Supporting Information

Oxygen-deficient MoO_{3-x} evoked synergistic photo-thermal catalytic CO_2 reduction over g-C_3N_4

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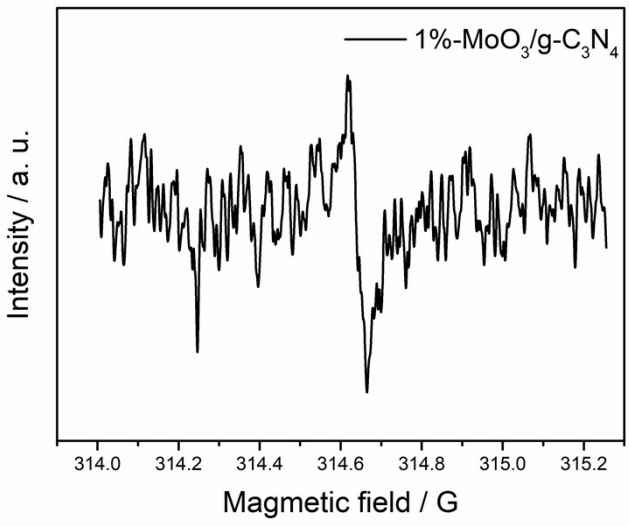

Figure S1 EPR spectrum of 1%-MoO_3/g-C_3N_4 in the dark.

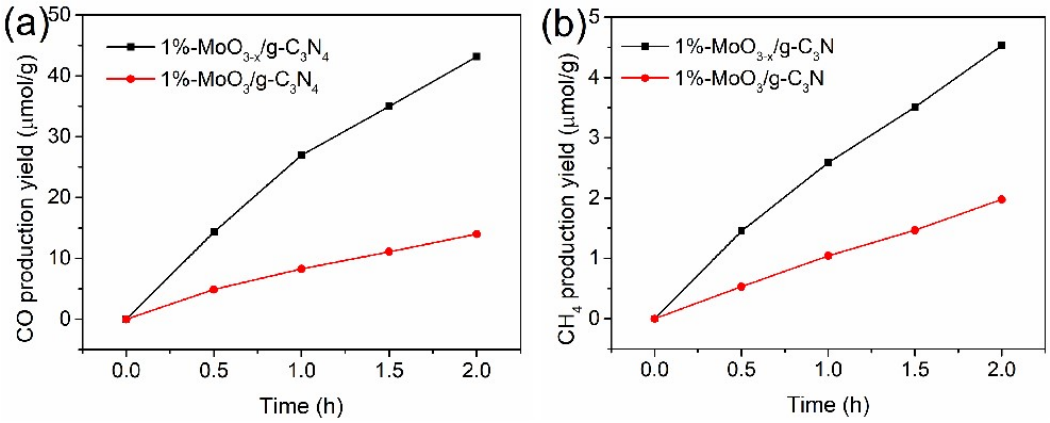

Figure S2 Photo-thermal catalytic CO_2 reduction into (a) CO and (b) CH_4 over 1%-MoO_{3-x}/g-C_3N_4 and 1%-MoO_3/g-C_3N_4 under UV-Vis-IR light irradiation for 2 h.

Table S1 Comparison of photocatalytic activity of CO_2 reduction over g-C_3N_4-based materials reported in the literature.

Photocatalytic Materials	Light Source	CH_4 Production rate	CO Production rate	Ref.
MoO_{3-x}/ g-C_3N_4	300 W Xe lamp	4.53μmol/g/h	43.15μmol/g/h	This work

g-C_3N_4/Cu_2O@Cu	300 W Xe lamp	3.1μmol/g/h	10.8μmol/g/h	[1]
CeO_2/3D g-C_3N_4	300 W Xe lamp	3.03μmol/g/h	4.69μmol/g/h	[2]
W^{6+}/ g-C_3N_4	300 W Xe lamp	4.45μmol/g/h	5.75μmol/g/h	[3]
$Cu_{2-x}S$/g-C_3N_4	300 W Xe lamp	23.7μmol/g/h	319.4μmol/g/h	[4]
NiO/g-C_3N_4	300 W Xe lamp	1.79μmol/g/h	2.75μmol/g/h	[5]
FeV_2O_4/g-C_3N_4	300 W Xe lamp	0.715μmol/g/h	9.58μmol/g/h	[6]

References

[1] B. L. Dai, W. Zhao, W. Wei, J.H. Cao, G. Yang, S.J. Li, C. Sun, D.Y. Leung, Photocatalytic reduction of CO_2 and degradation of Bisphenol-S by g-C_3N_4/Cu_2O@ Cu S-scheme heterojunction: Study on the photocatalytic performance and mechanism insight. Carbon, 193 (2022) 272-284.

[2] X. X. Zhao, J. R. Guan, J. Z. Li, X. Li, H. Q. Wang, P. W. Huo, Y. S. Yan, CeO_2/3D g-C_3N_4 heterojunction deposited with Pt cocatalyst for enhanced photocatalytic CO_2 reduction. Applied Surface Science, 537 (2021) 147891.

[3] Y. J. Liang, X. Wu, X. Y. Liu, C. H. Li, S. W. Liu, Recovering solar fuels from photocatalytic CO_2 reduction over W^{6+}-incorporated crystalline g-C_3N_4 nanorods by synergetic modulation of active centers. Applied Catalysis B: Environmental, 304 (2022) 120978.

[4] L. S. Jiang, K. Wang, X. Y. Wu, and G. K. Zhang, Highly Enhanced Full Solar Spectrum-Driven Photocatalytic CO_2 Reduction Performance in $Cu_{2-x}S$/g-C_3N_4 Composite: Efficient Charge Transfer and Mechanism Insight. Solar RRl, 5 (2021) 2000326.

[5] L. X. Wang, Y. L. Dong, J. Y. Zhang, F. F. Tao, J. J. Xu, Construction of NiO/g-C_3N_4 pn heterojunctions for enhanced photocatalytic CO_2 reduction. Journal of Solid State Chemistry, 308 (2022) 122878.

[6] X. Zhao, D. F. Han, M. J. Dai, Y. Y. Fan, Z. X. Wang, D. X. Han, L. Niu, Direct Z-scheme FeV_2O_4/g-C_3N_4 binary catalyst for highly selective reduction of carbon dioxide. Chemical Engineering Journal, 436 (2022) 132051.