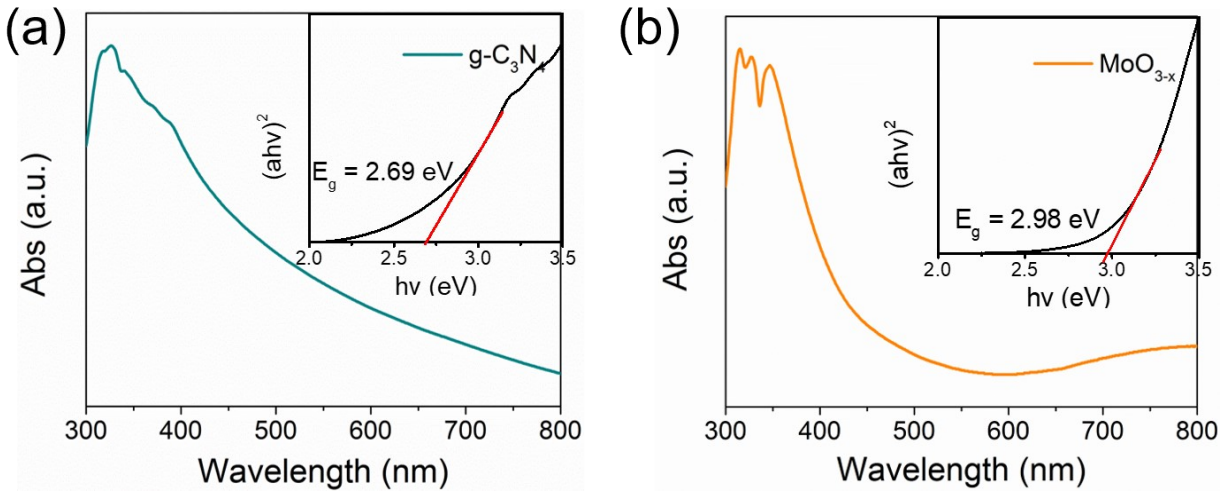

Figure S7 UV−vis diffuse reflectance spectra of *g*-C_3N_4 (a) and MoO_{3-x} (b), the illustrations are their corresponding Tauc's plot.

Table S1. The N/C ratios of *g*-C_3N_4 and MoO_{3-x}/*g*-C_3N_4 calculated by XPS.

g-C_3N_4	Atomic %	N/C ratio	MoO_{3-x}/g-C_3N_4	Atomic %	N/C ratio
N1s	54.06		N1s	45.40	
O1s	4.92	1.32	O1s	4.47	1.02
C1s	41.02		C1s	44.08	
			Mo 3s	3.44	
			Na 1s	1.42	
			Cl 2p	1.18	

Table S2. The ratios of different O species of MoO_3 calculated by XPS.

Species	Peak BE	FWHM eV	Area (P) CPS. eV	Ratio %
Lattice oxygen	530.5	1.34	230460.80	72.02
Defect oxygen	532.2	1.67	69881.18	21.84
Hydroxyl oxygen	533.0	1.37	19636.34	6.14

Table S3. The ratios of different O species of MoO_{3-x}/*g*-C_3N_4 calculated by XPS.

Species	Peak BE	FWHM eV	Area (P) CPS.eV	Ratio %
Lattice oxygen	531.1	1.55	17656.19	31.67
Defect oxygen	532.2	1.49	27133.34	48.67
Adsorbed water	535.4	3.16	10963.82	19.66

Table S4. Photocatalytic hydrogen production performance of similar photocatalysts reported in recent references.

Photocatalysts	**HER performance /μmol h^{-1} g^{-1}**	**Co-catalyst**	**Sacrificial agent**	**Reference**
MoS_2/*g*-C_3N_4	3570.0	2 wt% Pt	TEOA	Ref. 1
WO_3/*g*-C_3N_4	982.0	2 wt% Pt	lactic acid	Ref. 2
Cu $(OH)_2$/*g*-C_3N_4	48.7	--	CH_3OH	Ref. 3
MoO_{3-x}/*g*-C_3N_4	4694.3	2 wt% Pt	TEOA	This work
MoO_{3-x}/*g*-C_3N_4	821.0	2 wt% Pt	lactic acid	This work

Refences

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2. J. Fu, Q. Xu, J. Low, C. Jiang and J. Yu, *Appl. Catal. B*, 2019, **243**, 556-565.

3. X. S. Zhou, Z. H. Luo, P. F. Tao, B. Jin, Z. J. Wu and Y. S. Huang, *Mater. Chem. Phys.*, 2014, **143**, 1462-1468.