Supporting Information

Co-present Pb(II) Accelerates the Oxidation of Organic Pollutants by Permanganate: Role of Pb(III)

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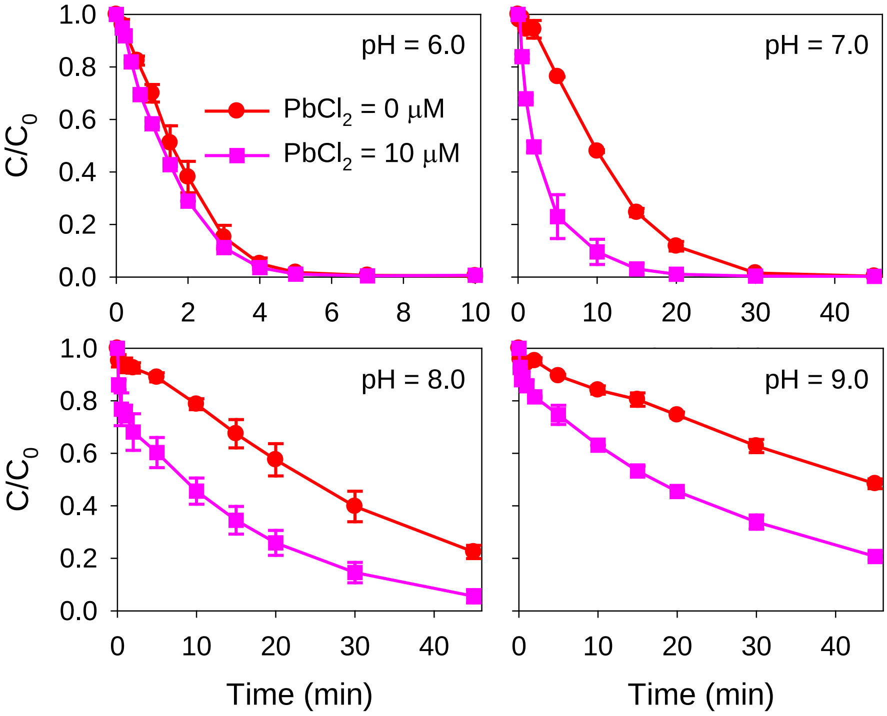

Fig. S1. Time course plot of aniline concentration in $KMnO_4$ system with the absence and presence of Pb^{2+}.

Reaction conditions: $[\text{aniline}]_0$ = 10 μM, $[KMnO_4]_0$ = 100 μM, [NaCl] = 5.0 mM, T = 25 °C.

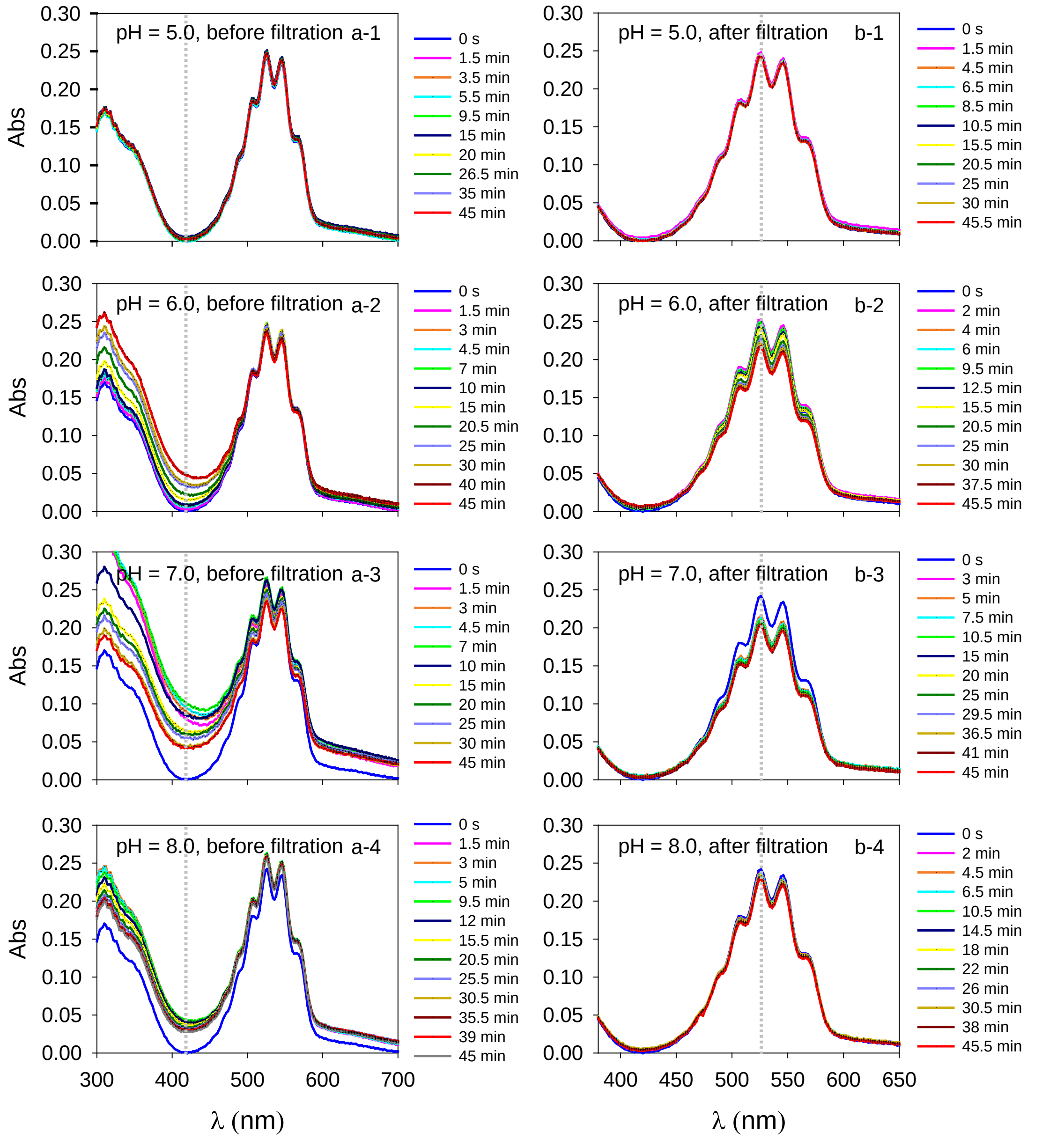

Fig. S2. Variation of UV-vis spectra during the reaction between $KMnO_4$ and $PbCl_2$ in the absence of DCF over the pH range of 5.0−8.0. Peaks at 418 nm and 526 nm represent MnO_2 and MnO_4^-, respectively. Reaction conditions: $[KMnO_4]_0$ = 100 μM, [NaCl] = 5.0 mM, $[PbCl_2]_0$ = 50 μM (pH 5.0–7.0) or 20 μM (pH 8.0), T = 25 °C. The lines ascribed to “0 s” represent the spectra of solution containing Mn(VII) before adding Pb(II).

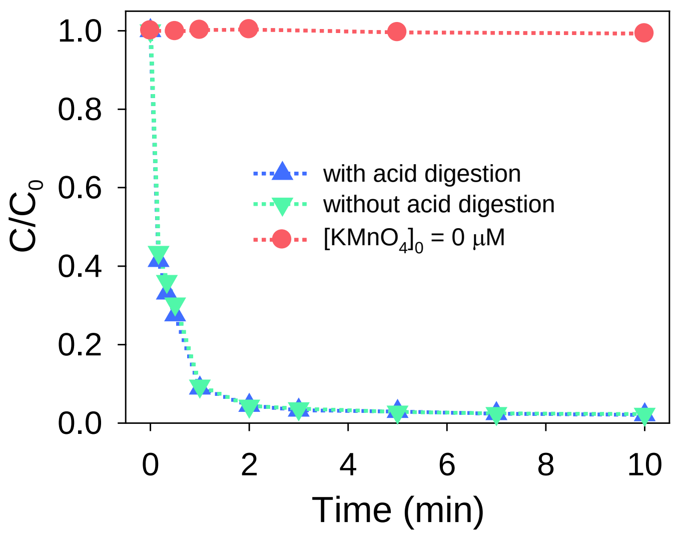

Fig. S3. The potential influence of MnO_2 adsorption on the abatement of 2,4-DCP oxidation in $KMnO_4$ system. Reaction conditions: $[2,4\text{-DCP}]_0$ = 10 μM, $[PbCl_2]_0$ = 100 μM, $[KMnO_4]_0$ = 100 μM (if any), pH = 8.0, [NaCl] = 5.0 mM, T = 25 °C. To confirm that the decrease in 2,4-DCP concentration was reaction progressed and not caused by adsorption onto MnO_2, aliquots were acid digested prior to UPLC analysis.

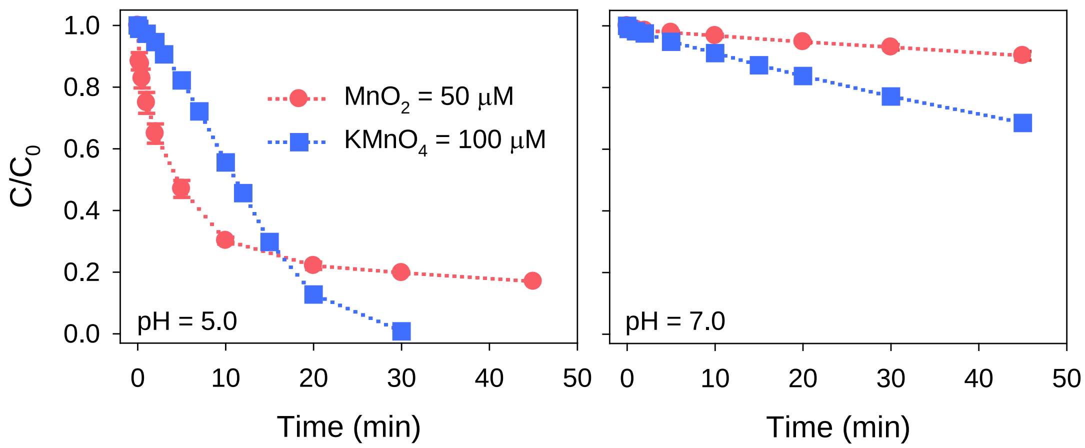

Fig. S4. The kinetics of DCF oxidation by MnO_2. Reaction conditions: $[DCF]_0$ = 10 μM, [NaCl] = 5.0 mM, T = 25 °C.

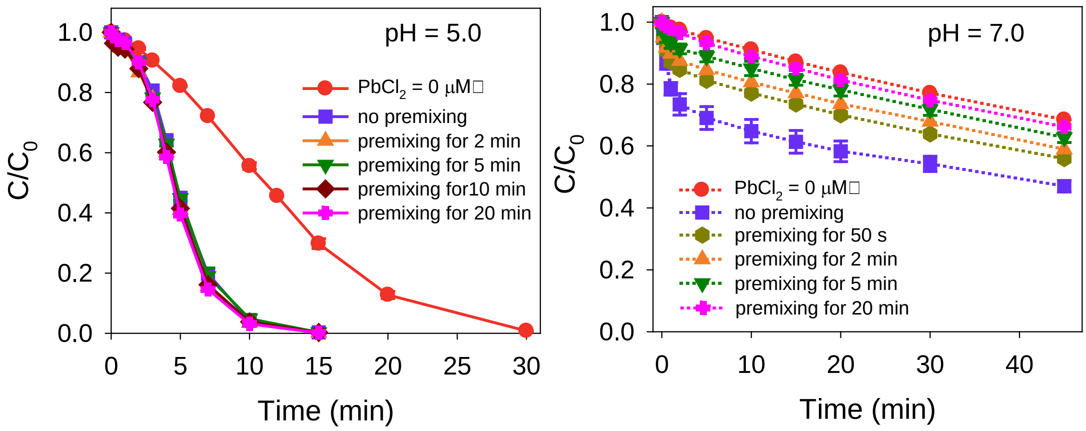

Fig. S5. Effect of premixing of Pb^{2+} and $KMnO_4$ on the kinetics of DCF oxidation by $KMnO_4$. Reaction conditions: $[DCF]_0$ = 10 μM, $[PbCl_2]_0$ = 10 μM (if any), $[KMnO_4]_0$ = 100 μM, [NaCl] = 5.0 mM, T = 25 °C.

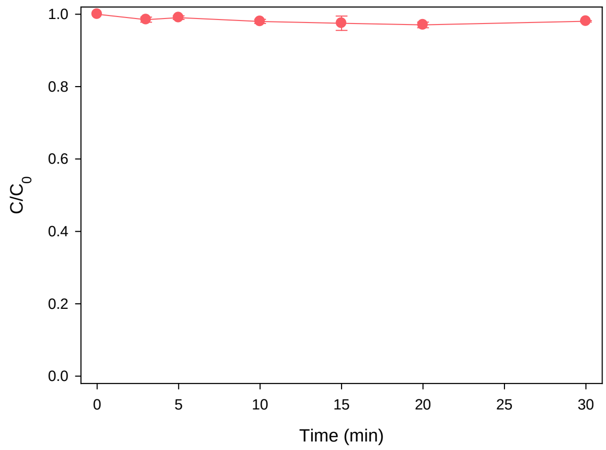

Fig. S6. The kinetics of DCF oxidation by lead oxides at pH 5.0. Reaction conditions: $[DCF]_0$ = 10 μM, [lead oxides]$_0$ = 10 μM, [NaCl] = 5.0 mM, T = 25 °C. The lead oxides were collected after the reaction between H_2O_2 and Pb(II) at pH 7.0, then the solids were washed with pure water and freeze-dried under vacuum.