

Supplementary

# Materials: Peracetic Acid Activated with Electro-Fe<sup>2+</sup> Process for Dye Removal in Water

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## Text S1. Materials and Reagents

Methylene blue (MB), rhodamine b (RhB), peracetic acid (PAA), potassium chloride (KCl), sodium bicarbonate (NaHCO<sub>3</sub>), sodium nitrate (NaNO<sub>3</sub>), ferrous sulfate (FeSO<sub>4</sub>), and ethylenediamine tetra acetic acid disodium (EDTA-2Na) were supplied from Kermel Chemical Reagent Co., Ltd. Methyl orange (MO) was supplied from Guangfu Fine Chemical Research Institute. PAA stock solution was prepared through mixing acetic acid and H<sub>2</sub>O<sub>2</sub> and stored at 4 °C. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), glacial acetic acid (CH<sub>3</sub>COOH), potassium iodide (KI), and sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) were supplied from Kaitong Chemical Reagent Co., Ltd. Metronidazole (MTZ), tetracycline (TCH), Humic acid (HA), L-Histidine (L-His), ammonium molybdate ((NH<sub>4</sub>)<sub>2</sub>MoO<sub>4</sub>), potassium permanganate (KMnO<sub>4</sub>), sodium phosphate dibasic dodecahydrate (Na<sub>2</sub>HPO<sub>4</sub>·12H<sub>2</sub>O), hydroxylamine hydrochloride (NH<sub>2</sub>OH·HCl), and sodium dihydrogen phosphate (NaH<sub>2</sub>PO<sub>4</sub>) were supplied from Aladdin company. Tert-butyl alcohol, L-Histidine, phenol and sodium acetate (CH<sub>3</sub>COONa) were supplied from Song Qi Trading Co., Ltd. P-benzoquinone and methanol were supplied from Damao Chemical Reagent Factory. Phenol was purchased from Guangzhou Chemical Reagent Factory. Sodium hydroxide (NaOH), phenanthroline, hydrochloric acid (HCl), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), and N, N-Diethyl-p-phenylenediamine (DPD) were purchased from Sinopharm Chemical Reagent Co., Ltd. All the chemicals were used as received without further purification. Deionized water was used to prepare aqueous solutions.

## Text S2. Equipment and Procedure

The EC system was supplied by the direct current (DC) power (WYK-60V10A-H, Guangdong East Power Co., Ltd., China). A Pt sheet (20 mm × 20 mm × 0.1 mm) was applied as the anode purchased from Xuzhou Zhenghao Electronic Technology Co., Ltd., China. A graphite plate (20 mm × 100 mm × 3 mm) was used as the cathode obtained from Beijing Crystal Carbon Technology Co., Ltd., China. Two electrodes with an interelectrode distance of 2 cm were inserted into the solution and linked to the DC power.

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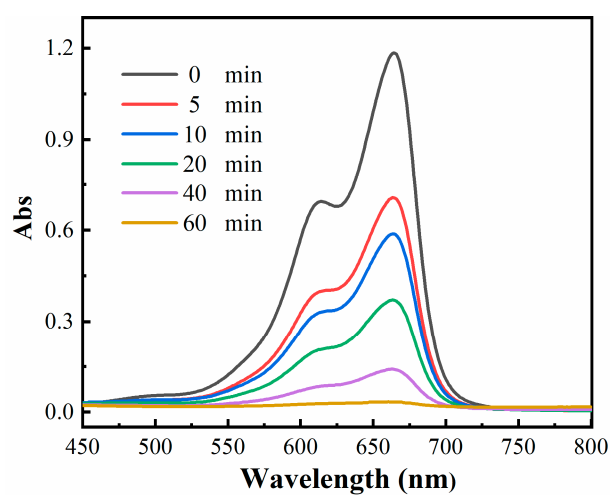
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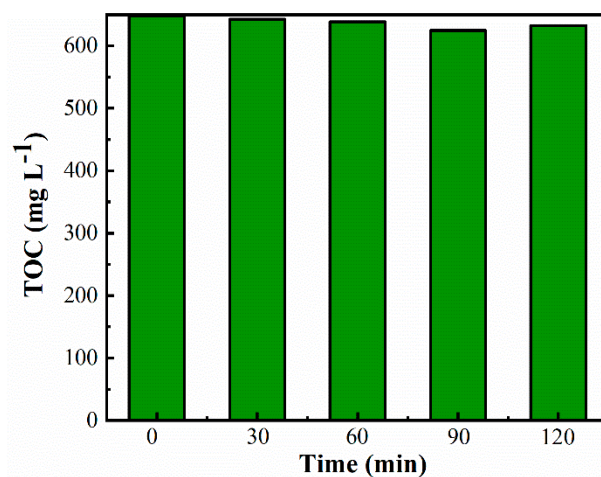
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**Figure S1.** UV-Vis spectrum for MB removal in EC/Fe<sup>2+</sup>/PAA system. Experimental conditions: [MB]<sub>0</sub> = 20 mg L<sup>-1</sup>, [Fe<sup>2+</sup>]<sub>0</sub> = 30 μmol L<sup>-1</sup>, [PAA]<sub>0</sub> = 5.4 mmol L<sup>-1</sup>, [H<sub>2</sub>O<sub>2</sub>]<sub>0</sub> = 11.25 mmol L<sup>-1</sup>, [NaNO<sub>3</sub>] = 30 mmol L<sup>-1</sup>, pH = 2.9, *j* = 15 mA cm<sup>-2</sup>.



**Figure S2.** TOC removal for MB in EC/Fe<sup>2+</sup>/PAA system. Experimental conditions: [MB]<sub>0</sub> = 20 mg L<sup>-1</sup>, [Fe<sup>2+</sup>]<sub>0</sub> = 30 μmol L<sup>-1</sup>, [PAA]<sub>0</sub> = 5.4 mmol L<sup>-1</sup>, [H<sub>2</sub>O<sub>2</sub>]<sub>0</sub> = 11.25 mmol L<sup>-1</sup>, [NaNO<sub>3</sub>] = 30 mmol L<sup>-1</sup>, pH = 2.9, *j* = 15 mA cm<sup>-2</sup>.

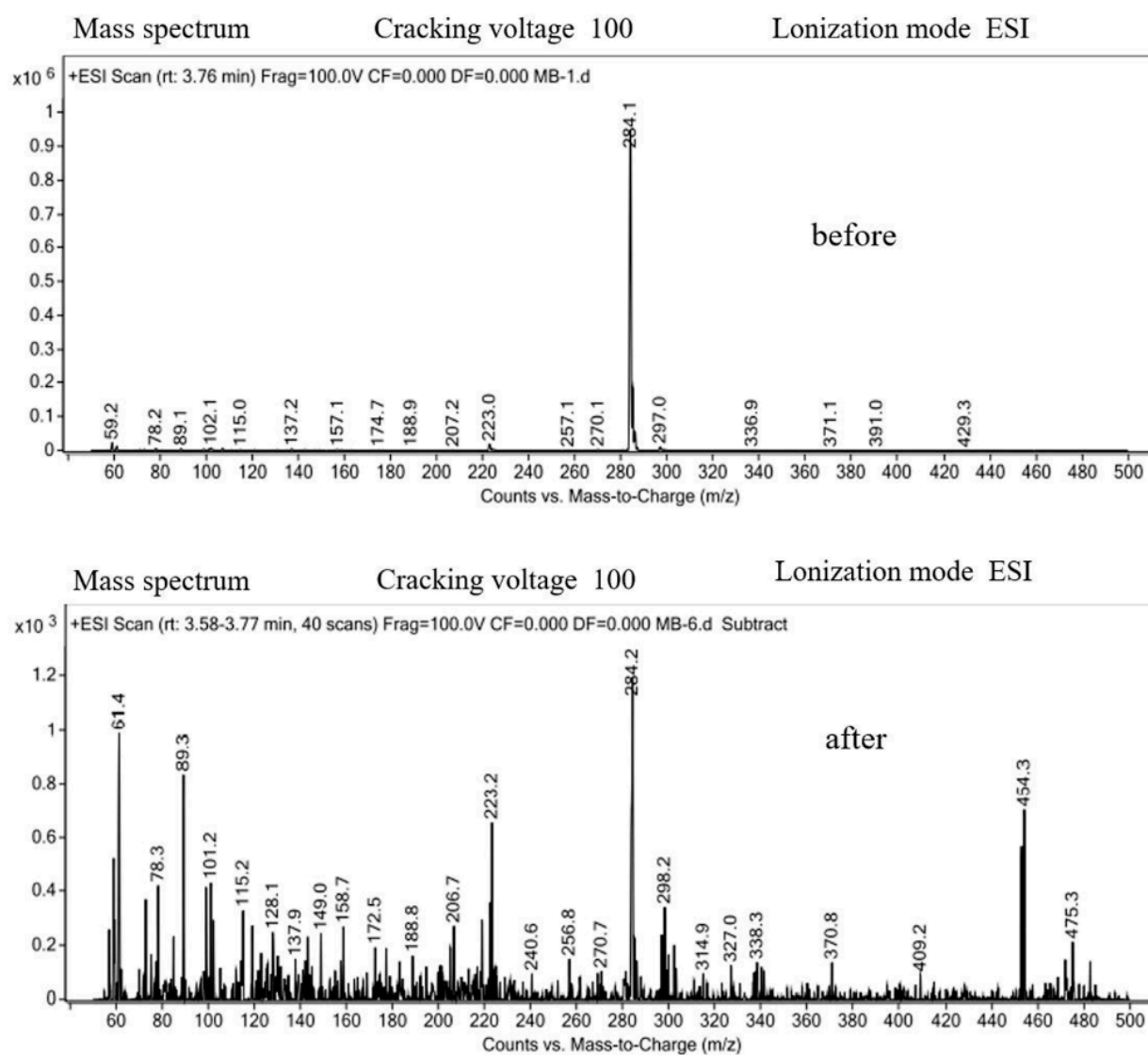


Figure S3. HPLC-MS analysis of MB before and after reaction.