

SUPPORTING INFORMATION

Auto-accelerating and Auto-inhibiting Phenomena in the Oxidation Process of Organic Contaminants by Permanganate and Manganese Dioxide under Acidic Conditions: Effects of Manganese Intermediates/Products[†]

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[†]Electronic supplementary information (ESI) available.

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Table of Contents	Pages
Figure S1. Oxidation kinetics of aniline by permanganate at pH 4.5.	S3
Figure S2. Oxidation kinetics of aniline by permanganate at pH 8.0.	S4
Figure S3. The correlation of MnO ₂ concentration with the increase in phenol oxidation rate at pH 4.5.	S5
Figure S4. Variation of the absorbance at 418 nm in the process of phenol oxidation by colloidal MnO ₂ at pH 3.0.	S6
Figure S5. Variation of the absorbance at 418 and 258 nm in the process of phenol oxidation by colloidal MnO ₂ at pH 3.0 in the presence of PP.	S7
Figure S6. Variation of the absorbance at 258 nm for the reduction of Mn(III)-PP by phenol at pH 3.0.	S8
Figure S7. The correlation of Mn(III)-PP concentration with the increase in phenol oxidation rate at pH 3.0.	S9
Figure S8. Variation of the absorbance at 525, 418 and 258 nm in the process of phenol oxidation by permanganate at pH 3.0 in the presence of PP.	S10
Figure S9. The correlation of Mn(III)-PP concentration with the increase in phenol oxidation rate at pH 3.0.	S11

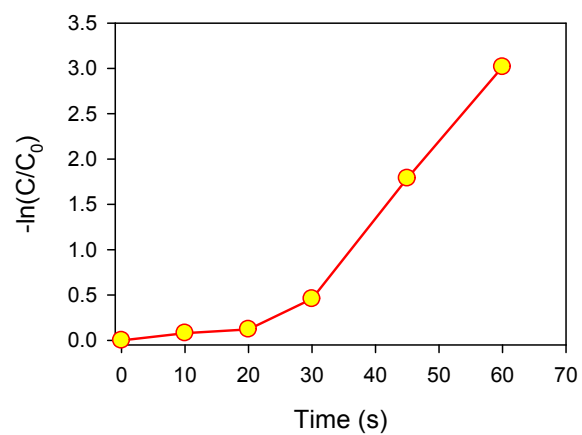


Figure S1. Oxidation kinetics of aniline by permanganate at pH 4.5. Experimental conditions: $[\text{aniline}]_0 = 5.0 \mu\text{M}$, $[\text{KMnO}_4]_0 = 50 \mu\text{M}$.

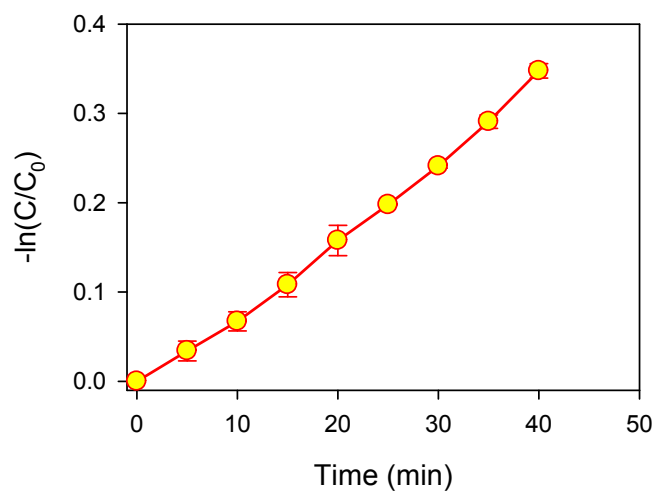


Figure S2. Oxidation kinetics of aniline by permanganate at pH 8.0. Experimental conditions: $[\text{aniline}]_0 = 5.0 \mu\text{M}$, $[\text{KMnO}_4]_0 = 50 \mu\text{M}$.

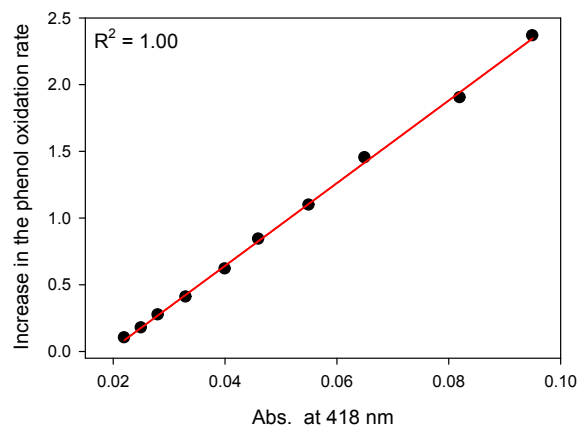


Figure S3. The correlation of MnO_2 concentration (corresponding to the absorbance at 418 nm) with the increase in phenol oxidation rate at pH 4.5. The increase in the phenol oxidation rate was determined by subtracting the initial degradation rate of phenol by permanganate from the degradation rates at different time (Fig. 1). Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{KMnO}_4]_0 = 50 \mu\text{M}$.

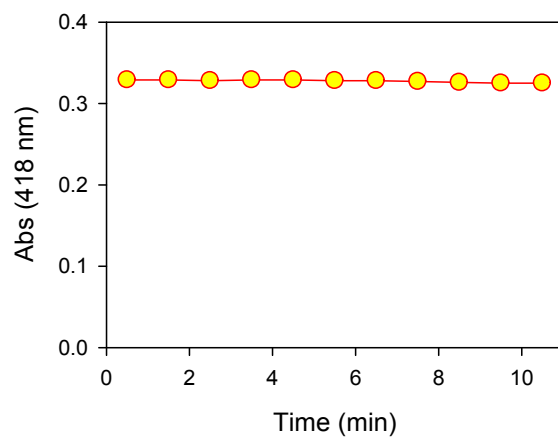


Figure S4. Variation of the absorbance at 418 nm in the process of phenol oxidation by colloidal MnO_2 at pH 3.0. Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{MnO}_2]_0 = 50 \mu\text{M}$.

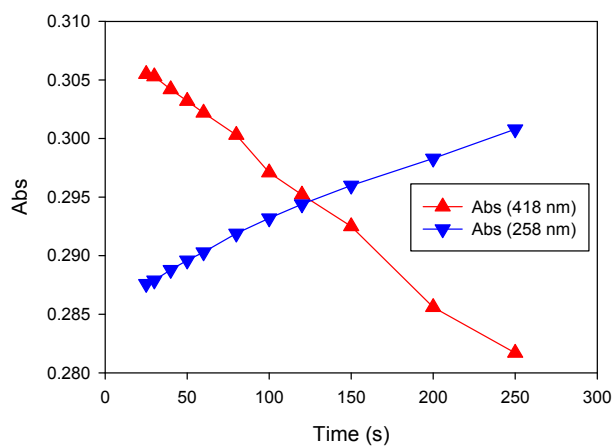


Figure S5. Variation of the absorbance at 418 and 258 nm in the process of phenol oxidation by colloidal MnO_2 at pH 3.0 in the presence of PP. Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{MnO}_2]_0 = 50 \mu\text{M}$, $[\text{PP}] = 5 \text{ mM}$.

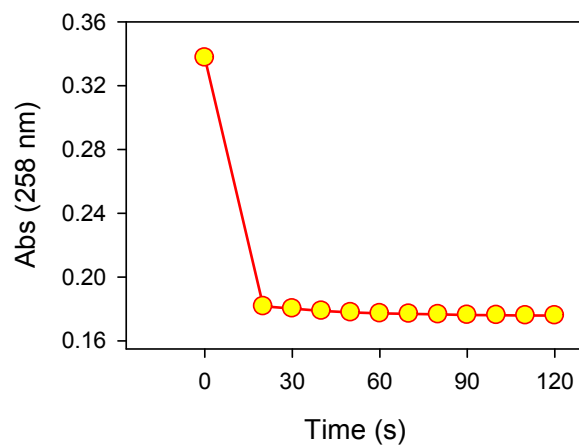


Figure S6. Variation of the absorbance at 258 nm for the reduction of Mn(III)-PP by phenol at pH 3.0. Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{Mn(III)-PP}]_0 = 50 \mu\text{M}$, $[\text{PP}]_0 = 5 \text{ mM}$.

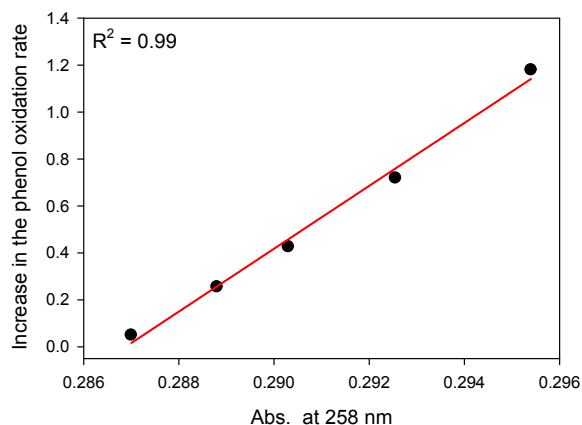


Figure S7. The correlation of Mn(III)-PP concentration (corresponding to the absorbance at 258 nm) with the increase in phenol oxidation rate by MnO₂ with time at pH 3.0. The increase in the phenol oxidation rate was obtained by subtracting the initial degradation rate of phenol by MnO₂ from the oxidation rates at different time (Fig. 6(A)). Experimental conditions: [phenol]₀ = 5.0 μM, [MnO₂]₀ = 50 μM, [PP]₀ = 5.0 mM.

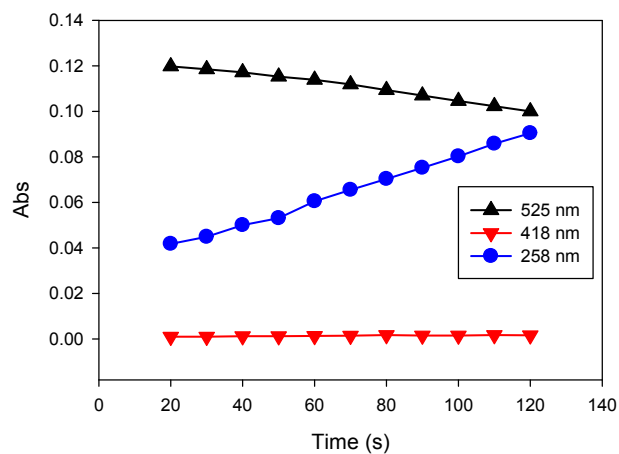


Figure S8. Variation of the absorbance at 525, 418 and 258 nm in the process of phenol oxidation by permanganate at pH 3.0 in the presence of PP. Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{KMnO}_4]_0 = 50 \mu\text{M}$, $[\text{PP}] = 5 \text{ mM}$.

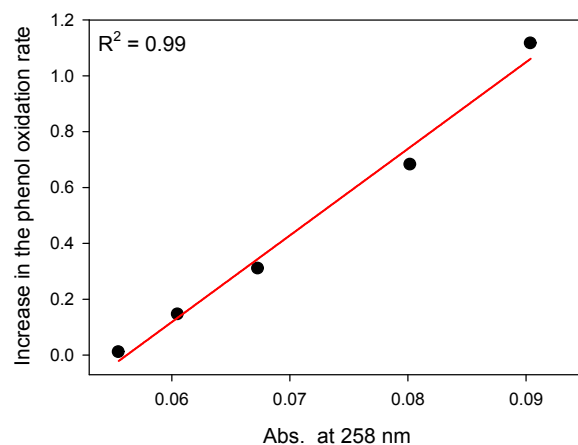


Figure S9. The correlation of Mn(III)-PP concentration (corresponding to the absorbance at 258 nm) with the increase in phenol oxidation rate by KMnO_4 with time at pH 3.0. The increase in the phenol oxidation rate was obtained by subtracting the initial degradation rate of phenol by permanganate from the oxidation rates of phenol at different time (Fig. 8(A)). Experimental conditions: $[\text{phenol}]_0 = 5.0 \mu\text{M}$, $[\text{KMnO}_4]_0 = 50 \mu\text{M}$, $[\text{PP}]_0 = 5.0 \text{ mM}$.