

Supplementary Materials

Catalytic Wet Peroxide Oxidation of Anionic Pollutants over Fluorinated Fe₃O₄ Microspheres at Circumneutral pH Values

Fengxi Chen ^{1*}, Huaixiang Lv ¹, Wu Chen ², Rong Chen ^{1,3}

¹ State Key Laboratory of New Textile Materials & Advanced Processing Technologies, Wuhan Textile University, Wuhan 430200, PR China

² School of Chemistry and Environmental Engineering, Wuhan Institute of Technology, Wuhan 430205, P. R. China

³ Henan Institute of Advanced Technology, Zhengzhou University, Zhengzhou 450002, P.R. China

* Correspondence: fxchen@wtu.edu.cn (F.C.)

Table S1. Effect of initial H₂O₂ concentration on OG decolorization with H₂O₂ over F-Fe₃O₄-1 microspheres

| [H ₂ O ₂] ₀ (mM) | 15-min adsorption (%) | 2-h DR (%) | k _{s1} /min ⁻¹ (R ²) |
|---|--------------------------|---------------|---|
| 20 | 13.2 | 65.9 | 0.0082 (0.993) |
| 40 | 12.3 | 96.8 | 0.0284 (0.991) |
| 60 | 13.3 | 97.3 | 0.0304 (0.992) |
| 80 | 10.3 | 90.3 | 0.0182 (0.994) |

Reaction conditions: OG (0.1 mM, pH 6.5) and F-Fe₃O₄-1 (0.5 g/L) at 40 °C for 2 h.

Table S2. Effect of initial pH on OG decolorization with H₂O₂ over F-Fe₃O₄-1 microspheres

| [pH] ₀ | 15-min adsorption (%) | 2-h DR (%) | k _{s1} /min ⁻¹ (R ²) |
|-------------------|--------------------------|---------------|---|
| 3.0 | 22.2 | 97.5 | 0.0381 (0.991) |
| 5.0 | 15.2 | 97.4 | 0.0320 (0.990) |
| 6.5 | 12.3 | 96.8 | 0.0284 (0.991) |
| 7.0 | 10.8 | 94.8 | 0.0252 (0.995) |
| 9.0 | 8.1 | 88.5 | 0.0175 (0.992) |

Reaction conditions: OG (0.1 mM) and F-Fe₃O₄-1 (0.5 g/L) at 40 °C for 2 h.

Table S3. Effect of reaction temperature on OG decolorization with H₂O₂ over F-Fe₃O₄-1 microspheres

| Temperature (°C) | 15-min adsorption (%) | 2-h DR (%) | k _{s1} /min ⁻¹ (R ²) |
|---------------------|--------------------------|---------------|---|
| 25 | 5.5 | 32.6 | 0.0028 (0.991) |
| 40 | 12.3 | 96.8 | 0.0284 (0.990) |
| 55 | 13.1 | 99.5 | 0.0445 (0.991) |

Reaction conditions: OG (0.1 mM, pH 6.5) and F-Fe₃O₄-1 (0.5 g/L) for 2 h.

Table S4. EDX-determined elemental composition of F-Fe₃O₄-1 microspheres

| Element/wt% | O | F | Fe |
|-------------|----------|---------|----------|
| Spot 1 | 15.19 | 8.24 | 76.57 |
| Spot 2 | 16.41 | 7.57 | 76.02 |
| Spot 3 | 16.71 | 5.48 | 77.82 |
| Average/wt% | 16.1±0.8 | 7.1±1.4 | 76.8±0.9 |

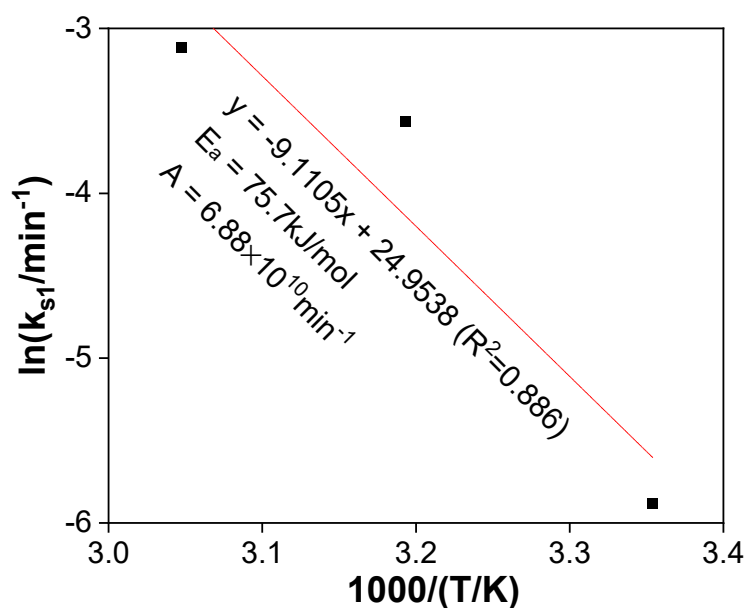


Figure S1. The Arrhenius plot of the decolorization of OG (0.1 mM, pH 6.5) with H₂O₂ on F-Fe₃O₄-1 microspheres.