

Supporting Information

In-situ formation of Cu₂O decorated CuZnAl-layered double hydroxides heterostructured photocatalysts for enhancing degradation of tetracycline under visible light

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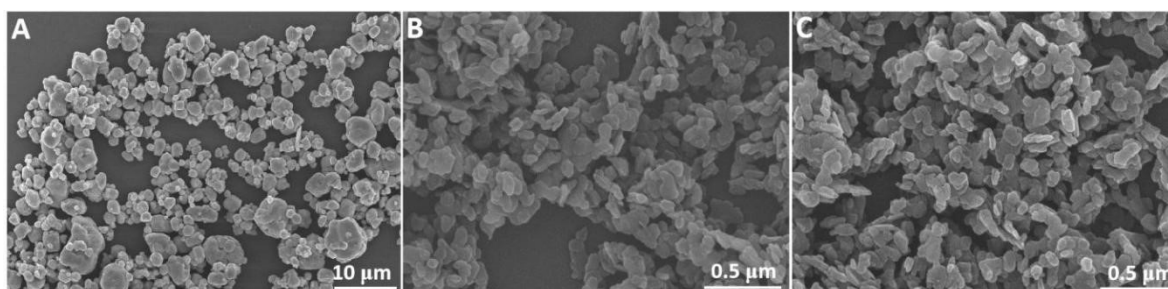


Fig. S1 (A) SEM images of Cu₂O, (B) as-synthesized CuZnAl-LDHs and (C) Cu₂O/CuZnAl-LDHs.

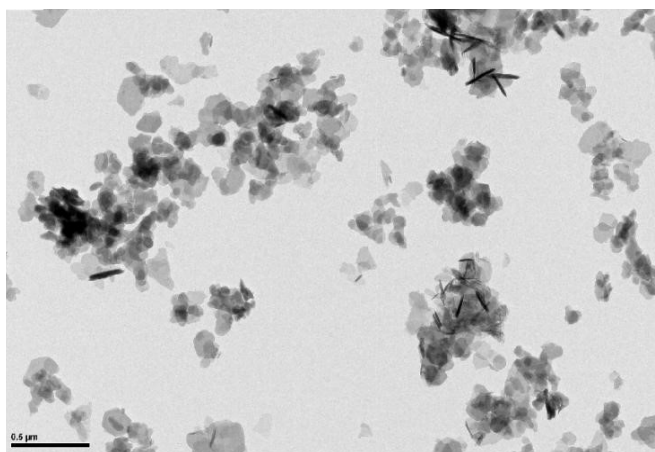


Fig. S2 TEM images of as-synthesized CuZnAl-LDHs.

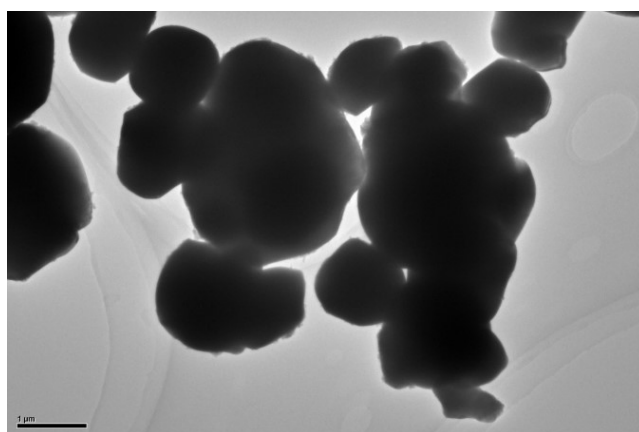


Fig. S3 TEM image of Cu₂O sample.

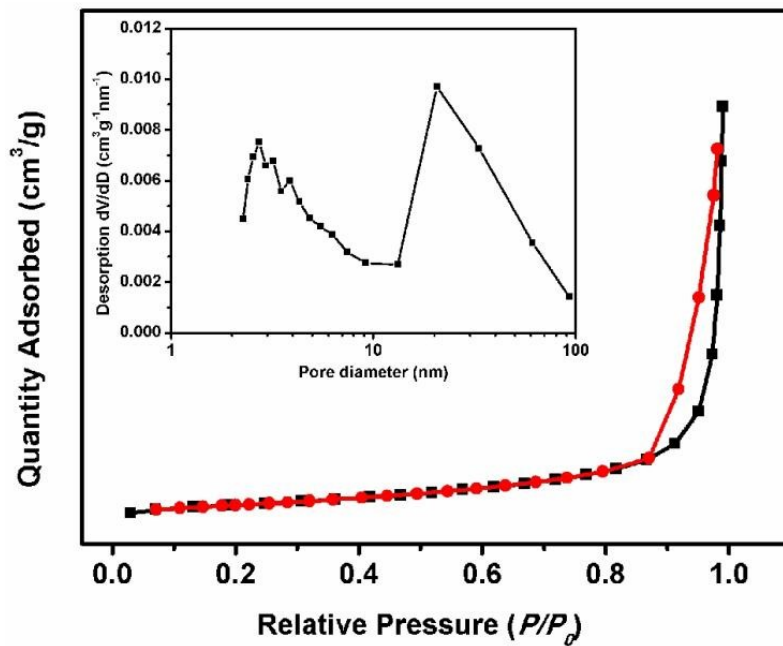


Fig. S4 N₂ adsorption-desorption isotherms and corresponding pore size distribution curves (inset) of CuZnAl-LDHs.

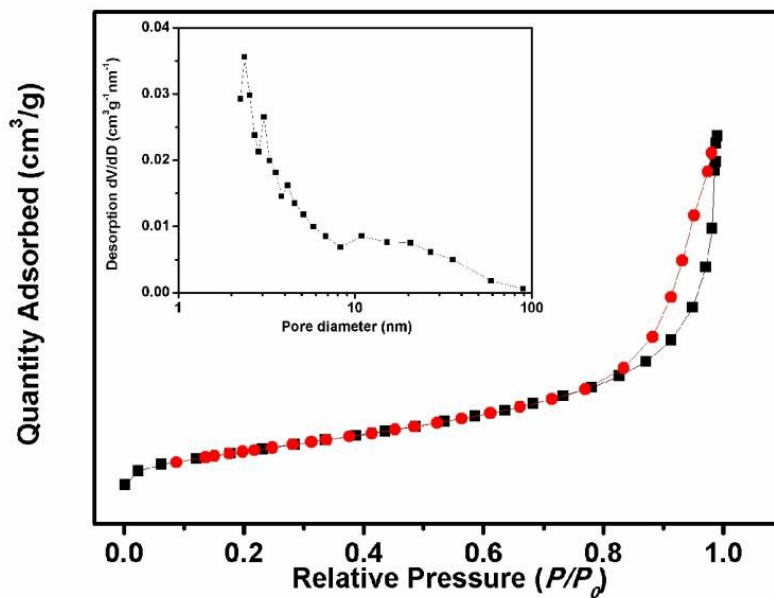


Fig. S5 N₂ adsorption-desorption isotherms and corresponding pore size distribution curves (inset) of Cu₂O.

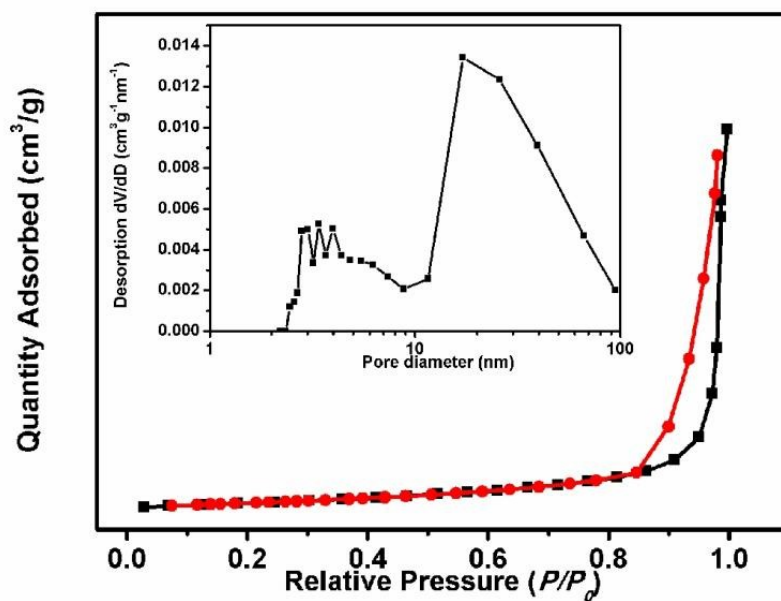


Fig. S6 N₂ adsorption-desorption isotherms and corresponding pore size distribution curves (inset) of Cu₂O/CuZnAl-LDHs.

Table S1 BET results for CuZnAl-LDHs, Cu₂O, and Cu₂O/CuZnAl-LDHs catalysts.

Sample	BET surface area (m ² g ⁻¹)	Pore volume (cm ³ g ⁻¹)	Average pore size (nm)
CuZnAl-LDHs	95.4	0.54	18.42
Cu ₂ O	26.2	0.065	7.43
Cu ₂ O/CuZnAl-LDHs	89.6	0.38	14.57

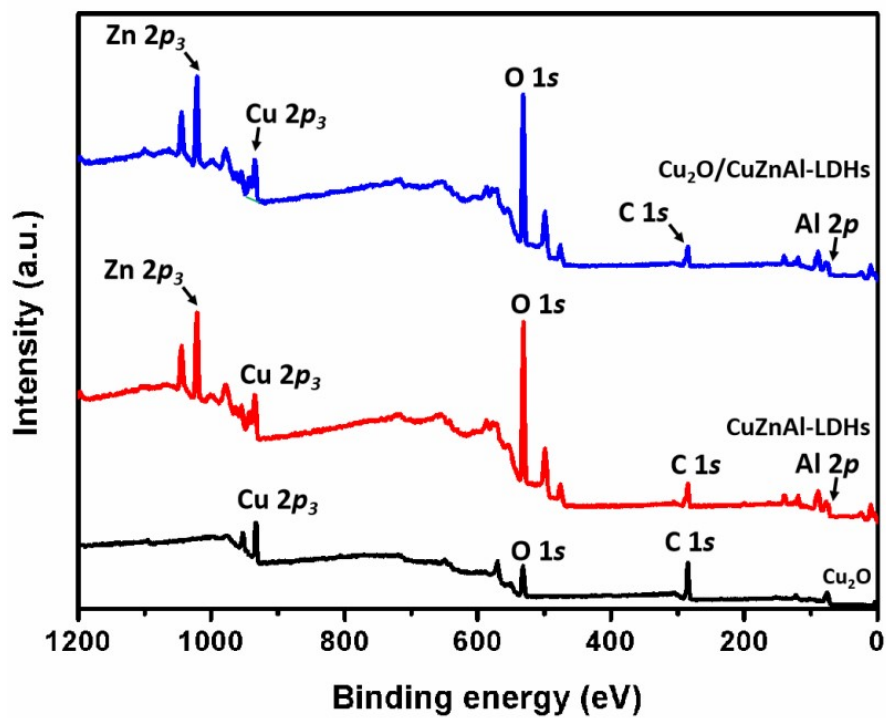


Fig. S7 XPS survey spectra of all elements.

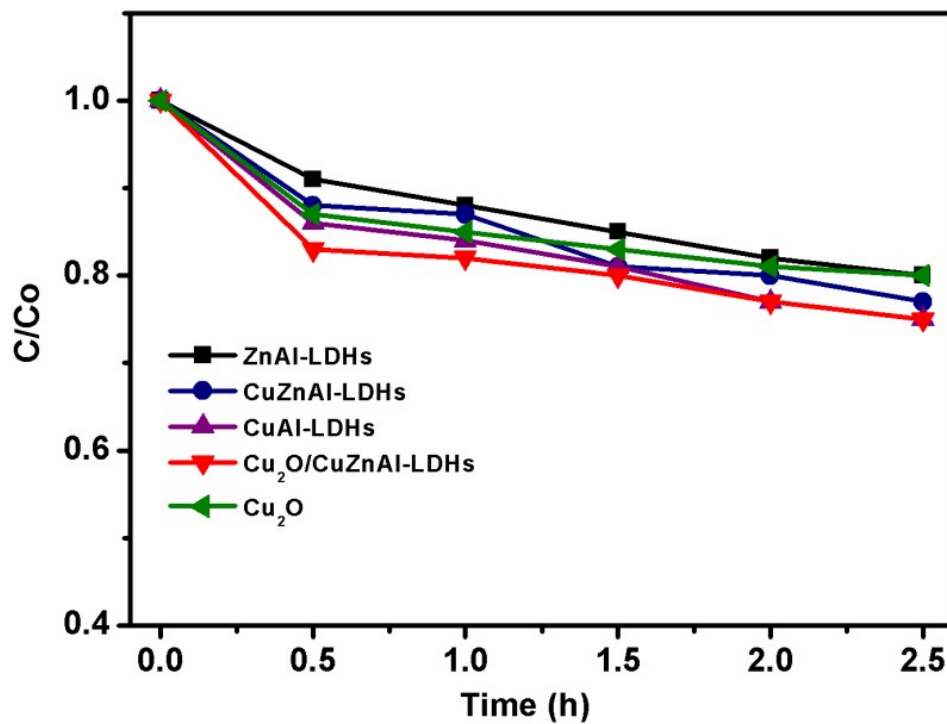


Fig. S8 Adsorption capacity of Cu₂O/CuZnAl-LDHs heterojunction photocatalysts.

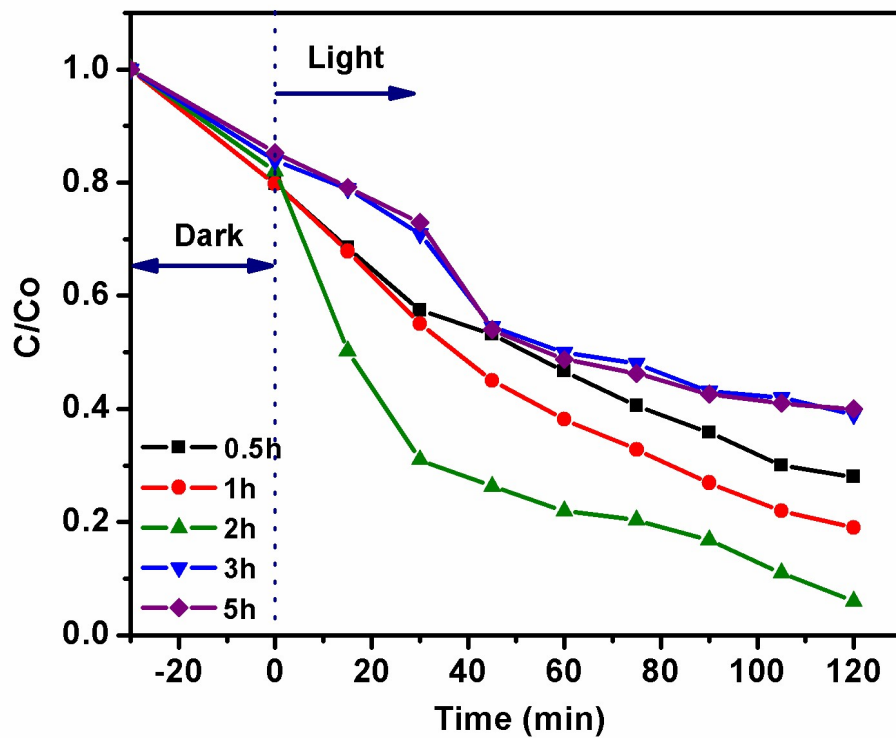


Fig. S9 Effects of ascorbic acid reduction time on $\text{Cu}_2\text{O}/\text{CuZnAl-LDHs}$ system for TC degradation.

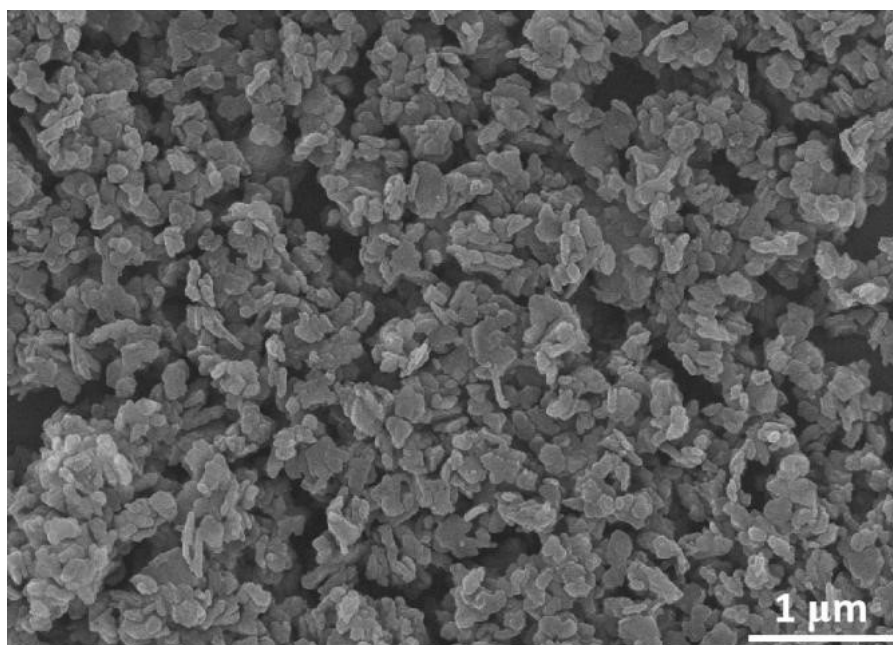


Fig. S10 SEM image of the used $\text{Cu}_2\text{O}/\text{CuZnAl-LDHs}$ catalyst.

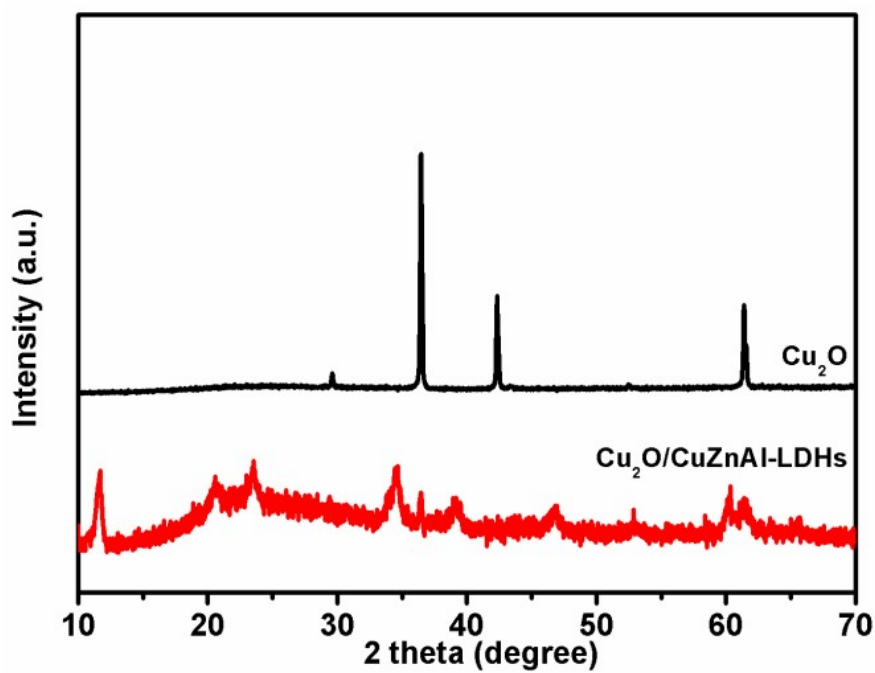


Fig. S11 The XRD spectra of the used $\text{Cu}_2\text{O}/\text{CuZnAl-LDHs}$ catalyst.

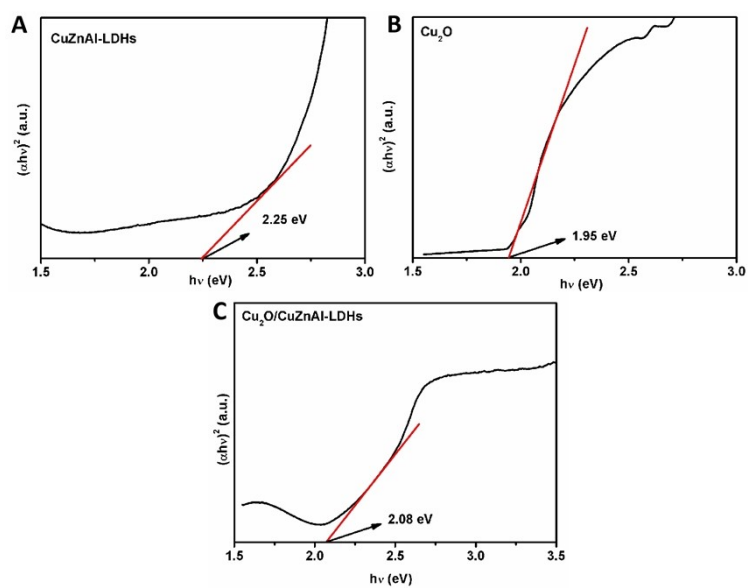


Fig. S12 Kubelka-Munk plots for CuZnAl-LDHs , Cu_2O , and $\text{Cu}_2\text{O}/\text{CuZnAl-LDHs}$.

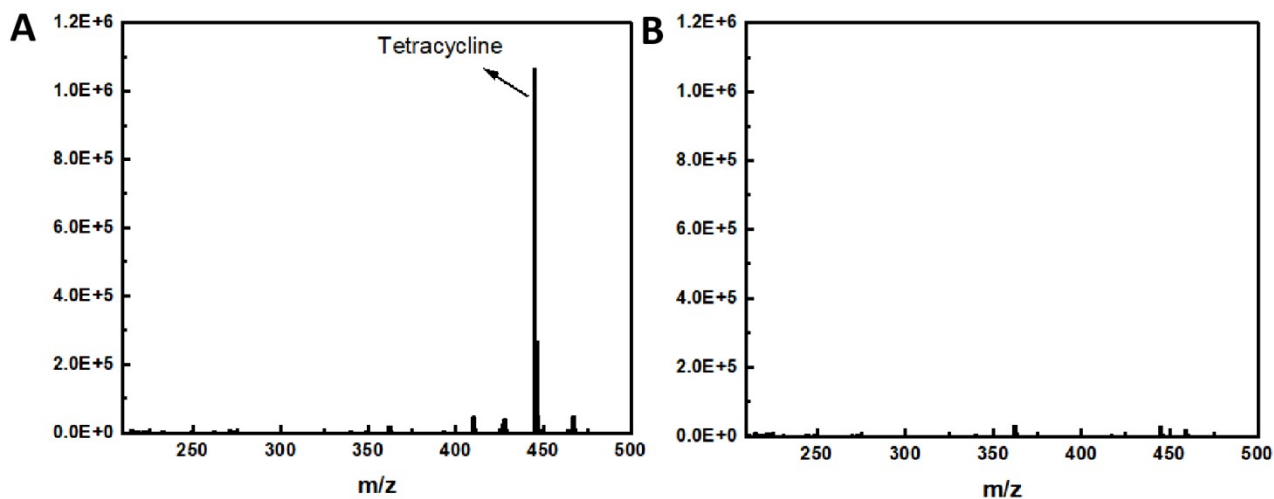


Fig. S13 The HPLC-MS spectra before and after photodegradation of tetracycline for 2 h.

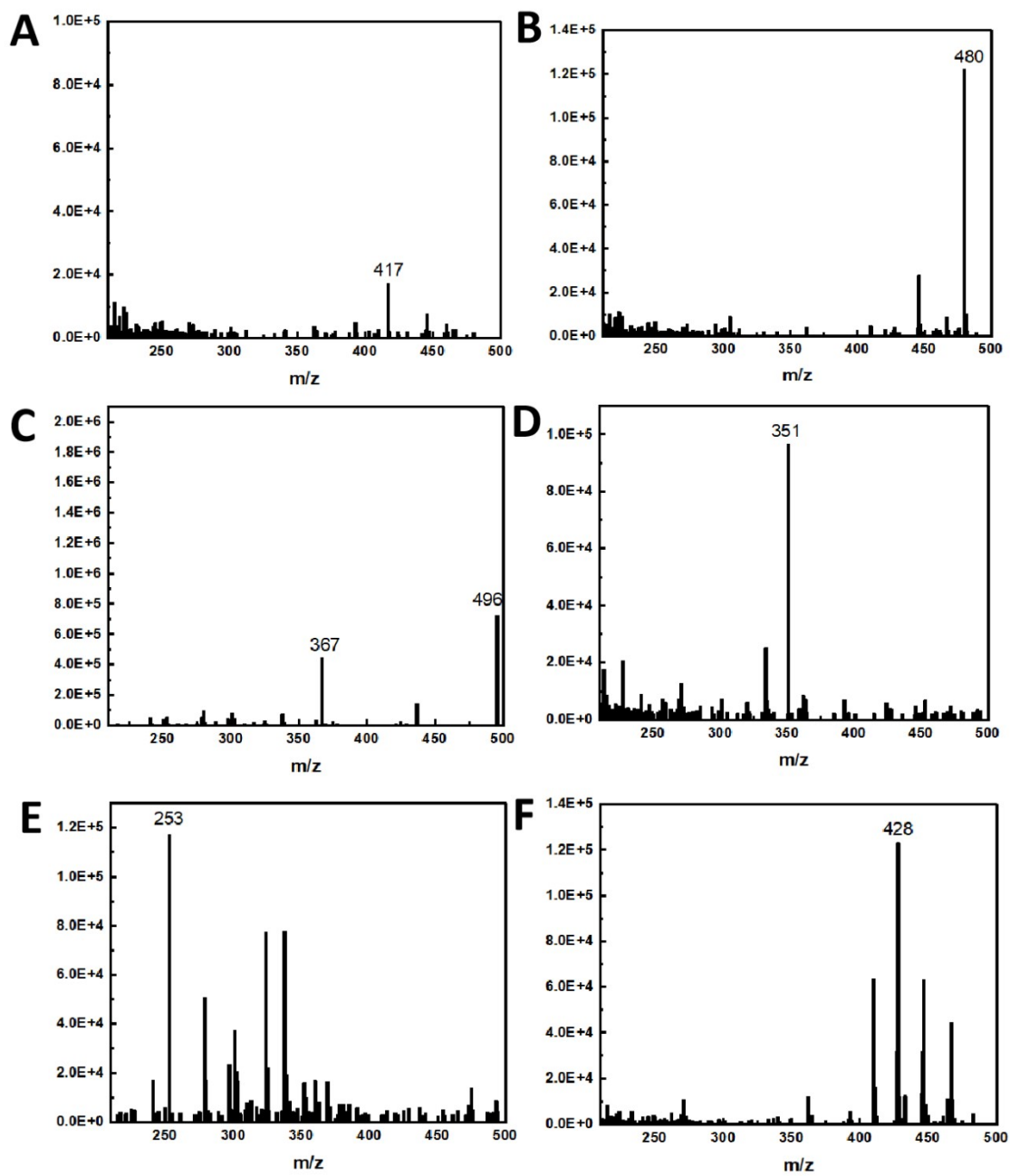


Fig. S14 The HPLC-MS spectra of a fraction of the intermediates during tetracycline degradation.

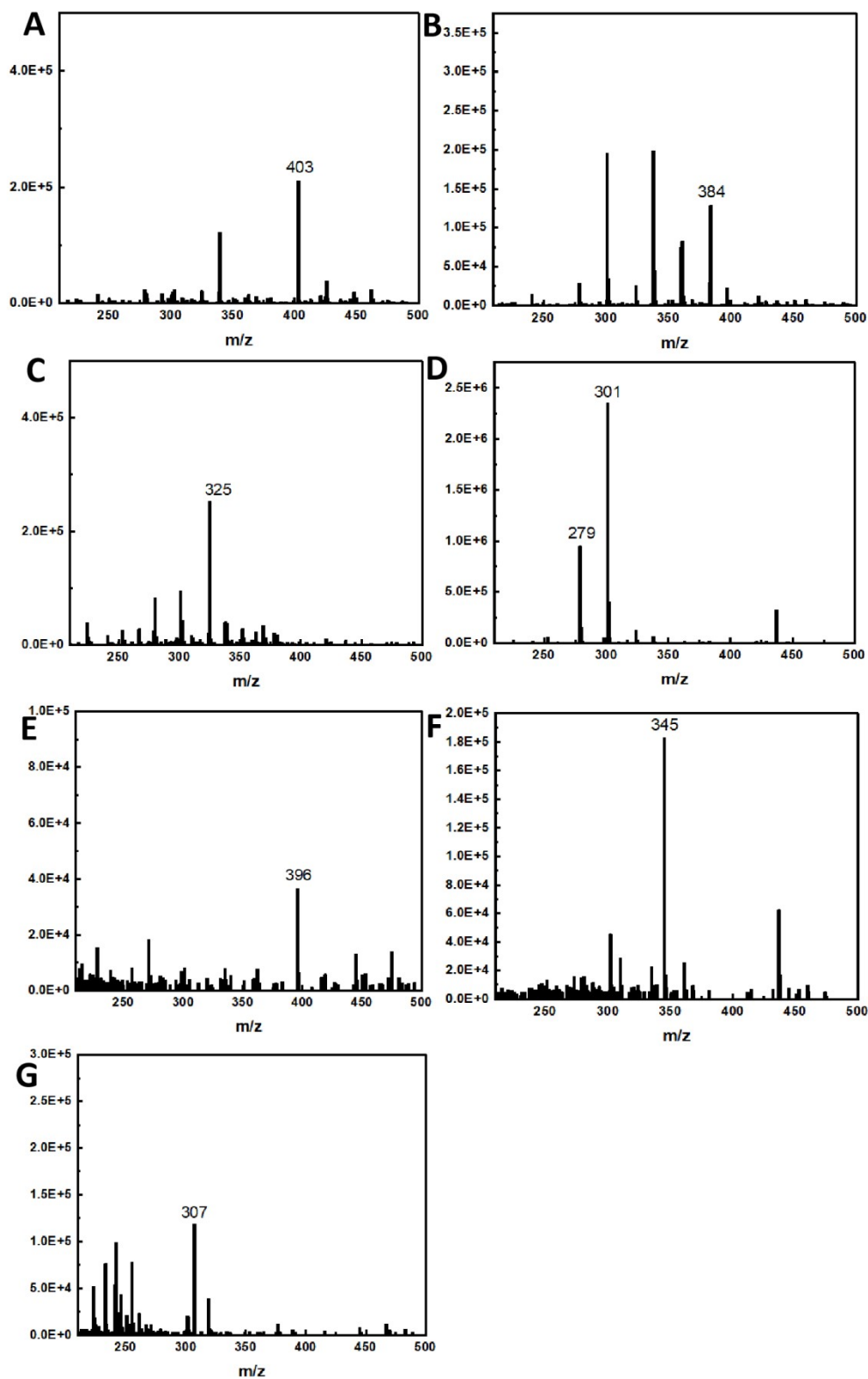
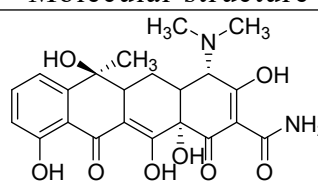
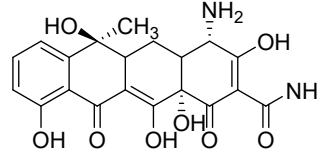
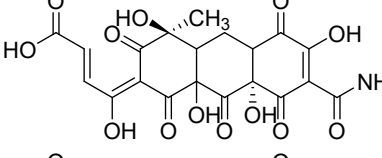
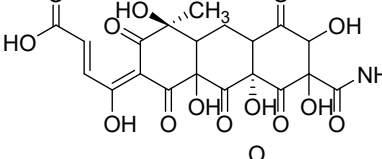
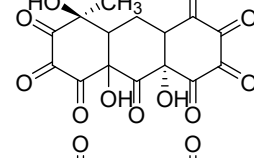
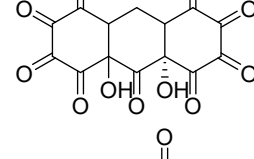
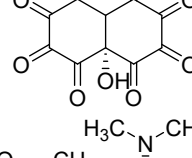
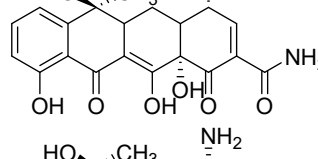
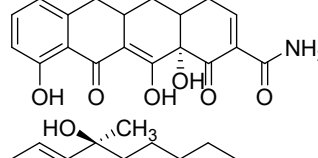
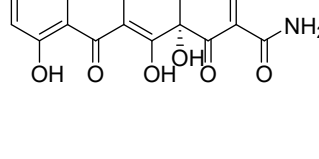
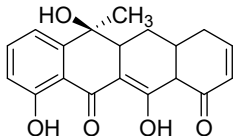
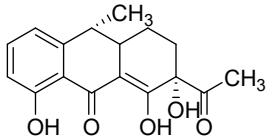
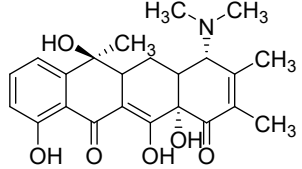
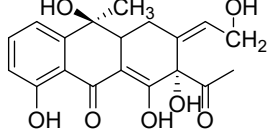
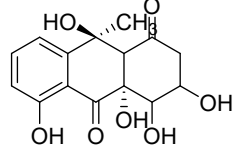
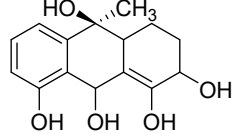


Fig. S15 The HPLC-MS spectra of the other intermediates during tetracycline degradation.

Table S2 The intermediates in the process of tetracycline photodegradation by Cu₂O/CuZnAl-LDHs.

Formula	Molecular structure	m/z
C ₂₂ H ₂₄ N ₂ O ₈		445
C ₂₀ H ₂₀ N ₂ O ₈		417
C ₂₀ H ₁₇ NO ₁₃		480
C ₂₀ H ₁₉ NO ₁₄		496
C ₁₅ H ₁₀ O ₁₁		367
C ₁₄ H ₆ O ₁₁		351
C ₁₀ H ₄ O ₈		253
C ₂₂ H ₂₄ N ₂ O ₇		428
C ₂₀ H ₂₂ N ₂ O ₇		403
C ₂₀ H ₁₉ NO ₇		384

$C_{19}H_{18}O_5$		325
$C_{17}H_{18}O_5$		301
$C_{23}H_{27}NO_5$		396
$C_{18}H_{18}O_7$		345
$C_{15}H_{15}O_7$		307
$C_{15}H_{18}O_5$		279
