Supporting Information

Catalytic activation of peroxymonosulfate with manganese cobaltite nanoparticles for the degradation of organic dyes

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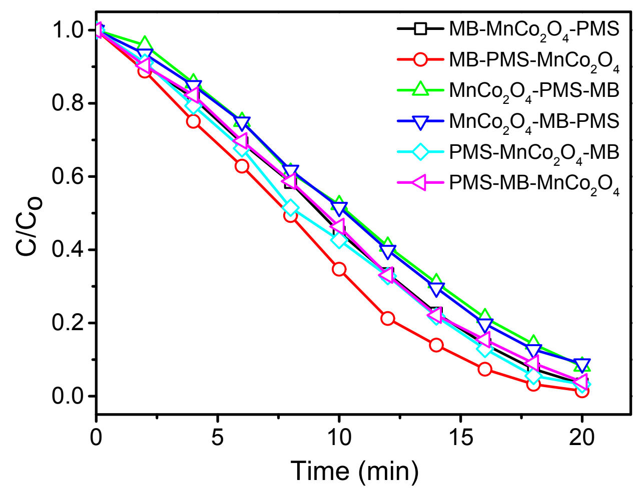

Figure S1. Influence of reaction sequence on MB degradation. Initial conditions: $[Dye]_0 = 20$ mg L^{-1}; $[Oxone]_0 = 500$ mg L^{-1}; $[MnCo_2O_{4.5}]_0 = 20$ mg L^{-1}; T = 25 ^oC; unadjusted pH.

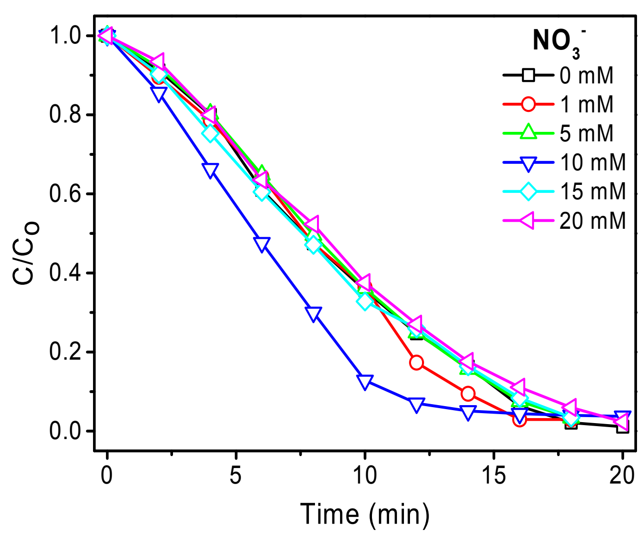

Figure S2. Influence of NO_3^- concentration on MB degradation. Initial conditions: $[Dye]_0 = 20$ mg L^{-1}; $[Oxone]_0 = 500$ mg L^{-1}; $[MnCo_2O_{4.5}]_0 = 20$ mg L^{-1}; T = 25 ^oC; unadjusted pH.

Table S1. The proposed reactions of coexisting anions with free radicals

Anion	Reaction equation	First-order rate constant (mol L^{-1} s^{-1})	Reference
Cl^-	$SO_4{\bullet}^- + Cl^- \rightarrow SO_4^{2-} + Cl{\bullet}$ $HO{\bullet}^- + Cl^- \leftrightarrow ClOH{\bullet}^-$ $ClOH{\bullet}^- + H^+ \rightarrow Cl{\bullet} + H_2O$ $Cl{\bullet} + Cl^- \rightarrow Cl_2{\bullet}^-$	2.3×10^8 4.2×10^9 6.1×10^9 7.8×10^9	[1]
HCO_3^-	$SO_4{\bullet}^- + HCO_3^- \rightarrow SO_4^{2-} + CO_3{\bullet}^- + H^+$ $HO{\bullet} + HCO_3^- \rightarrow CO_3{\bullet}^- + H_2O$	1.6×10^6 8.5×10^6	[2]
CO_3^{2-}	$SO_4{\bullet}^- + CO_3^{2-} \rightarrow SO_4^{2-} + CO_3{\bullet}^-$ $HO{\bullet}^- + CO_3^{2-} \rightarrow CO_3{\bullet}^- + HO^-$	6.1×10^6 3.9×10^8	[2]
NO_3^-	$SO_4{\bullet}^- + NO_3^- \rightarrow SO_4^{2-} + NO_3{\bullet}^-$ $HO{\bullet} + NO_3^- \rightarrow NO_3{\bullet}^- + HO^-$	5.6×10^4 N/A	[3]

Table S2. Some physicochemical properties of H_2O_2, PS and PMS

Oxidant	Oxidative structure	O–O bonding energy (E, kJ mol^{-1})	E^0	pK_a	Reference
H_2O_2	H–O–O–H	213.3	1.78	$H_2O_2 \rightarrow HO_2^- + H^+$ $pK_a = 11$	[4]
PS	SO_3^-–O–O–SO_3^-	140	2.01	No change in dissociation form pH > 3	[4]
PMS	H–O–O–SO_3^-	$140 < E_{PMS} < 213.3$	1.82	$HSO_5^- \rightarrow SO_5^{2-} + H^+$ $pK_a = 9.4$	[5]

References

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