Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting Information

Highly enhanced H_2 evolution of MoO_3/g-C_3N_4 hybrid composites based on direct Z-scheme photocatalytic system

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Contents

1.1 Characterizations

X-ray diffraction (XRD) patterns were recorded on a PAN-analytical Xpert Pro MRD X-ray diffractometer (the Netherlands). Fourier transform infrared (FTIR) spectra were obtained on a Thermo fisher Nicolet iS8 facilities. Photoluminescence spectra were taken on a Hitachi F-4600 fluorescence spectrophotometer (Japan). X-ray photoelectron spectroscopy (XPS) analysis measurements were performed on a Thermo Fisher ESCALAB 250Xi X-ray photoelectron spectrometer equipped with a monochromatic Al (Ka) source (USA). Scanning electron microscope (FESEM) images were obtained by using a Hitachi S-4800 scanning electron microscope (Japan). Transmission electron microscope (TEM) images were taken on a JEOL JEM-2100 transmission electron microscope (Japan). Time resolution photoluminescence (TRPL) decay spectrum were recorded with a PicoQuant FluoTime 200 (Japan). UV–vis spectra were recorded with a Hitachi U-3900 UV-vis spectrophotometer (Japan). N_2 adsorption and desorption isotherms were investigated on Micromeritics ASAP-2020 nitrogen adsorption apparatus (USA). The Brunauer–Emmett–Teller (BET) specific surface area (S_{BET}) was calculated from Brunauer-Emmett Teller modal.

1.2 Figures and Tables

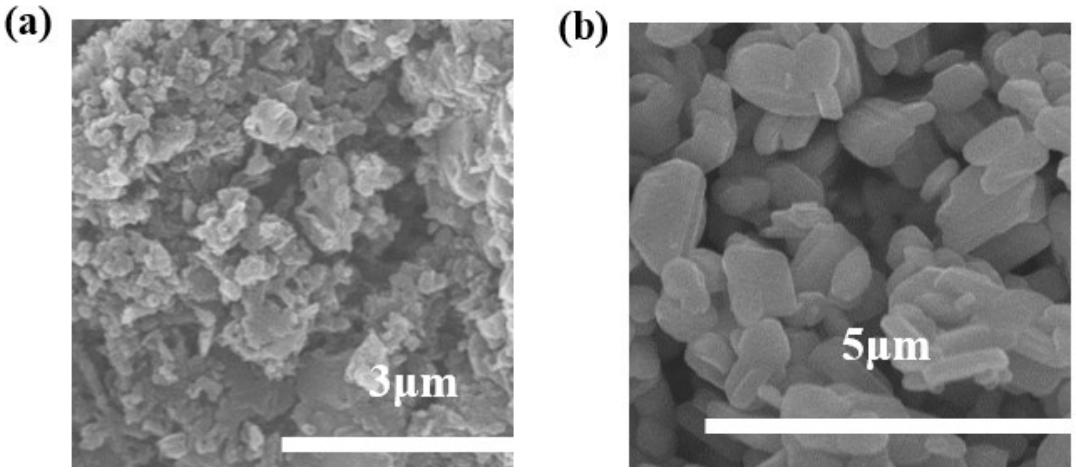

Figure S1. SEM images of (a) pristine carbon nitride (b) MoO_3.

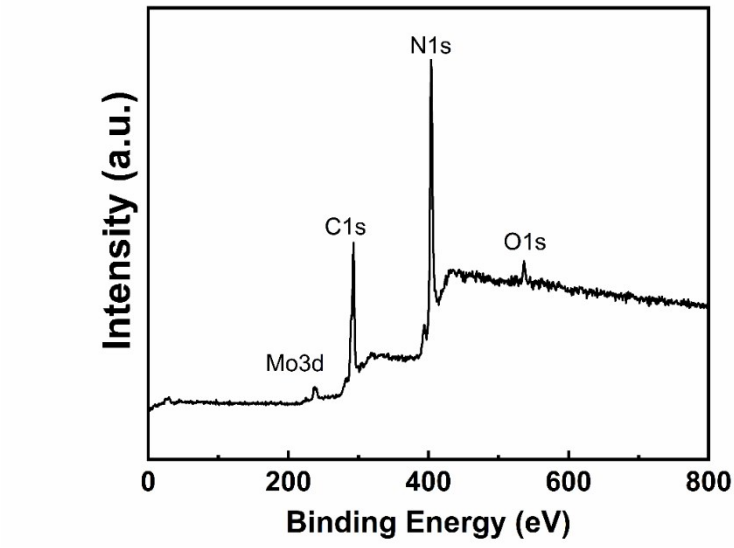

Figure S2. XPS data for 0.1 MoO_3/g-C_3N_4 sample.

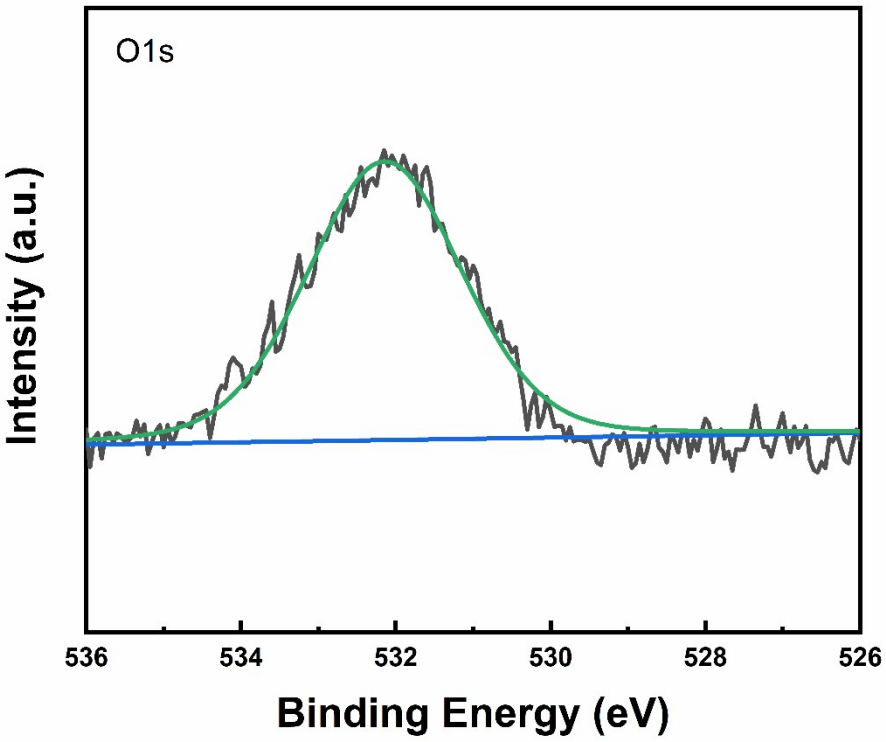

Figure S3. High resolution XPS O 1s spectrum of pristine carbon nitride.

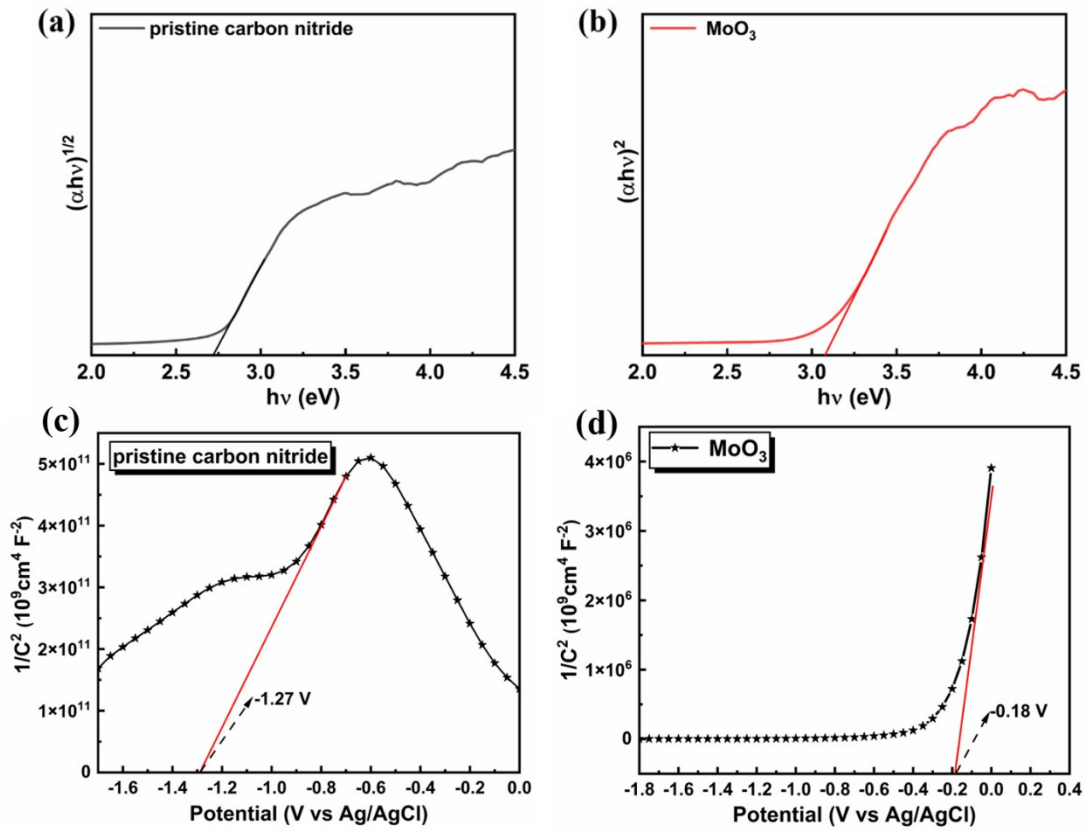

Figure S4. Band gap potential of (a) g-C_3N_4, (b) MoO_3. Mott−Schottky plots of (c) pristine carbon nitride and (d) MoO_3.

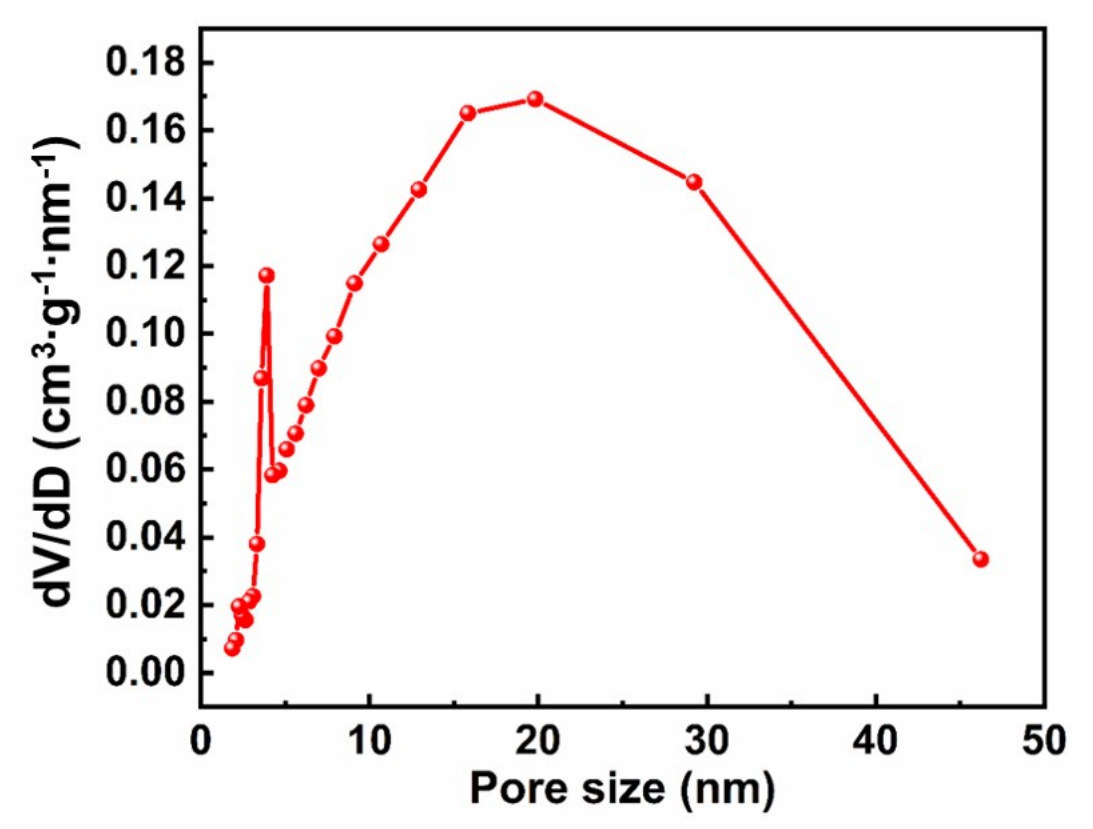

Figure S5. Pore-size distribution of 0.2 MoO_3/g-C_3N_4.

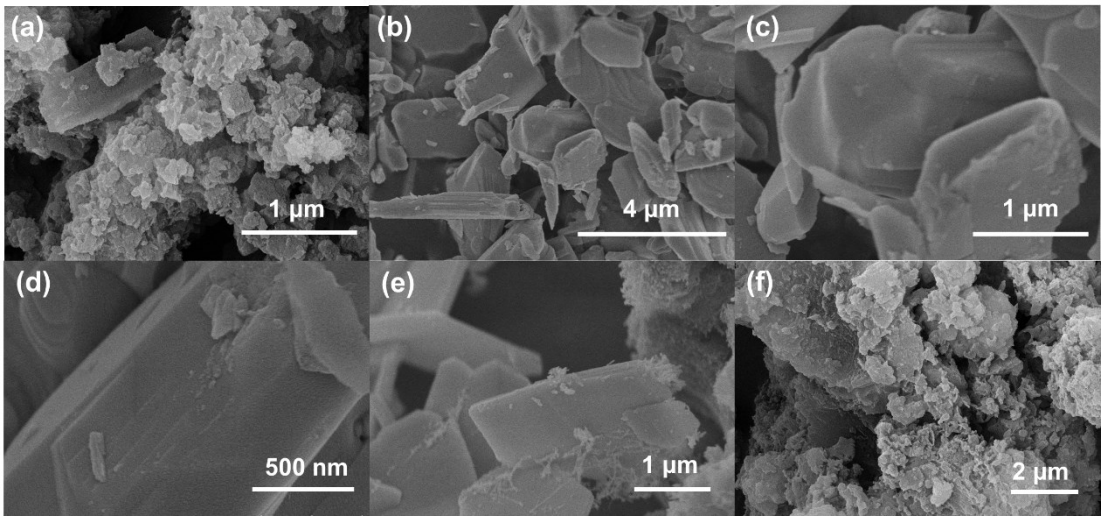

Figure S6. SEM images of (a) 0.05 MoO_3/g-C_3N_4 (b,c) 0.2 MoO_3/g-C_3N_4 (d) 0.5 MoO_3/g-C_3N_4 (e,f) 1.0 MoO_3/g-C_3N_4 samples.

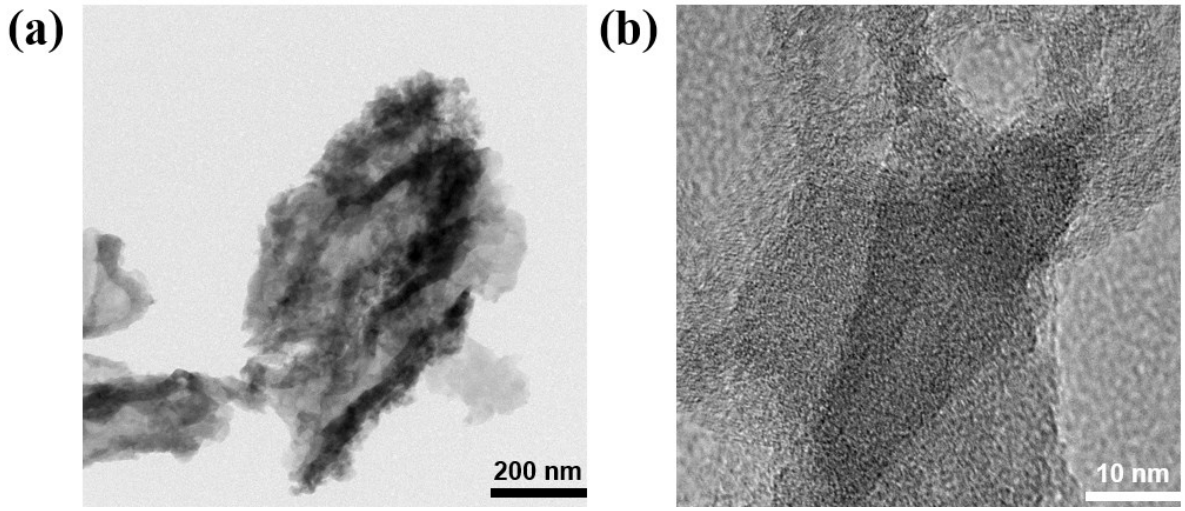

Figure S7. (a) HRTEM and (b) TEM images of 0.1 MoO_3/g-C_3N_4.

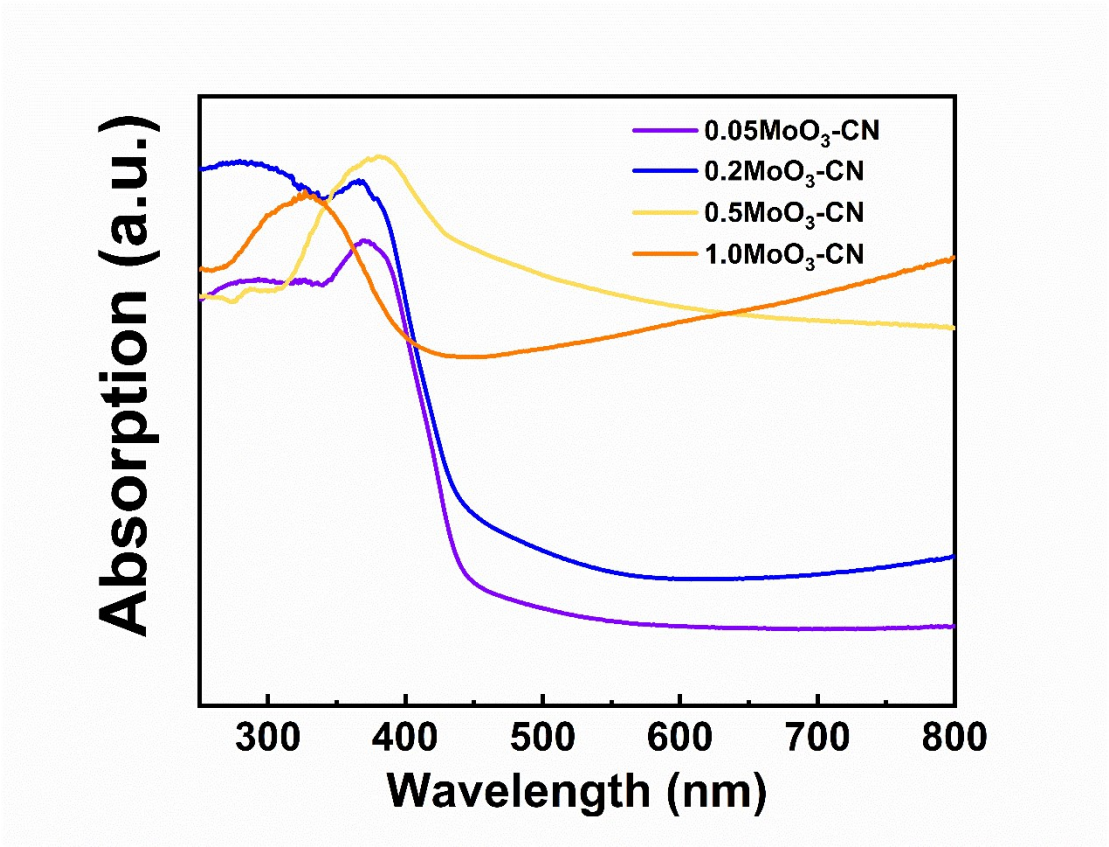

Figure S8. Absorption spectra of 0.05 MoO_3/g-C_3N_4, 0.2 MoO_3/g-C_3N_4, 0.5 MoO_3/g-C_3N_4 and 1.0 MoO_3/g-C_3N_4 samples.

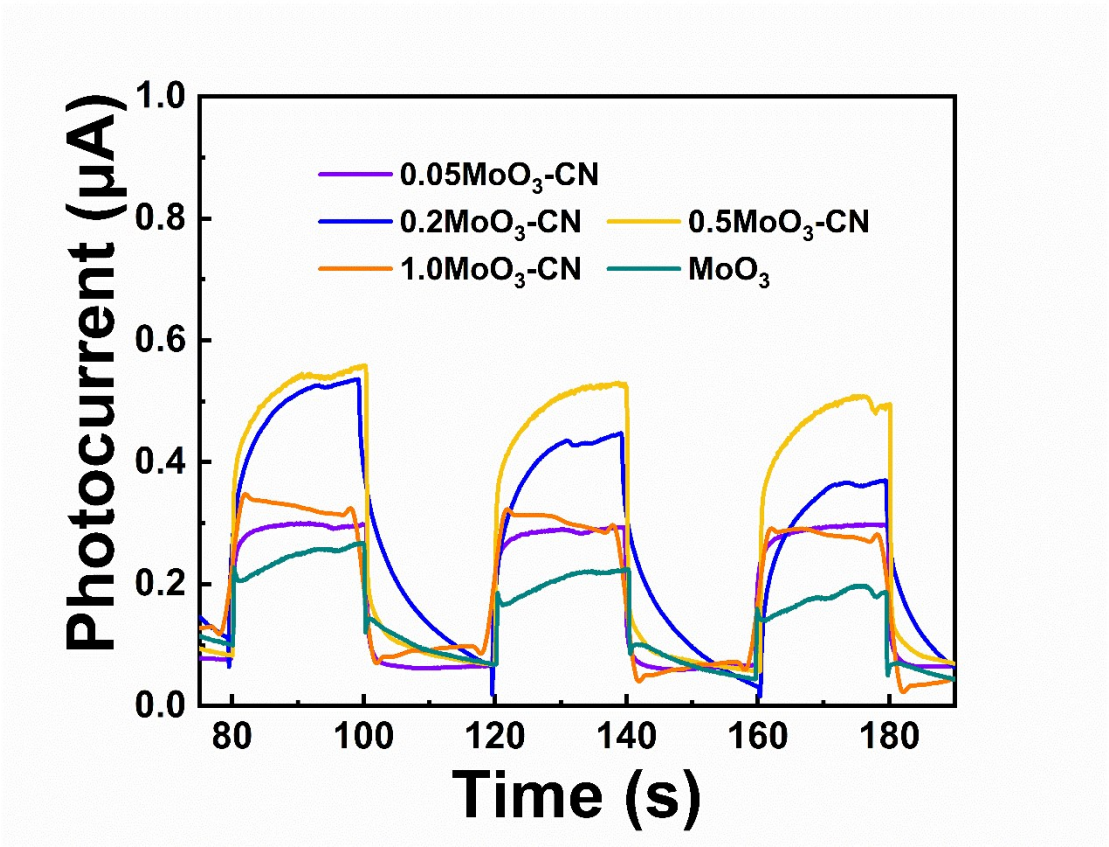

Figure S9. Visible light photocurrent response of 0.05 MoO_3/g-C_3N_4, 0.2 MoO_3/g-C_3N_4, 0.5 MoO_3/g-C_3N_4, 1.0 MoO_3/g-C_3N_4 and MoO_3 samples in 0.5 M Na_2SO_4 aqueous solution under visible light irradiation.

Table S1. Contents of C, H, N elements in MoO_3/g-C_3N_4 hybrid.

	N [%]	C [%]	H [%]
0.05 MoO_3/g-C_3N_4	61.15	33.69	1.558
0.1 MoO_3/g-C_3N_4	60.69	33.72	1.684
0.2 MoO_3/g-C_3N_4	48.55	26.7	1.277
1.0 MoO_3/g-C_3N_4	52.66	27.15	1.317

Table S2. BET specific surface area of the materials.

Sample	pristine carbon nitride	0.05 MoO_3/g-C_3N_4	0.1 MoO_3/g-C_3N_4	0.2 MoO_3/g-C_3N_4
S_{BET} ($m^2 \cdot g^{-1}$)	12.0	34.05	43.72	64.25