

Supplementary Material

# Removal of Bound PAH Residues in Contaminated Soils by Fenton Oxidation

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**Table S1** The concentration of bound PAH residues in soil with different reaction time

Time	The concentration of PAH at specified oxidation time (mg/kg)			
	NAP	ACP	FLU	ANT
0	0.2730	0.3380	0.1440	2.0580
3	0.1230	0.3060	0.0270	0.6580
6	0.1170	0.2930	0.0140	0.4300
12	0.0980	0.2800	0.0130	0.1140
18	0.0760	0.2720	0.0100	0.0070
24	0.0550	0.2580	0.0030	0.0040
36	0.0460	0.2500	0	0

**Table S2** The amounts of each reagent added at different H<sub>2</sub>O<sub>2</sub> and Fe<sup>2+</sup> ratios

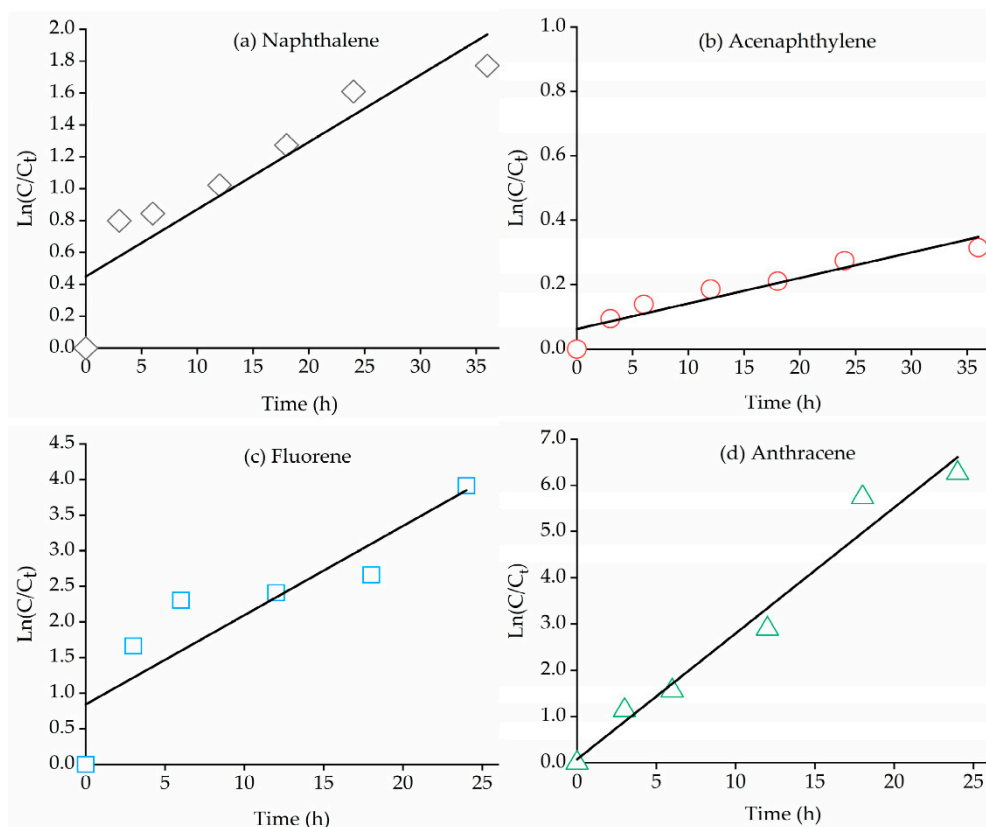
Reagent	H <sub>2</sub> O <sub>2</sub> :Fe <sup>2+</sup> (m/m)							
	10:1	15:1	20:1	24:1	26:1	28:1	30:1	33:1
Critic acid (mL)	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500
FeSO <sub>4</sub> (mL)	1.7868	0.8899	0.5925	0.4675	0.4229	0.3861	0.3551	0.3170
H <sub>2</sub> O <sub>2</sub> (mL)	1.9592	1.4637	1.2994	1.2303	1.2057	1.1853	1.1682	1.1472

**Table S3** The amounts of each reagent added at different H<sub>2</sub>O<sub>2</sub> concentration

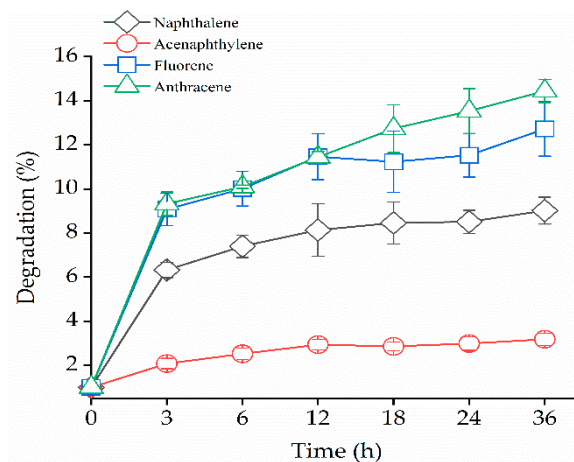
Reagent	H <sub>2</sub> O <sub>2</sub> Concentration (%)							
	4	6	7	8	9	10	12	15
Critic acid (mL)	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500
FeSO <sub>4</sub> (mL)	0.0822	0.1335	0.1702	0.1941	0.2286	0.2666	0.3551	0.5316
H <sub>2</sub> O <sub>2</sub> (mL)	0.2704	0.4392	0.5600	0.6384	0.7521	0.8770	1.1682	1.7488

**Table S4** The basic physicochemical properties of the main chemical reagents

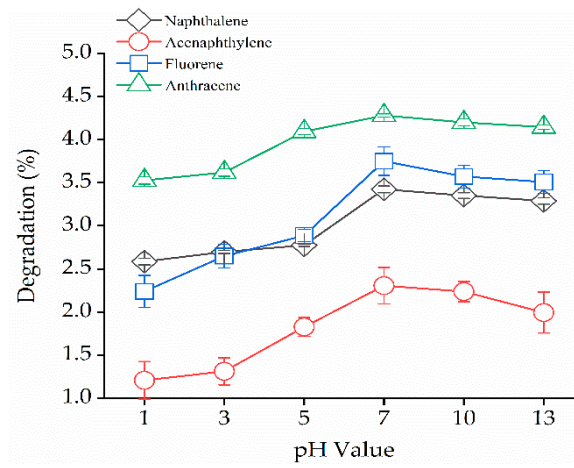
Reagent	General properties of each reagent			
	Molecular weight (g/mol)	Melting Point (°C)	Solubility (g/100mL)	pK <sub>a</sub>
Citric acid monohydrate	210.138	135	59.2	2.79
Oxalic acid dihydrate	126.064	101-102	13-14	pK <sub>a</sub> 1: 1.46 pK <sub>a</sub> 2: 4.40
Hydrochloric acid	36.458	-114.2	miscible	—
Potassium oxalate monohydrate	184.230	356	36.4	—



**Figure S1** Pseudo-first-order kinetics fitting figure of bound PAH residues degradation.  $C$  is the initial bound PAH residues concentration, and  $C_t$  is the concentration of bound PAH residues at specified oxidation time.



**Figure S2** the Effects of soil as a catalyst for the degradation of bound PAH residues without  $\text{Fe}^{2+}$ . Solid=3 g,  $\text{H}_2\text{O}_2$  ( $27.9 \times 10^3$  mg/L), pH=3. Error bars represent standard errors.



**Figure S3** Effect pH on bound PAH residues oxidation without Fenton reagent. Error bars represent standard errors.