Supporting information

Construction and Engineering of Interfacial Structure in $Cu_x/FeMgO_y$ Catalyst for Photoreduction of CO_2 to Ethylene

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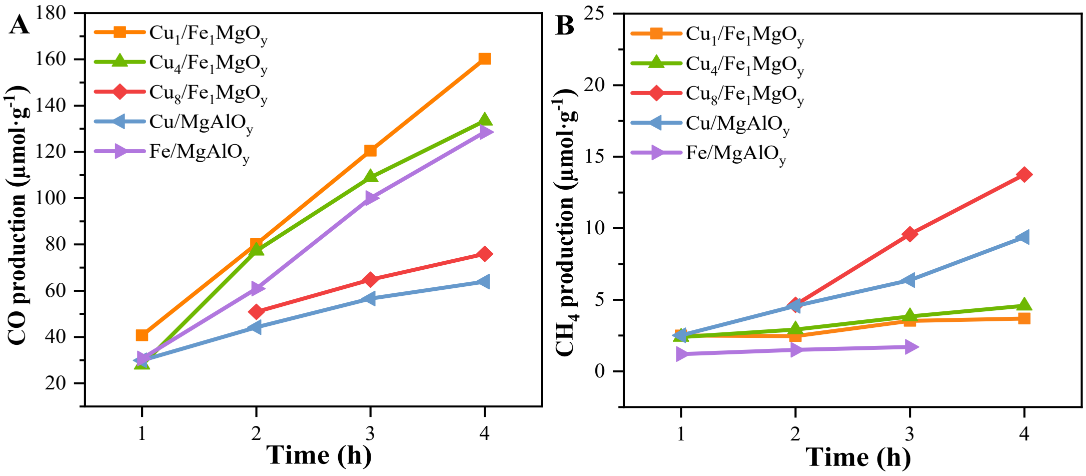

Figure S1. Production of (A) CO, (B) CH_4 on Cu_x/Fe_1MgO_y, $Cu/MgAlO_y$ and $Fe/MgAlO_y$ catalysts

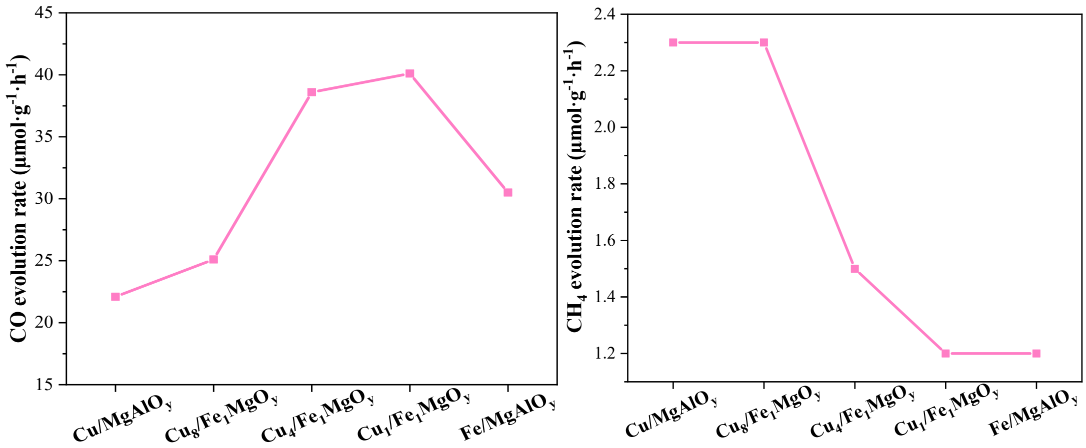

Figure S2. Evolution rate of CO and CH_4 at 2h over Cu_x/Fe_1MgO_y, $Cu/MgAlO_y$ and $Fe/MgAlO_y$ catalysts

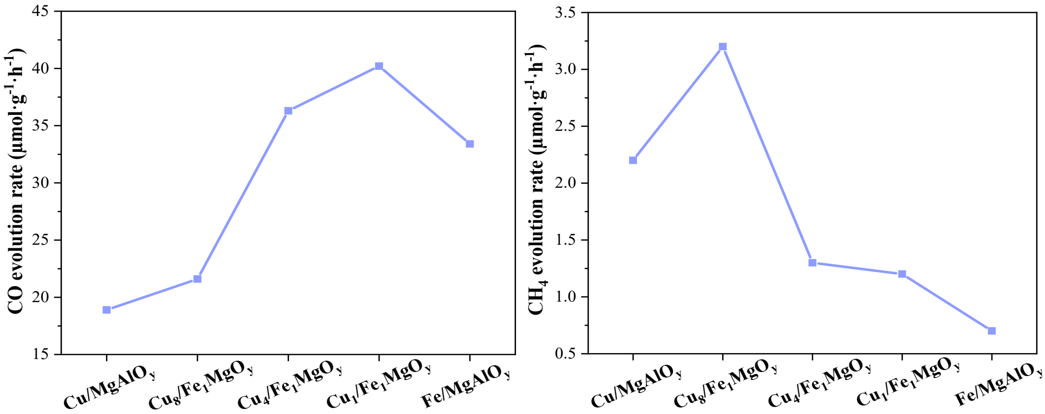

Figure S3. Evolution rate of CO and CH_4 at 3h over Cu_x/Fe_1MgO_y, $Cu/MgAlO_y$ and $Fe/MgAlO_y$ catalysts

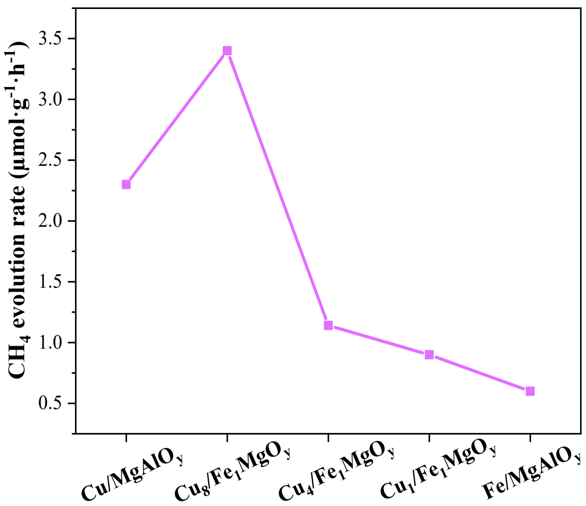

Figure S4. Evolution rate of CH_4 at 4h over Cu_x/Fe_1MgO_y, $Cu/MgAlO_y$ and $Fe/MgAlO_y$ catalysts

Table S1. Performance comparison of Cu_1/Fe_1MgO_y and some reported photocatalysts for CO_2 reduction

Catalysts	catalyst mass (mg)	Product evolution rate (μmol g^{-1} h^{-1})		
		CO	CH_4	C_2H_4
Cu_1/Fe_1MgO_y	1	40.1	0.9	9.9
6%CuO/WO_3[1]	50	1.6	-	-
3%Pt/p-C_3N_4[2]	100	4.7	4.0	-
$Cu^{\delta+}$/CeO_2-TiO_2[3]	10	3.5	1.6	4.5
Cu_2O@Cu@UiO-66-NH_2[4]	3	20.9	8.3	-
Ag/TiO_2[5]	10	5.2	-	-
a-Fe_2O_3/BCN[6]	4	11.0	0.7	-
α-Fe_2O_3/Cu_2O[7]	100	3.1	0.6	-
Cu@Cu_2O/N-GCs[8]	50	4.0	5.6	-
Ni-SA-x/ZrO_2[9]	10	11.8	-	-
Ru-Bi_2MoO_6[10]	30	23.8	-	-
ZnSe–$CsSnCl_3$[11]	5	54.0	3.0	-
TiO_2@Cu[12]	10	25.4	5.8	-
$SnTa_2O_6$[13]	20	31	-	-
Mn:CsPb(Cl/Br)$_3$[14]	10	64	-	-
Pt SA/ZrO_2[15]	20	16.6	0.4	-
$BiOIO_3$ nanostrips[16]	20	17.33	-	-
$Au_{SA}Cd_{1-x}S$[17]	30	32.2	11.3	-
CeO_2@CdS-Cu_xS_y[18]	5	-	18.2	-
Cu/Fe-CNC[19]	20	6.66	-	-

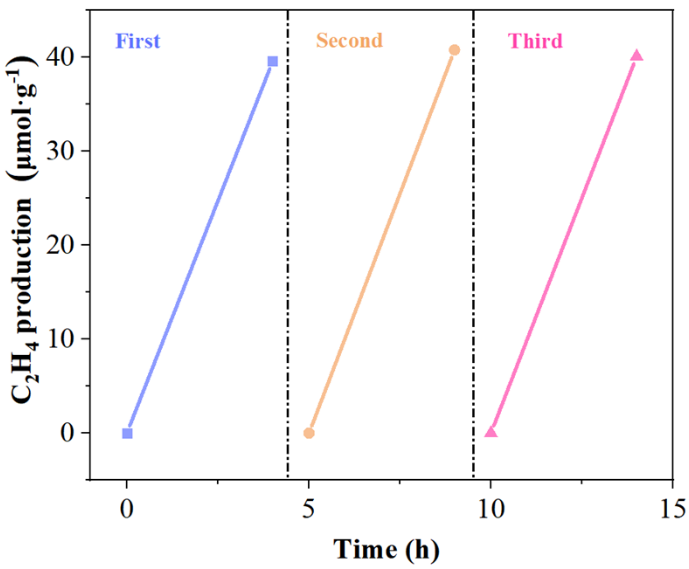

Figure S5. Recycling experiments of Cu_1/Fe_1MgO_y photocatalyst for three cycles

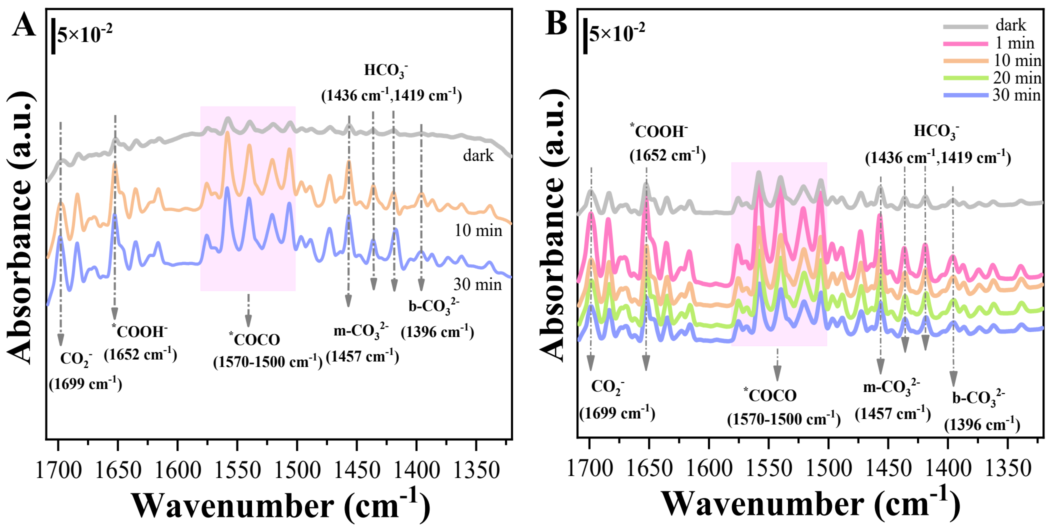

Figure S6. In situ FTIR spectra of humid CO_2 adsorbed on (A) Cu_4/Fe_1MgO_y and (B) $Fe/MgAlO_y$

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