

Supporting Information

Oxygen vacancy-rich Fe@Fe₃O₄ boosting Fenton chemistry

Rongwei Zheng^{1, +}, Ruifan Tan^{2, +}, Yali Lv², Xiaoling Mou^{2,3,*}, Junqiao Qian¹, Ronghe Lin^{2,3},
Ping Fan^{4,*}, and Weidong Kan⁵

1. Zhejiang Tongji Vocational College of Science and Technology, Hangzhou 311231, PR China

2. Hangzhou Institute of Advanced Studies, Zhejiang Normal University, 1108 Gengwen Road, Hangzhou 311231, PR China

3. Key Laboratory of the Ministry of Education for Advanced Catalysis Materials, Zhejiang Normal University, 688 Yingbin Road, Jinhua 321004, China

4. College of Chemistry and Chemical Engineering, Shaoxing University, Shaoxing, Zhejiang 312000, China

5. Shandong Tsurumi Hongqi Environmental Technology Co., Ltd, Weifang 261108, China

⁺ These authors contributed equally

^{*} Correspondence: xiaoling.mou@zjnu.edu.cn; fangping@usx.edu.cn

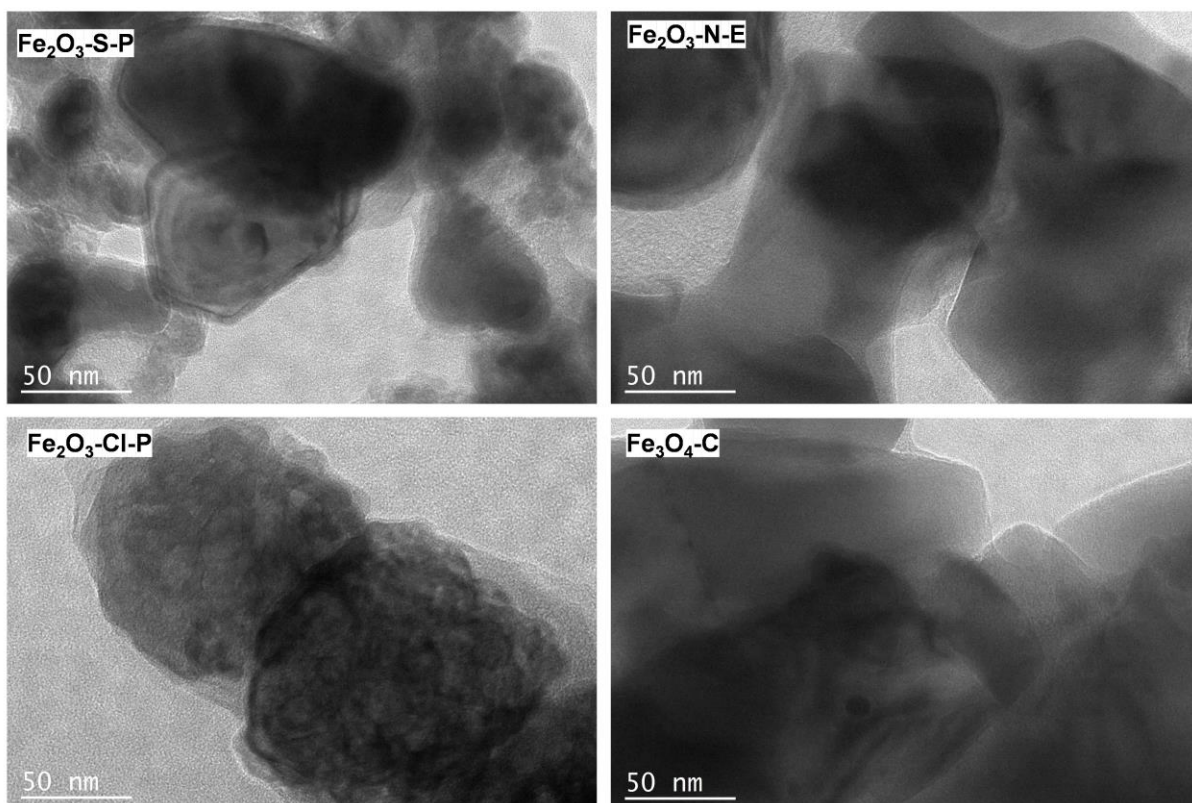


Figure S1. The additional TEM images of the iron oxides after 350 °C reduction.

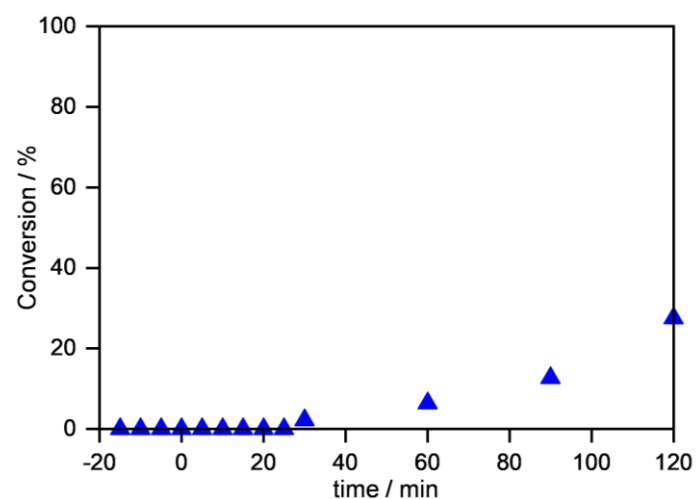


Figure S2. The MO decomposition activity as a function of time in the presence of an Fe^{3+} solution. Reaction conditions: $C_{\text{MO}} = 100 \mu\text{g/mL}$, $\text{pH} = 3$, $2.6 \text{ mg Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$, and $C_{\text{H}_2\text{O}_2} = 20 \text{ mM}$.

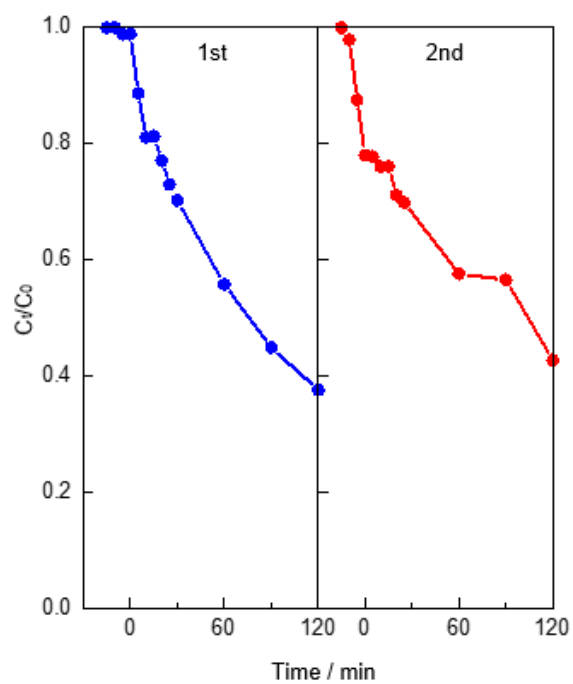


Figure S3. The kinetic profiles of MO decomposition on $\text{Fe}_2\text{O}_3\text{-S-P}$ in two consecutive runs. Reaction conditions: $w_{\text{cat}} = 20$ mg; $\text{pH} = 3$, $V = 400$ mL, $C_{\text{H}_2\text{O}_2} = 80$ mM, $C_{\text{MO}} = 500$ $\mu\text{g/mL}$. The catalyst after the use was recovered by centrifugation.

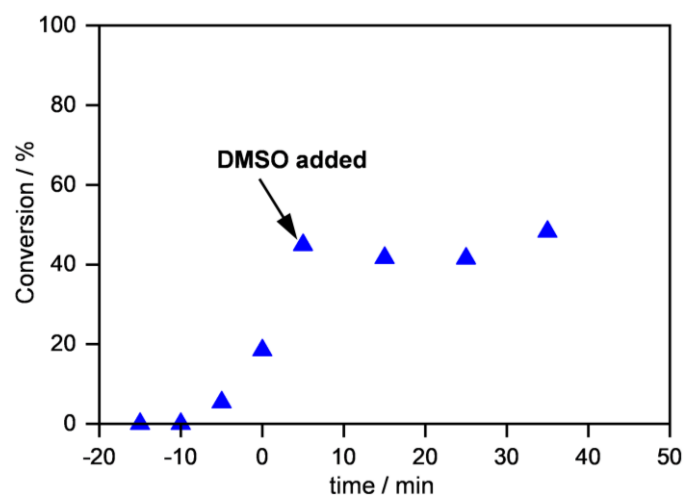


Figure S4. The MO decomposition activity as a function of time on $\text{Fe}_2\text{O}_3\text{-N-E}$. DMSO was added at 5 min, and the conversion did not increase hereafter, thus demonstrating the radical induction nature of the reaction.

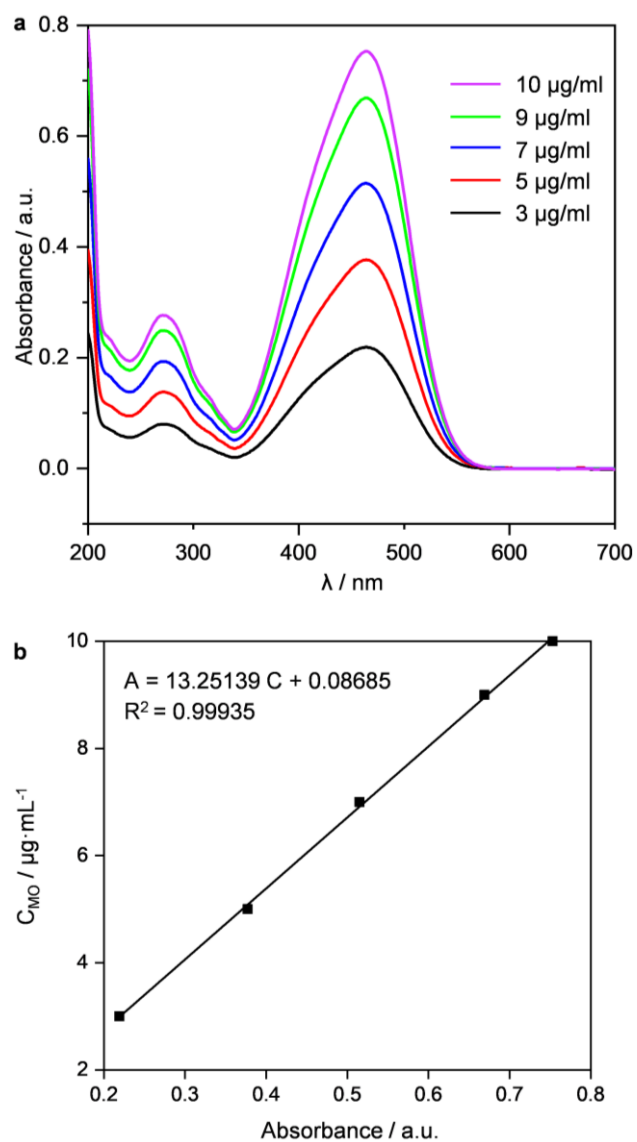


Figure S5. (a) The absorbance of MO solutions of different concentrations as a function of the wavelength, and (b) the linear relationship between the MO concentration and the absorbance intensity at 464 nm.