g-C_3N_4/CoNiFe-LDH Z-Scheme Heterojunction for efficient CO_2 photoreduction and MB dye photodegradation

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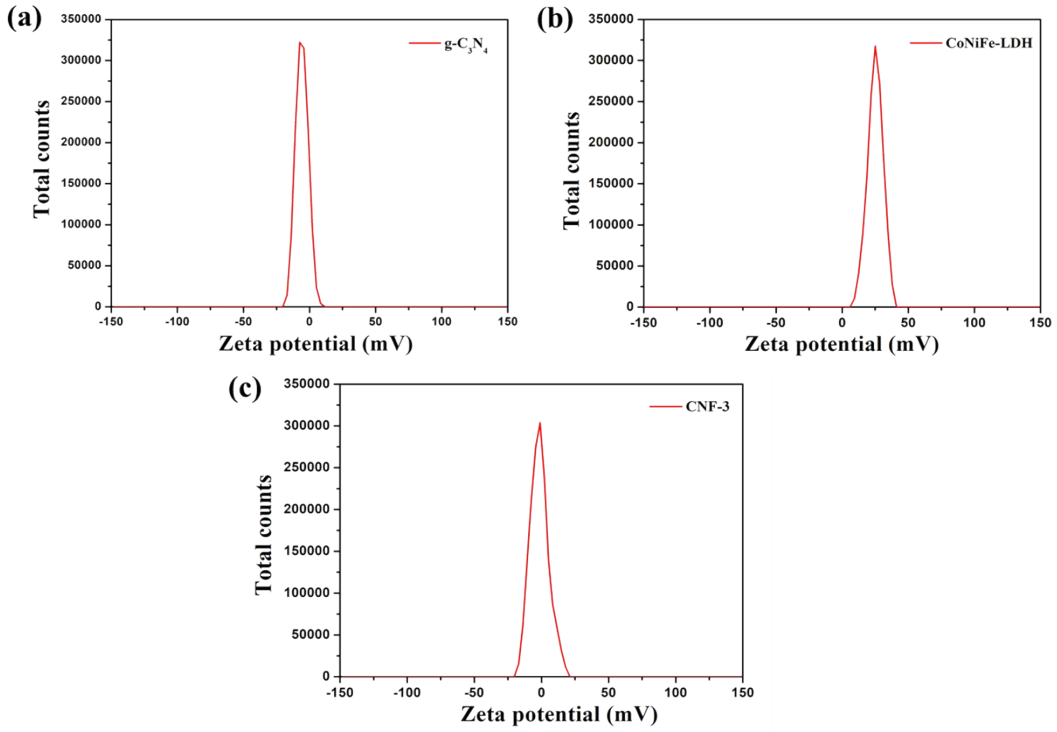

Fig. S1 Zeta potentials of (a) g-C_3N_4, (b) CoNiFe-LDH, (c) CNF-3 samples dispersed in water.

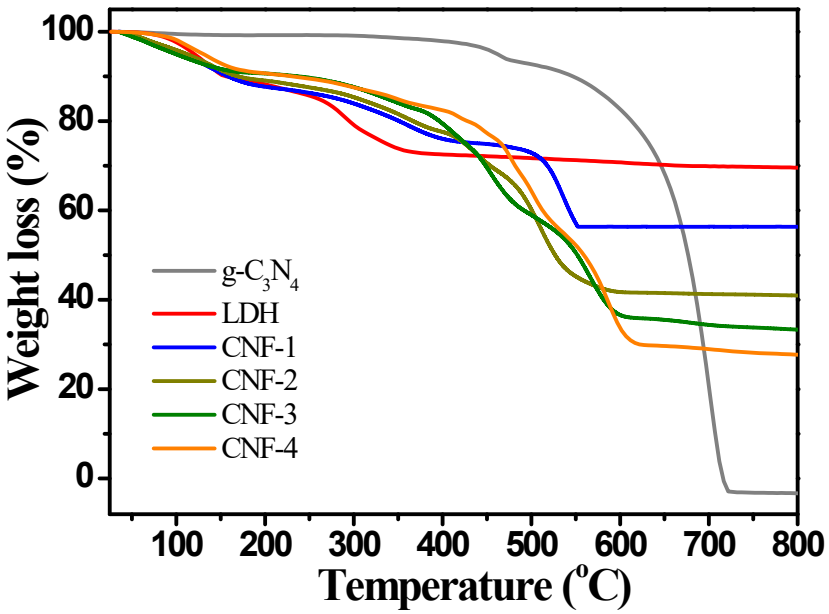

Fig. S2 TGA curves of the synthesized samples.

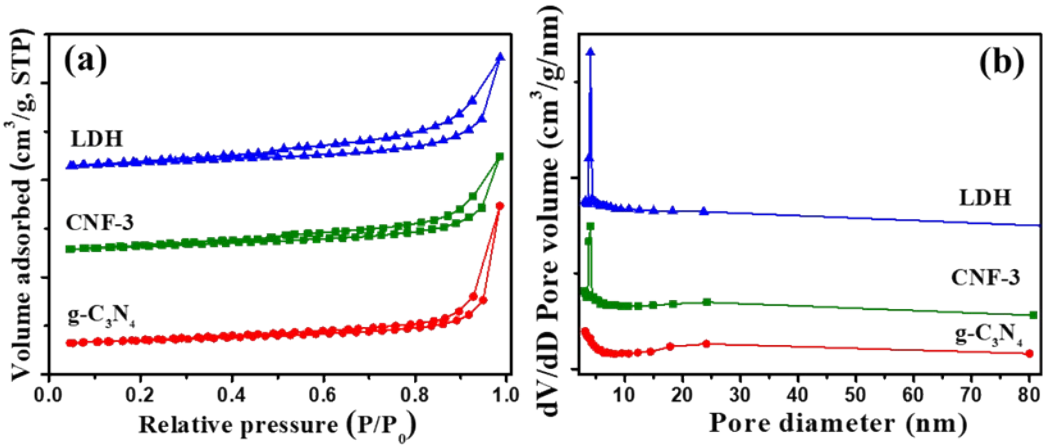

Fig. S3 (a) N_2 adsorption/desorption isotherms and (b) the corresponding pore size distribution of different samples.

Table S1. Comparative performance of inorganic heterostructures for the photocatalytic reduction of CO_2

Material	Reaction conditions	Light source	Product	CO Yied/ μmol g^{-1} h^{-1}	Ref.
CoNiFe-LDH/g-C_3N_4	CO_2 and water vapor	300 W Xe	CO	42.05	This work
CuS atomic layer	CO_2 and water vapor	IR light	CO	14.5	1
Cu/C_3N_4-6	CO_2 and 0.1 M $KHCO_3$	350W Xe lamp	CO	9.9	2
P/Bi-BOB-0.25	CO_2 and water vapor	300 W Xe lamp	CO	3.14	3
BON-Br	CO_2 and water vapor	300 W Xe lamp	CO	8.12	4
CoZnAl-LDH/ rGO/g-C_3N_4	CO_2 and water vapor	300 W Xe lamp	CO	10.11	5
Ti_3C_2/g-C_3N_4	CO_2 and water vapor	300 W Xe lamp (λ≥420nm)	CO	2.24	6
NG/CdS	CO_2 and water vapor	300 W Xe lamp (λ≥420nm)	CO	2.59	7
CdS/$CdWO_4$	CO_2 and water vapor	300 W Xe lamp	CO	1.39	8
CN-PA12	CO_2 and water vapor	(100 mW•cm^{-2})	CO and CH_4	5.42	9
K-CN-7	CO_2 and water vapor	Visible-light (λ>420 nm)	CO	8.7	10
Pt@45CeO_2/ 3DCN	CO_2 and 0.1 M NaOH	UV light	CO and CH_4	4.69	11
Cu_2O-loaded Zn-Cr-LDH	CO_2 and water vapor	200W Hg-Xe	CO	1.3	12

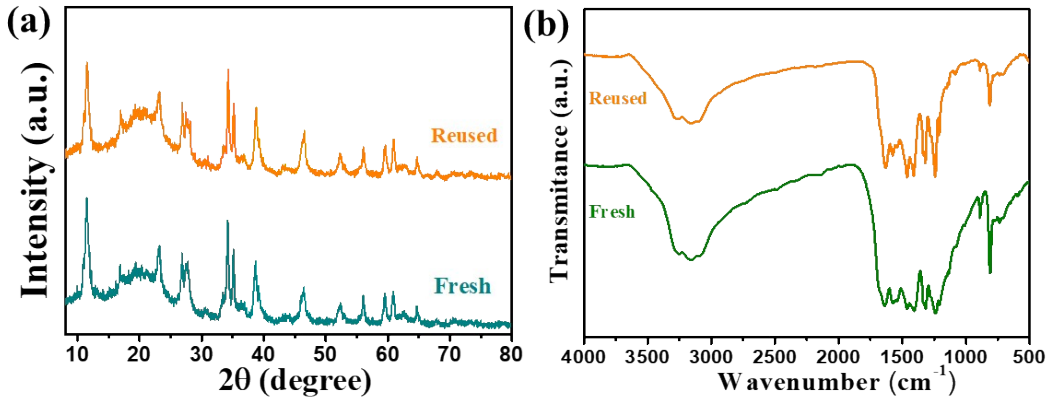

Fig. S4 (a) XRD patterns and (b) FT-IR of CNF-3 photocatalyst before and after photocatalytic reactions.

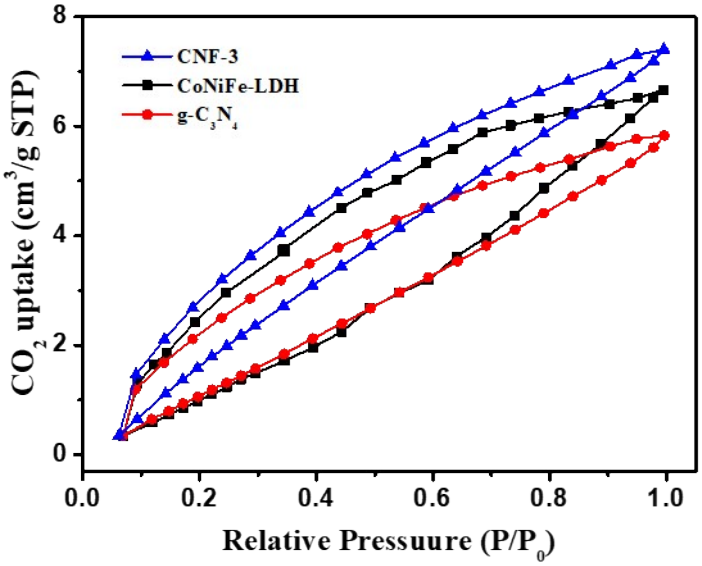

Fig. S5 CO_2 adsorption-desorption isotherms of the CNF-3, pure C_3N_4 and LDH.

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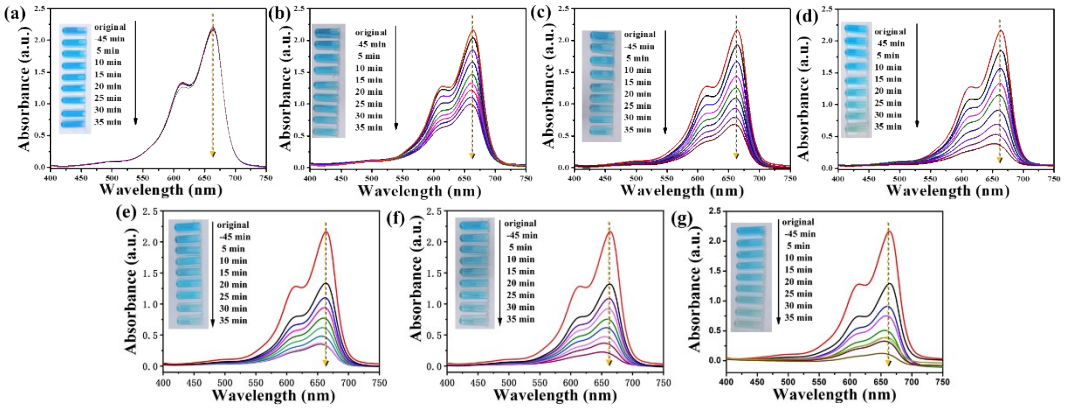

Fig. S6 The time-dependent UV-vis absorption spectra of MB with the use of different samples: (a) no catalyst; (b) H_2O_2; (c) H_2O_2+LDH; (d) H_2O_2+g-C_3N_4; (e) H_2O_2+CNF-1; (f) H_2O_2+CNF-2; (g) H_2O_2+ CNF-4.

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