Electronic Supplementary Material (ESI) for CrystEngComm


Supporting Information

# Hierarchical Flower-like $Fe_3O_4$ and $\gamma$-$Fe_2O_3$ Nanostructures: Synthesis, Growth Mechanism, and Photocatalytic Properties

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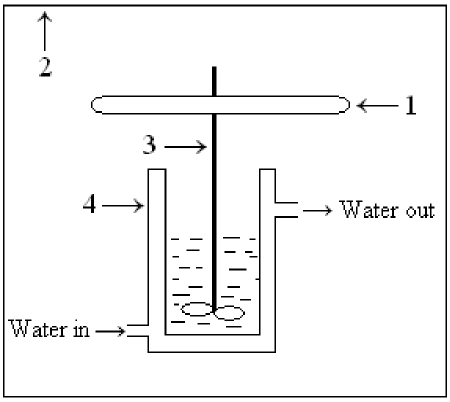


**Figure SI-1** Experimental setup for photocatalytic process. (1) 9 W visible-light lamp, (2) chamber, (3) mechanical stirrer, (4) jacketed reactor.

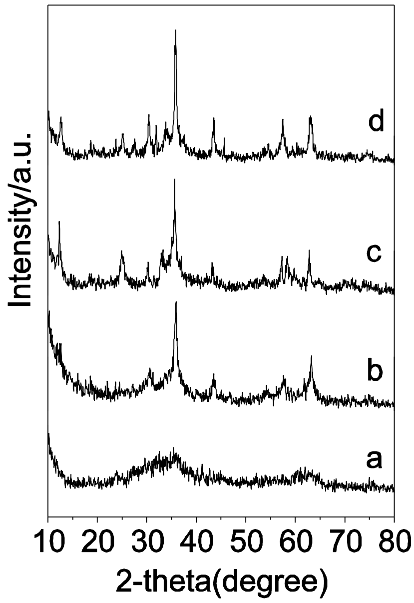


**Figure SI-2** XRD patterns of samples (a) Q2, (b) Q3, (C) Q4, and (d) Q5.

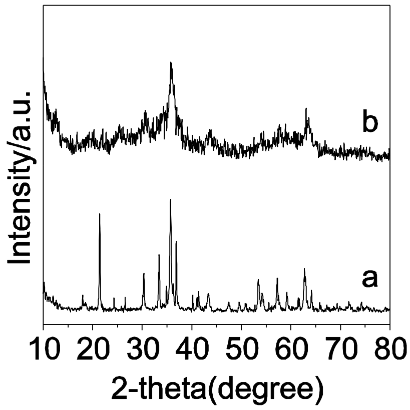


**Figure SI-3** XRD patterns of samples (a) Q6 and (b) Q7.

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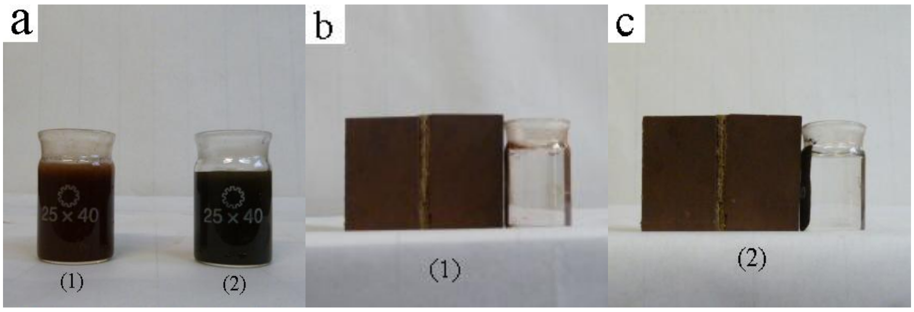


**Figure SI-4** Photographs of the flower-like (1) $\gamma$-$Fe_2O_3$ and (2) $Fe_3O_4$ before (a) and after (b, c) magnetic separation by an external magnetic field.

**Effect of photocatalyst dosage on the photodegradation of EBT**

The effect of amount of hierarchical flower-like $Fe_3O_4$ on the photodegradation of EBT versus time was shown in Figure SI-5. It was observed that the degradation percentage increased with increasing mass of photocatalyst, reached the higher value (0.5 g $L^{-1}$ of the photocatalyst) and then decreased. Therefore, 0.5 g $L^{-1}$ of the photocatalyst was used as optimum value.

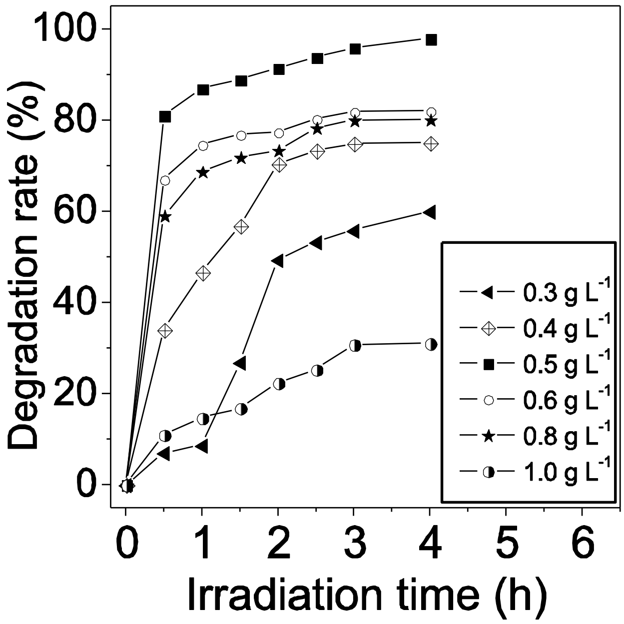


**Figure SI-5** Effect of photocatalyst dosage on the photodegradation of EBT (dye concentration 50 mg $L^{-1}$; V = 100 mL).

**Effect of the initial dye concentration on the photodegradation of EBT**

After optimizing the photocatalyst dosage, the effect of initial dye concentration ranging from 50 to 100 mg $L^{-1}$ on the photodegradation of EBT was investigated and the obtained results were shown in Figure SI-6. It was seen that for dye solutions of 50 and 60 mg $L^{-1}$, almost 97% degradation occurred in 4 h. In case of 70 mg $L^{-1}$, 84% degradation was observed in 4 h and the degradation percentage further decreased with increasing the concentration of dye. Therefore, in our experiment, the initial dye concentration was fixed at 60 mg $L^{-1}$.

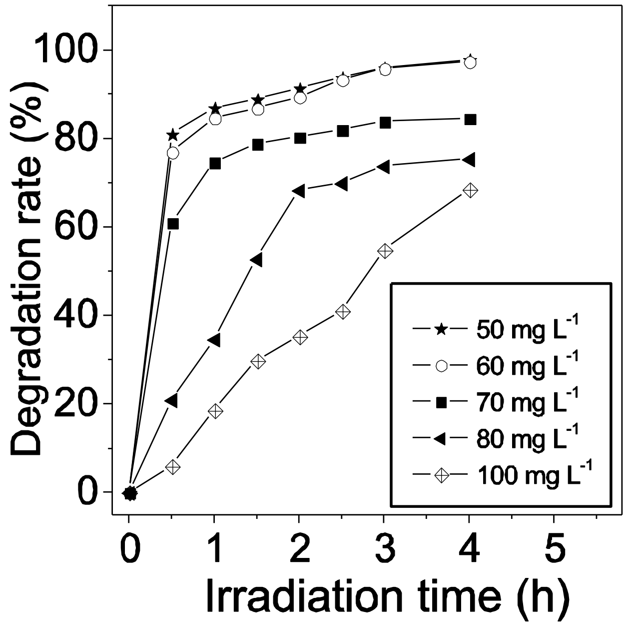


**Figure SI-6** Effect of the initial dye concentration on the photodegradation of EBT (photocatalyst dosage 0.5 g $L^{-1}$; V = 100 mL).