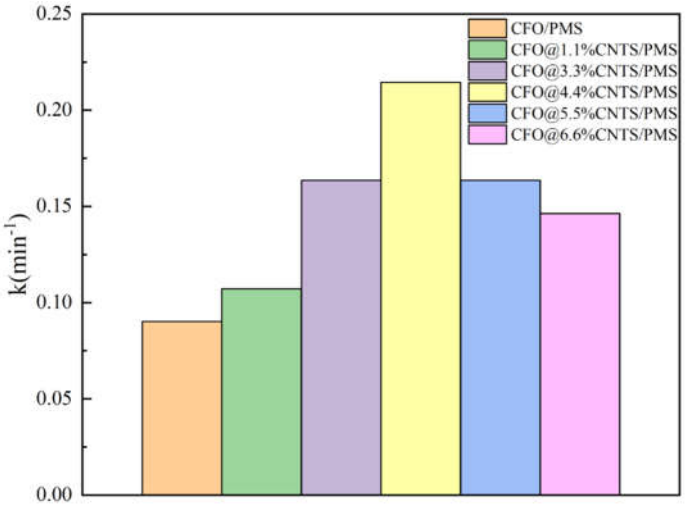

Figure S1. K_{obs} of CQP degradation in different systems. (Experiment conditions: $[[CQP]_0$ = 10 mg/L, [catalyst]= 35 mg/L, [PMS] = 2.0 mM, initial pH = 6.5 ± 0.3, T = 25°C).

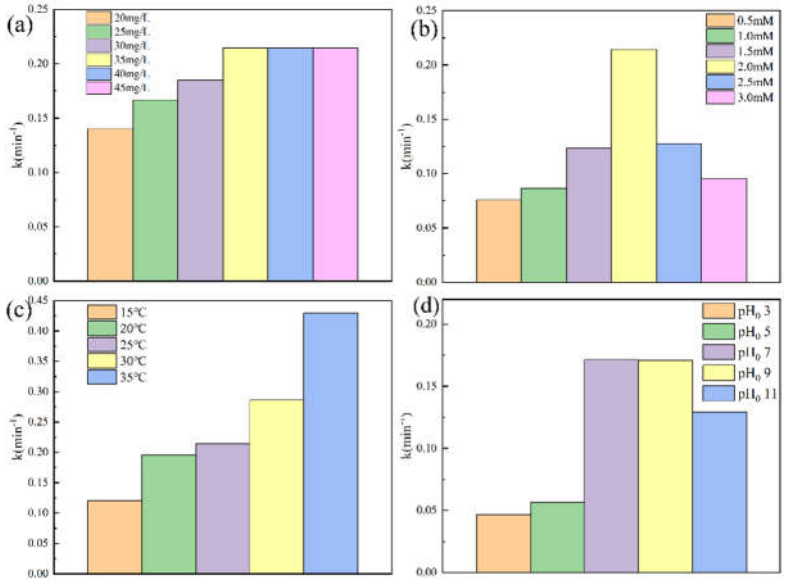

Figure S2. The K_{obs} under the reaction conditions of different (**a**) catalyst dosage, (**b**) PMS concentration, (**c**) reaction temperature, and (**d**) initial pH values on the removal efficiency of CQP. (Experiment conditions: $[[CQP]_0$ = 10 mg/L, [catalyst]= 35 mg/L, [PMS] = 2.0 mM, initial pH = 6.5 ± 0.3, T = 25°C).

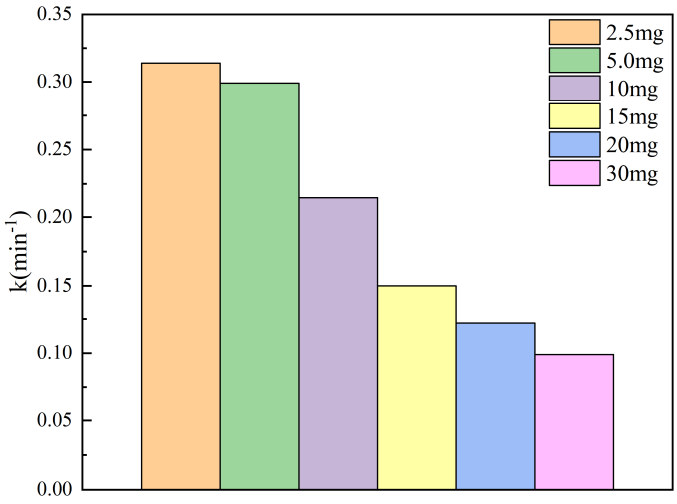

Figure S3. K_{obs} at various initial CQP concentrations. (Experiment conditions: [catalyst]= 35 mg/L, [PMS] = 2.0 mM, initial pH = 6.5 ± 0.3, T = 25°C)

Table S1. Comparison of the reaction parameters with previously reported catalysts for PMS activation.

catalyst	Pollutant	Degradation conditions	Removal efficiency	Reference
$CoFe_2O_4$@CNTs	10mg/L CQP	catalyst = 35 mg/L, PMS = 2.0mM	98.7% in 20 min	This work
CMO	5mg/L CQP	catalyst = 100 mg/L, PMS = 0.2mM	99.9% in 20 min	1
SA Co-N-C(30)	10mg/L CQP	catalyst = 150 mg/L, PMS = 1.0mM	98% in 30 min	2

Table S2. Concentration of key elements in leaching solution by ICP-OES.

element	**Content in sample(μg/L)**	**element**	**Content in sample(μg/L)**
Co	27672400.0	Li	3248400.0
S	76364000.0	Al	297524.0
Fe	1261.1	Ni	53247.0
Na	26244.3	Mg	135845.0
Mn	29531.5	Si	37488.1

References

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2. Peng, X.; Wu, J.; Zhao, Z.; Wang, X.; Dai, H.; Wei, Y.; Xu, G.; Hu, F., Activation of peroxymonosulfate by single atom Co-N-C catalysts for high-efficient removal of chloroquine phosphate via non-radical pathways: Electron-transfer mechanism. *Chemical Engineering Journal* **2022**, *429*, 132245.