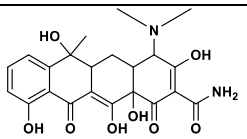
Supporting Information

Table S1. Determination of TC degradation products in the CoFeO@CHB/PMS system.

Compound	ESI mode (+/-)	m/z	Molecular formula	Possible structure	Retention time (min)
TC	ESI+	445.16054	$C_{22}H_{24}O_8N_2$		1.43
TC1	ESI+	461.15546	$C_{22}H_{24}N_2O_9$		0.86
TC2	ESI+	433.16054	$C_{21}H_{24}O_8N_2$		1.10
TC3	ESI+	427.14998	$C_{22}H_{22}O_7N_2$		1.45
TC4	ESI+	406.14964	$C_{20}H_{23}NO_8$		1.60
TC5	ESI+	404.13399	$C_{20}H_{21}NO_8$		1.88
TC6	ESI+	366.15473	$C_{18}H_{22}NO_7$		1.41
TC7	ESI+	365.08671	$C_{17}H_{16}NO_9$		1.37
TC8	ESI+	365.08671	$C_{17}H_{16}NO_9$		1.37
TC9	ESI-	329.06558	$C_{17}H_{12}O_7$		1.92
TC10	ESI-	317.06558	$C_{16}H_{14}O_7$		1.89
TC11	ESI+	301.07066	$C_{16}H_{12}O_6$		1.66

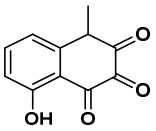
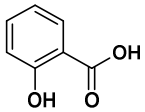
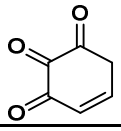
TC12	ESI+	205.04954	$C_{11}H_8O_4$		0.84
TC13	ESI+	139.03897	$C_7H_6O_3$		0.57
TC14	ESI+	127.03897	$C_6H_6O_3$		0.31

Table S2. Literature summary of TC degradation by different catalysts/PMS systems.

Catalyst	Synthesis method	Reaction conditions	Performance	Ref.
Fe@C-S	Pyrolysis-sulfidation	TC = 20 mg L^{-1}; catalyst = 0.1 g L^{-1}; PMS = 0.25 mM; pH = 5.0	91.2% removal in 40 min with a *k* of 0.2038 min^{-1}	[48]
Co-ZIF-$(Fe)_{0.5}$	Chemical precipitation	TC = 30 mg L^{-1}; catalyst = 0.2 g L^{-1}; PMS = 0.3 g L^{-1}; pH = 4.21	96.71% removal in 5 min	[49]
$CoFe_2O_4$/montmorillonite	Hydrothermal	TC = 50 mg L^{-1}; catalyst = 0.025 g L^{-1}; PMS = 0.5 mM; pH = 3	~100% removal in 30 min with a *k* of 0.178 min^{-1}	[11]
CoFe/Nickel	Hydrothermal followed by calcination	TC = 0.1 mM; PMS = 0.5 mM; pH = 7	80% removal in 60 min with a *k* of 0.049 min^{-1}	[50]
FeCo-LDH	Precipitation	TC = 30 mg L^{-1}; catalyst = 0.2 g L^{-1}; PMS = 0.25 g L^{-1}	92% removal in 5 min	[51]
$Mn_{0.85}Fe_{2.15}O_4$-CNTs	Hydrothermal followed by calcination	TC = 20 mg L^{-1}; catalyst = 0.4 g L^{-1}; PMS = 0.8 mM; pH = 6.8	90% removal in 60 min with a *k* of 0.0731 min^{-1}	[46]
Fe-doped $CoTiO_3$	Precipitation followed by calcination	TC = 20 mg L^{-1}; catalyst = 0.1 g L^{-1}; PMS = 1.0 mM; pH = 7.0	99% removal in 40 min with a *k* of 0.0986 min^{-1}	[52]
$FeCo_x$	Coprecipitation	TC = 0.0225 mM; catalyst = 0.3 g L^{-1}; PMS = 0.5 mM; pH = 6.35 ± 0.1	95.4% removal in 10 min	[53]
Fe-N/C	Carbonization	TC = 30 mg L^{-1}; catalyst = 0.05 g L^{-1}; PMS = 0.5 g L^{-1}	89.2% removal in 20 min	[54]
CoFeO@CHB	Precipitation - calcination	TC = 10 mg L^{-1}; catalyst = 1.15 g L^{-1} (~ 0.02 g L^{-1} when CHB was excluded); PMS = 0.4 mM; pH = 6.36	76% removal in 120 min with a *k* of 0.014 min^{-1}	This work

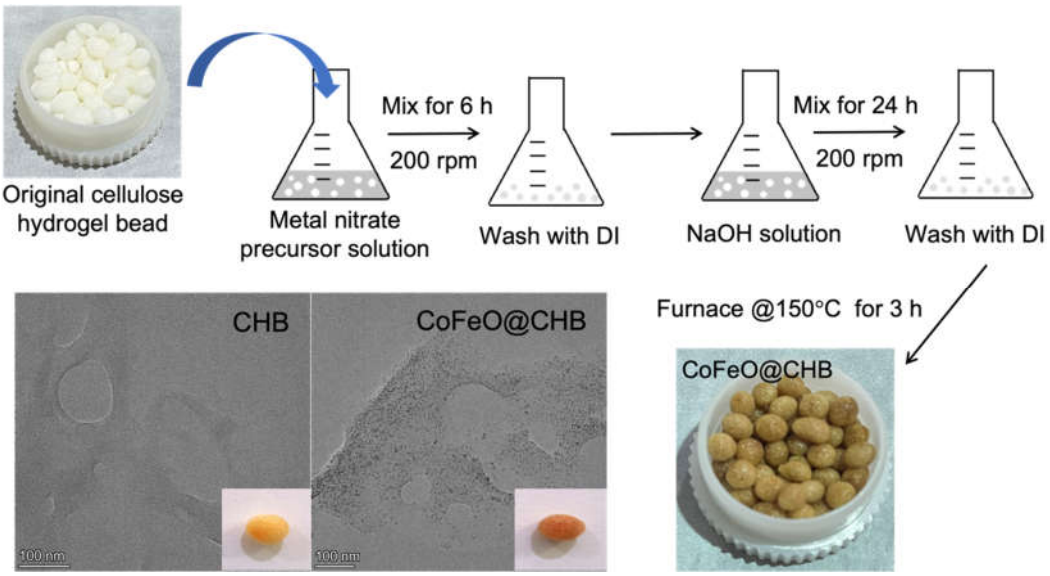


Figure S1. Synthesis and TEM images of as-prepared CHB and CoFeO@CHB.

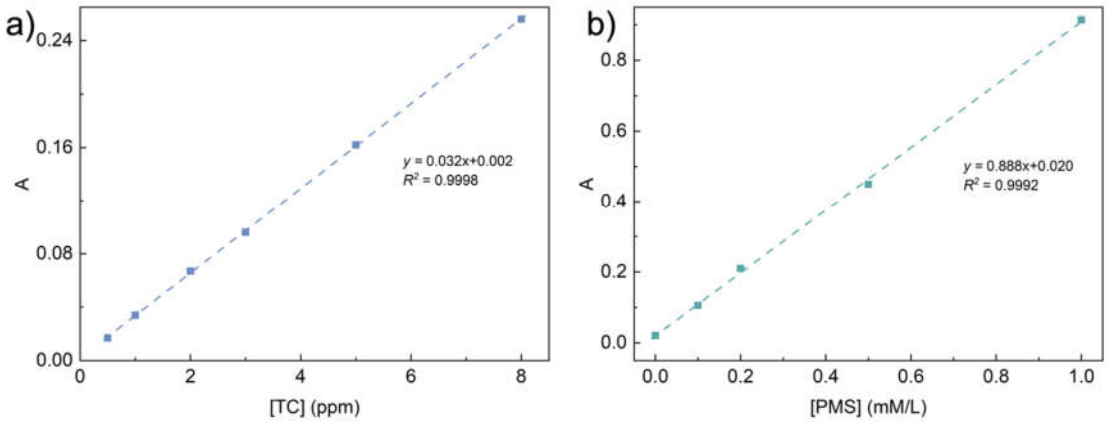


Figure S2. Standard curves for TC (a) and PMS (b).

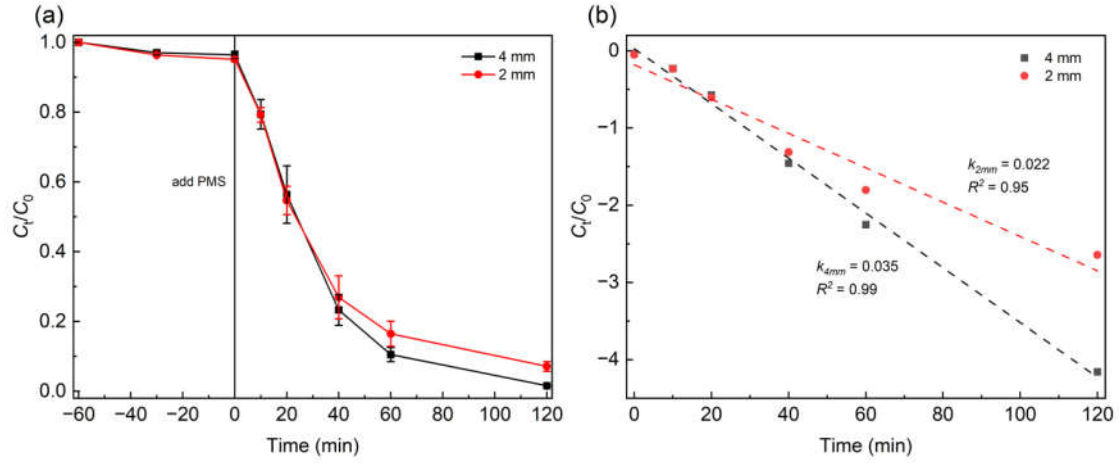


Figure S3. Effects of hydrogel beads diameter on TC degradation (cobalt was loaded into the substrates).

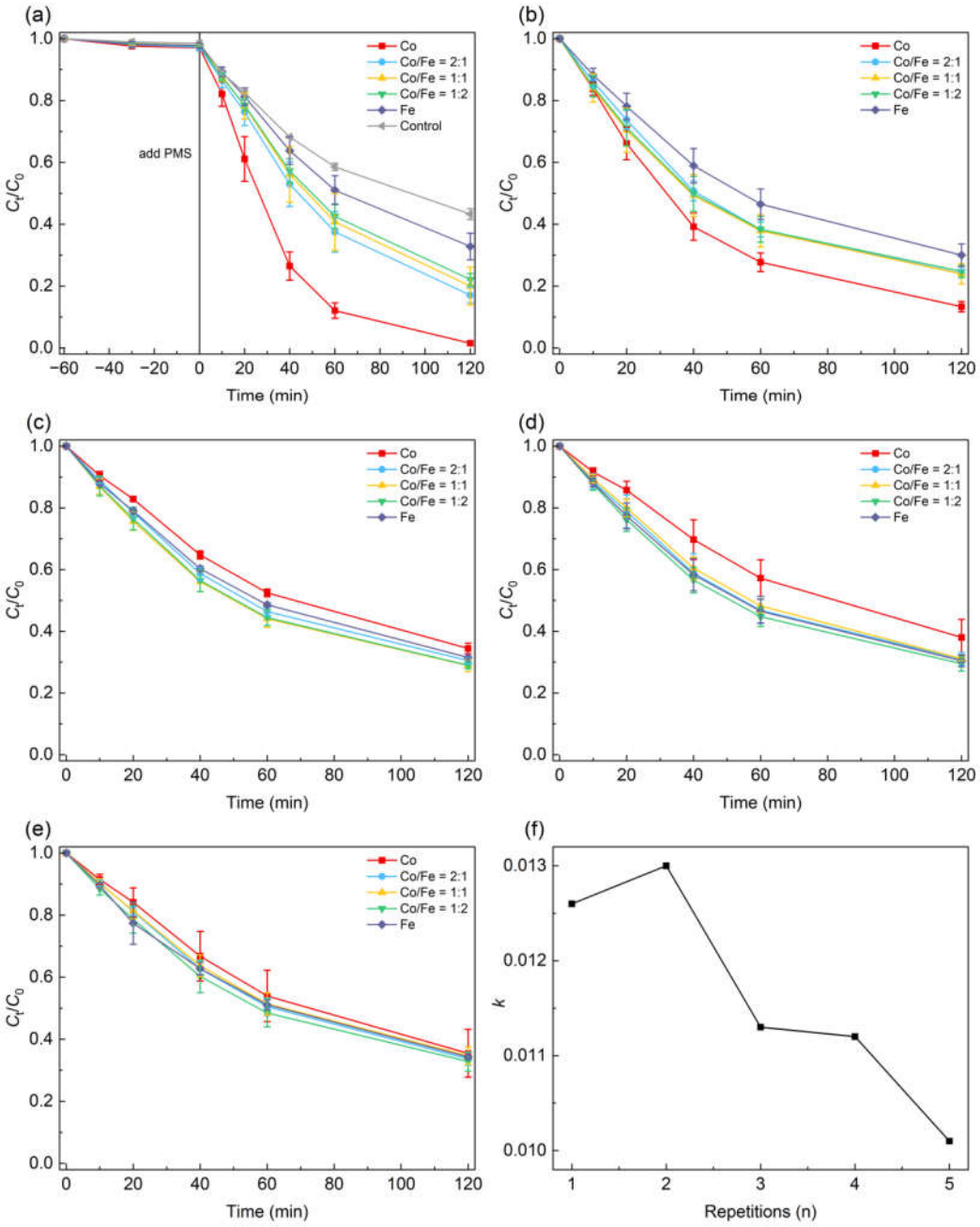


Figure S4. Degradation of TC by the (a) first usage, (b) second usage, (c) third usage, (d) fourth usage, (e) fifth usage of catalysts with different Co/Fe ratios and (f) effect of repetition times on reaction rate constants. (Conditions: [TC] = 10 mg L^{-1}, [PMS] = 40 mmol L^{-1}, [Catalyst] = 1.15 g/L, catalyst prepared without heat treatment).

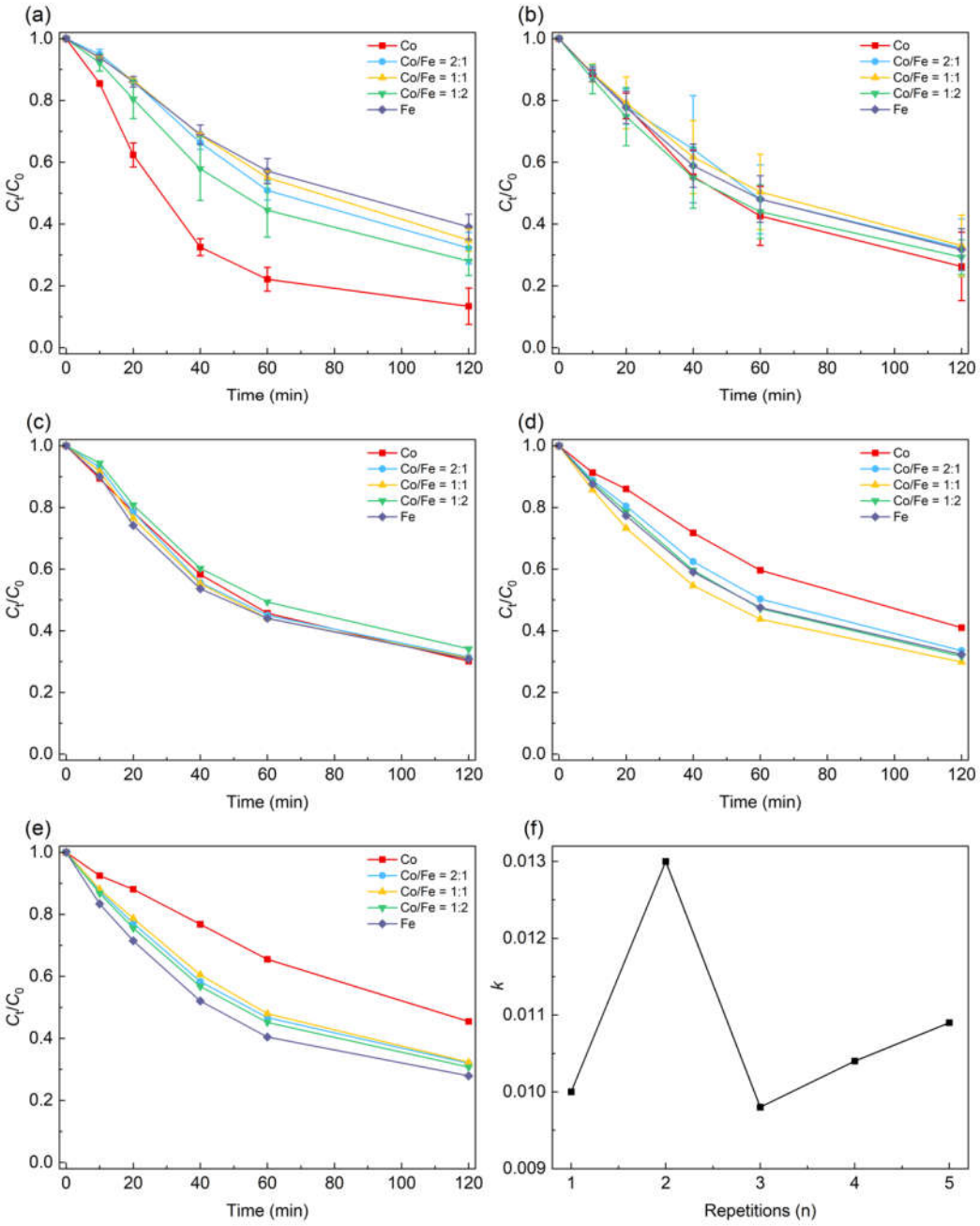


Figure S5. Degradation of TC by the (a) first usage, (b) second usage, (c) third usage, (d) fourth usage, (e) fifth usage of catalysts with different Co/Fe ratios and (f) effect of repetition times on reaction rate constants. (Conditions: [TC] = 10 mg L^{-1}, [PMS] = 40 mmol L^{-1}, [Catalyst] = 1.15 g/L, catalyst prepared with heat treatment).

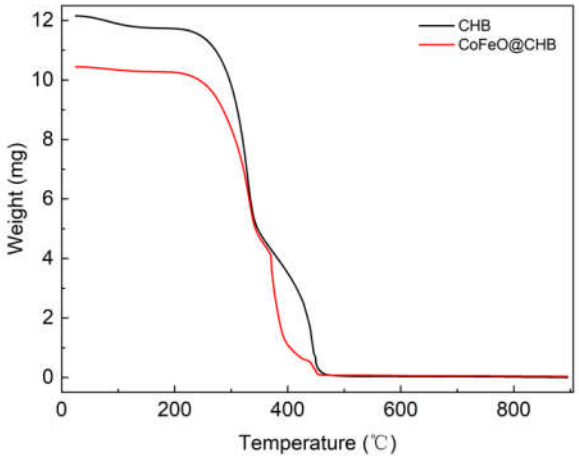


Figure S6. TGA of both CHB and CoFeO@CHB.

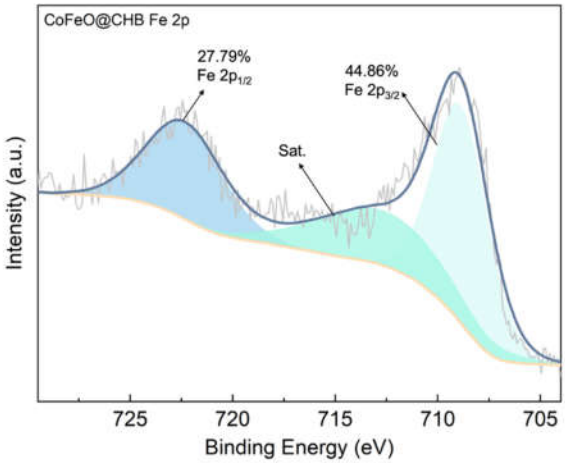


Figure S7. High resolution of Fe 2p spectra in CoFeO@CHB.

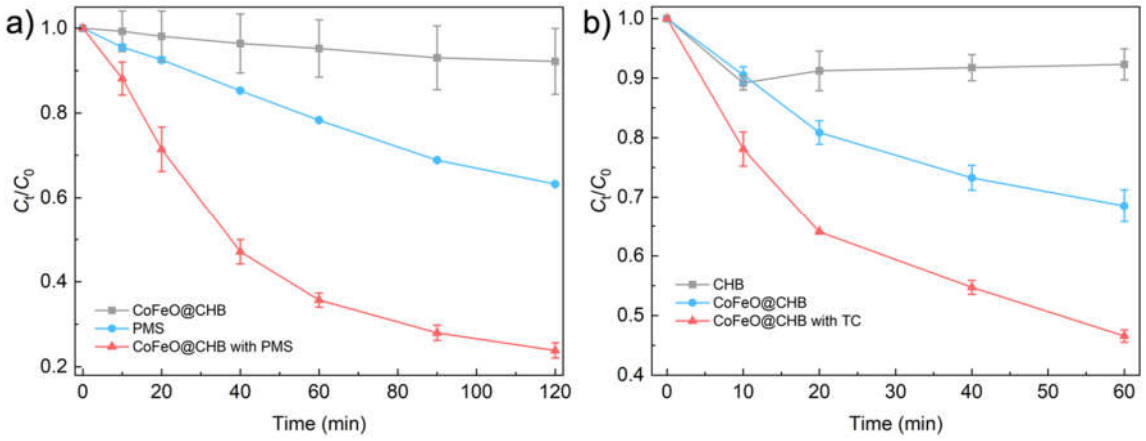


Figure S8. a) TC degradation in different systems (CoFeO@CHB = 1.15 g L^{-1}, PMS = 0.4 mM, pH = 6.36) and b) PMS decomposition in different systems.

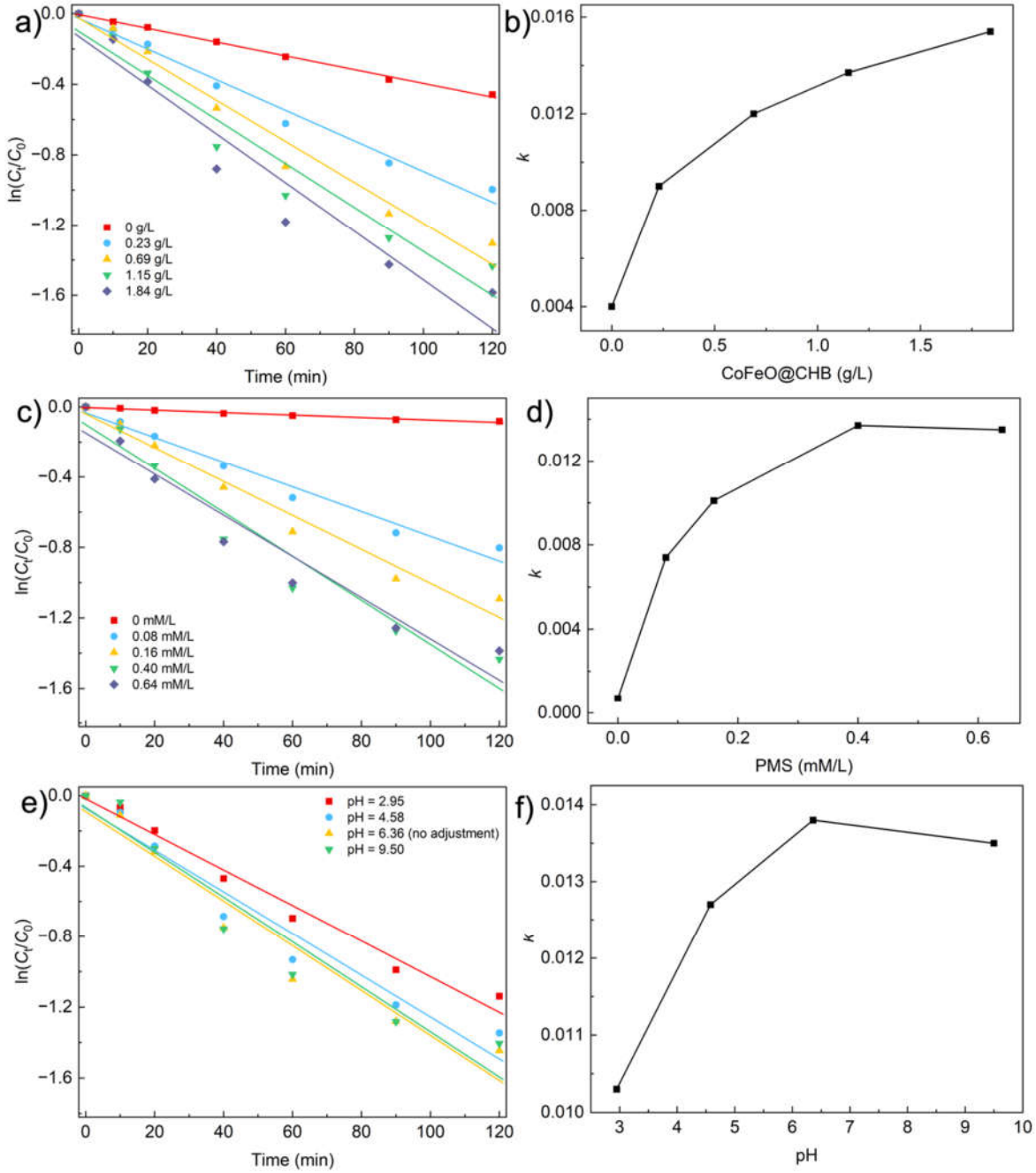


Figure S9. The pseudo-first-order kinetic plots for TC degradation and the calculated rate constant under different reaction conditions.

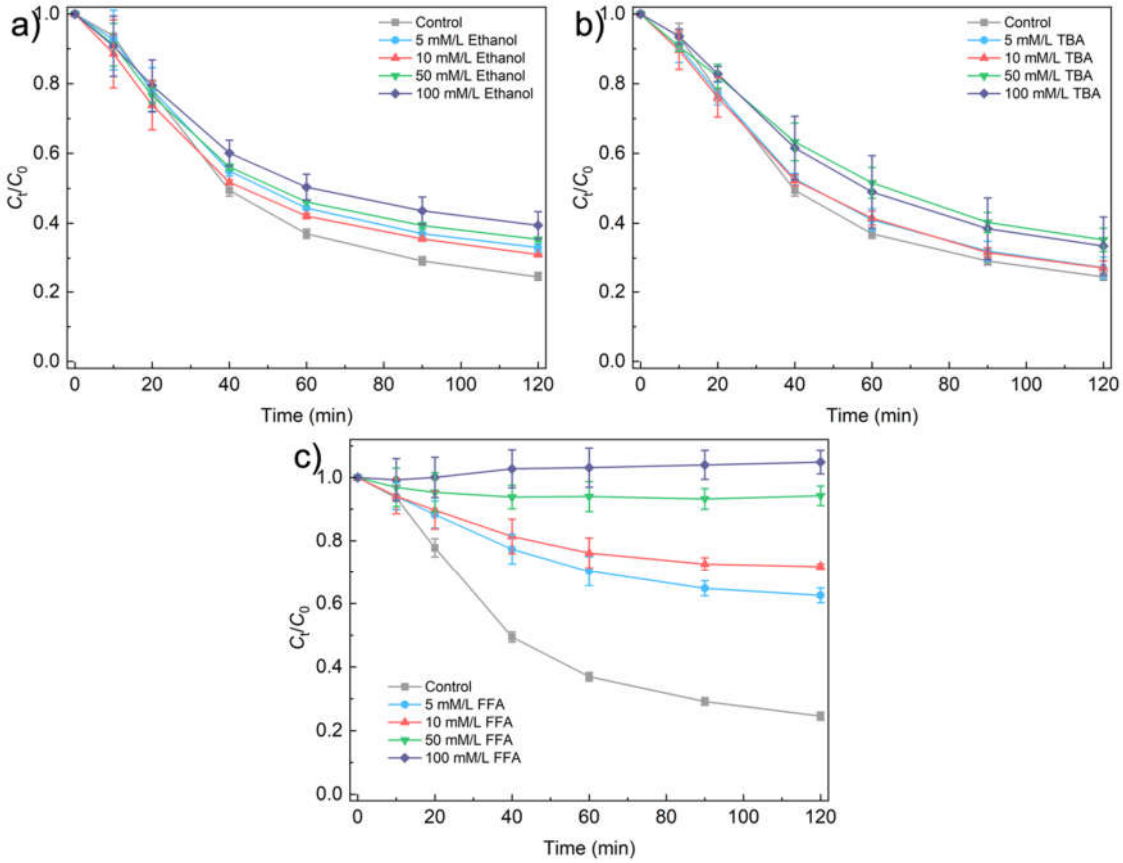


Figure S10. Effects of different scavengers on TC degradation in the CoFeO@CHB/PMS system (Conditions: [TC_0] = 10 mg·L^{-1}, [PMS] = 40 mmol·L^{-1}, [CoFeO@CHB] = 1.15 g L^{-1}, [pH] = 6.36).

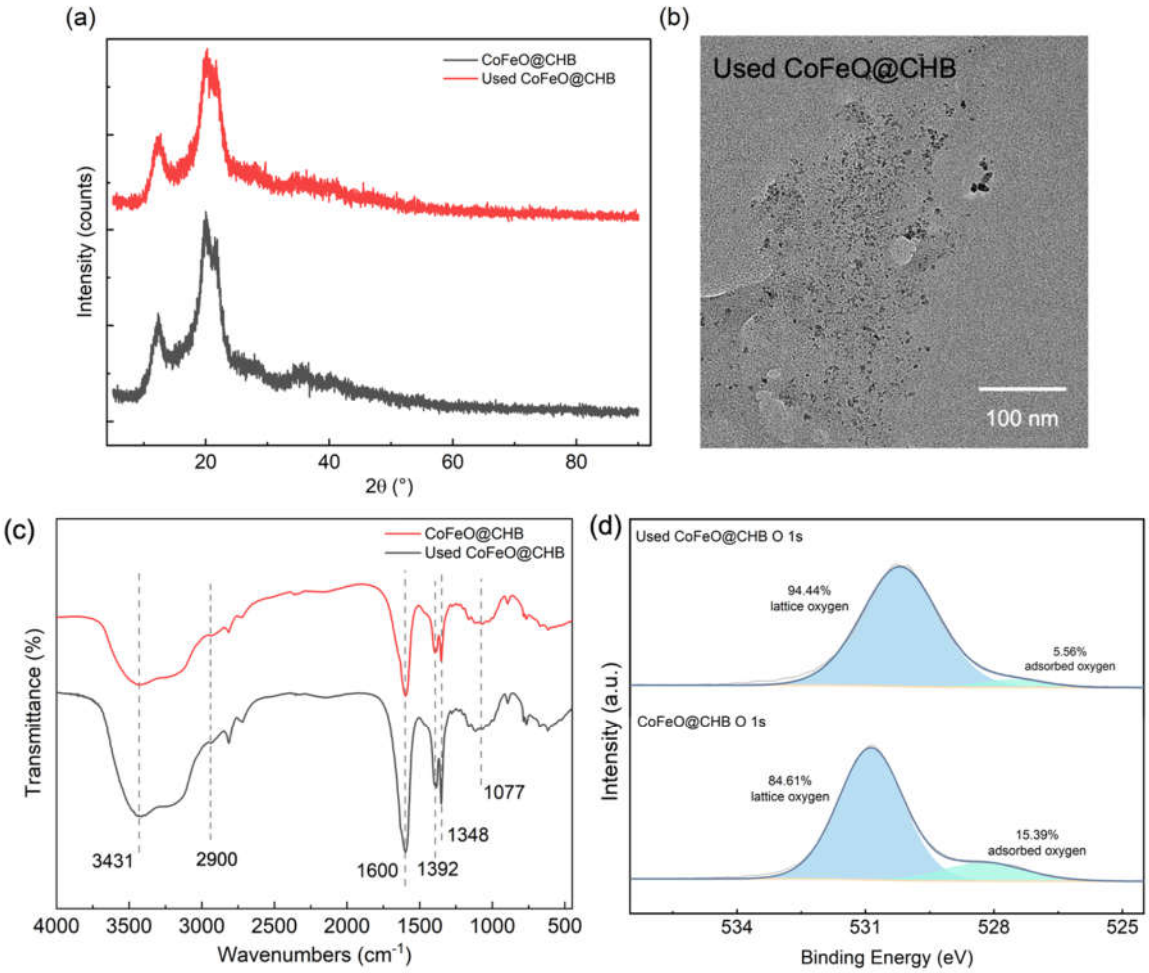


Figure S11. The XRD patterns of fresh and used CoFeO@CHB (a), TEM images of Used CoFeO@CHB (b), FTIR analysis of fresh and used CoFeO@CHB (c) and high resolution of O1s in fresh and used CoFeO@CHB (d).

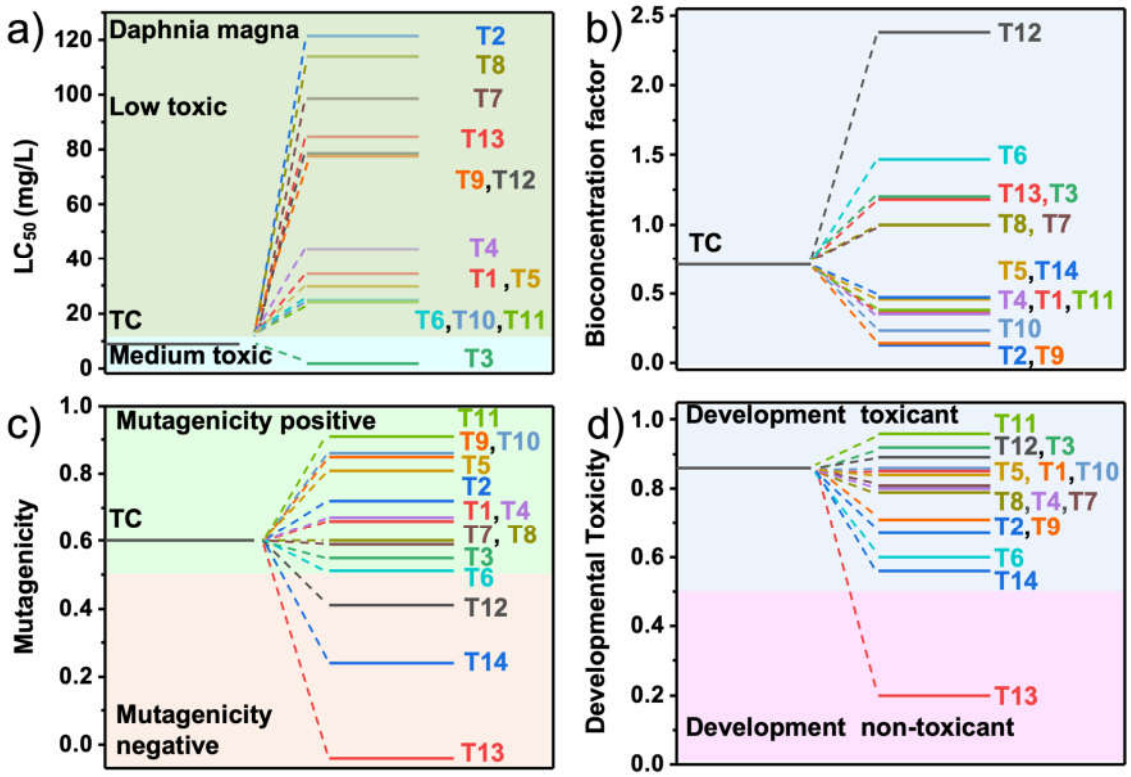


Figure S12. The toxicity evaluation of TC and its degradation products in the CoFeO@CHB/PMS system.

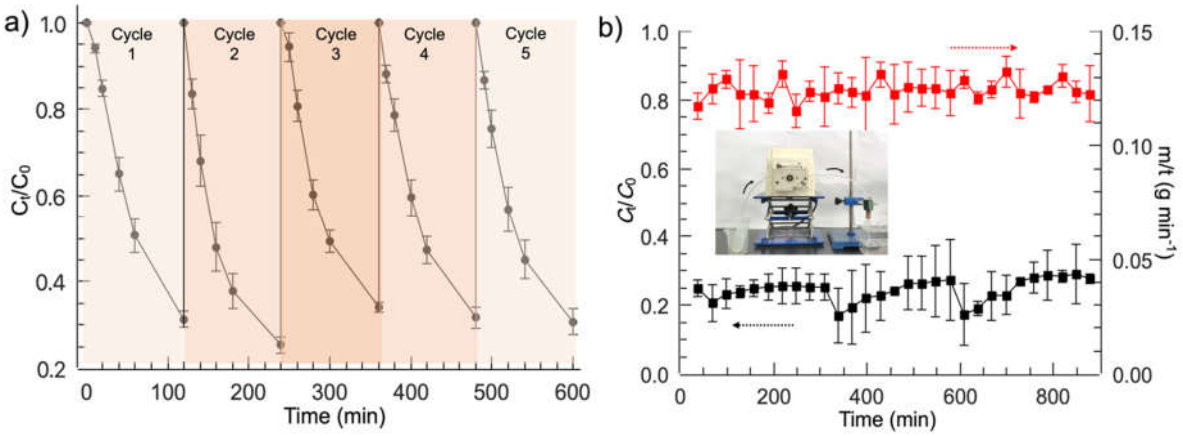


Figure S13. The reusability and stability test of CoFeO@CHB/PMS system for TC degradation in a batch (a) and continuous system (b).