Electronic Supplementary Information

From metal-organic frameworks to magnetic nanostructured porous carbon composites: Towards highly efficient dye removal and degradation

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1. The equation of the adsorption model.

The Langmuir equation is as follows:

$$q_e = \frac{q_{max} K_L C_e}{1 + K_L C_e} \quad \text{Eq. S1}$$

where K_L is the Langmuir constant, qmax is a constant related to the maximum amount of adsorbed adsorbate ($mg \cdot g^{-1}$), q_e is the extent of sorption at equilibrium ($mg \cdot g^{-1}$), and C_e is the equilibrium concentration of MG ($mg \cdot g^{-1}$).

The linear form of the Langmuir equation is

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{max}} + \frac{C_e}{q_{max}} \quad \text{Eq. S2}$$

The Freundlich equation can be written as follows:

$$q_e = K_F C_e^{1/} \quad \text{Eq. S3}$$

where K_F and 1/n represent the Freundlich constants that correspond to the adsorption capacity and adsorption intensity, respectively. Equation (5) can be rearranged into a linear form as follows:

$$\log q_e = \log K_F + \frac{1}{n} \log C_e \quad \text{Eq. S4}$$

2. The equation of the kinetics model.

The linear form of the pseudo–first-order model is generally expressed as follows:

$$\ln\left(q_e - q_t\right) = \ln q_e - k_1 t \quad \text{Eq. S5}$$

where k_1 is the equilibrium rate constant of pseudo–first-order kinetics (min^{-1}). The linear fit between the log(q_e–q_t) and contacttime (t) at 30 °C can be approximated as pseudo–first-order kinetics.

The linear form of the pseudo–second-order model is as follows:

$$\frac{t}{q_t} = \frac{1}{k q_e^2} + \frac{t}{q_e} \quad \text{Eq. S6}$$

where k_2 is the equilibrium rate constant of pseudo–second-order kinetics ($g \cdot mg^{-1} \cdot min^{-1}$).

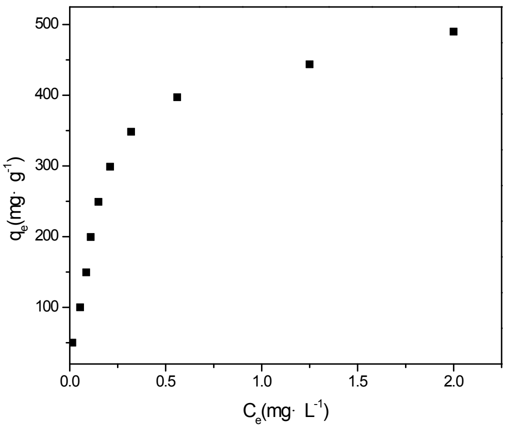

Fig.S1 Standard adsorption curve for MG onto γ-Fe_2O_3/C at the larger volume with lower concentration of MG at 30 °C. The concentrations of MG were 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 $mg \cdot L^{-1}$; the dosages of adsorbent: 10 mg; the volume: 50 mL.

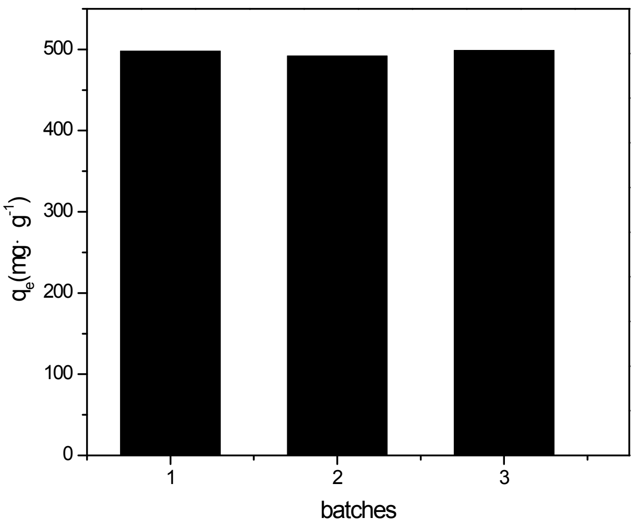

Fig.S2 The adsorption capacity of different batches of the γ-Fe_2O_3/C.

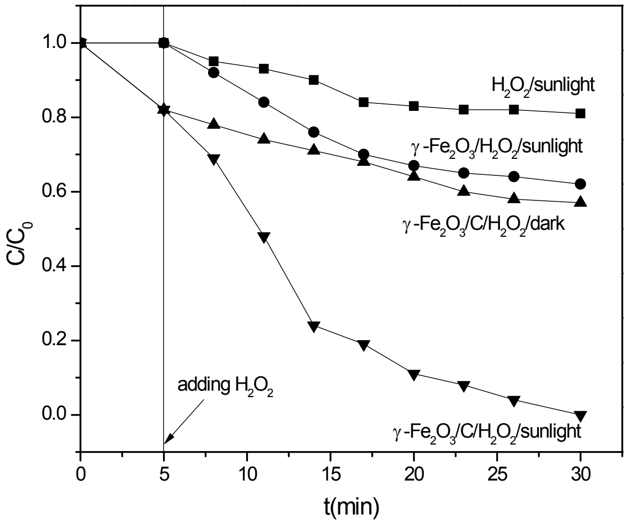

Fig.S3 Removal efficiency of MG under different condition within 30 min, 5 min adsorption/desorption equilibrium in the dark, and then adding H_2O_2 and put the glass bottle under the sunlight. Reaction condition: initial MG concentration, 500 mg·L^{-1}; H_2O_2, 30%, 20 μL; catalyst, 10 mg; room tempreture.