

Supporting Information for

# Controlled synthesis of novel flowerlike $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanostructures via a one-step biphasic interfacial reaction route

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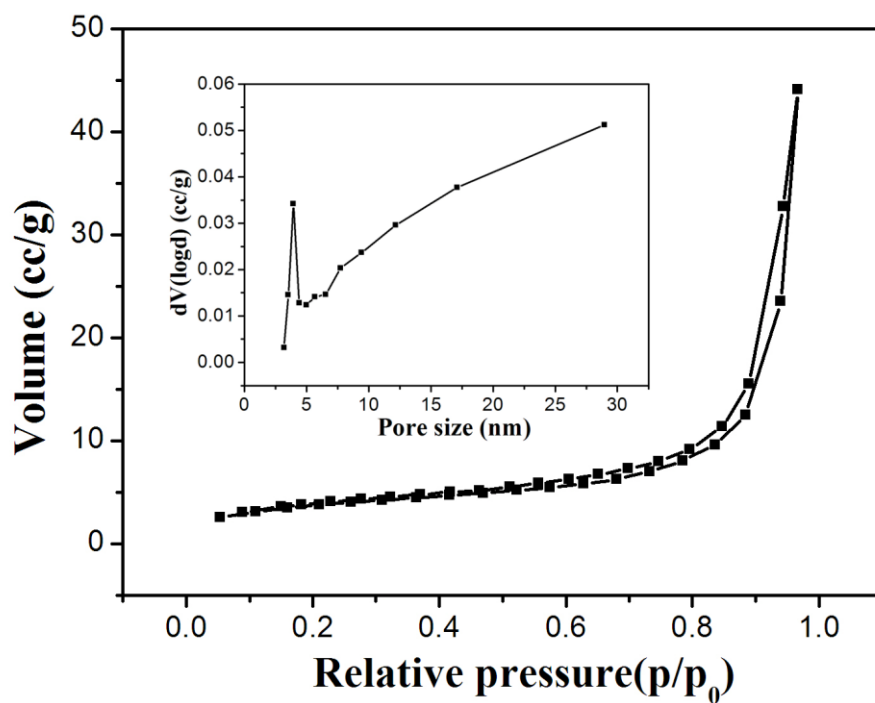
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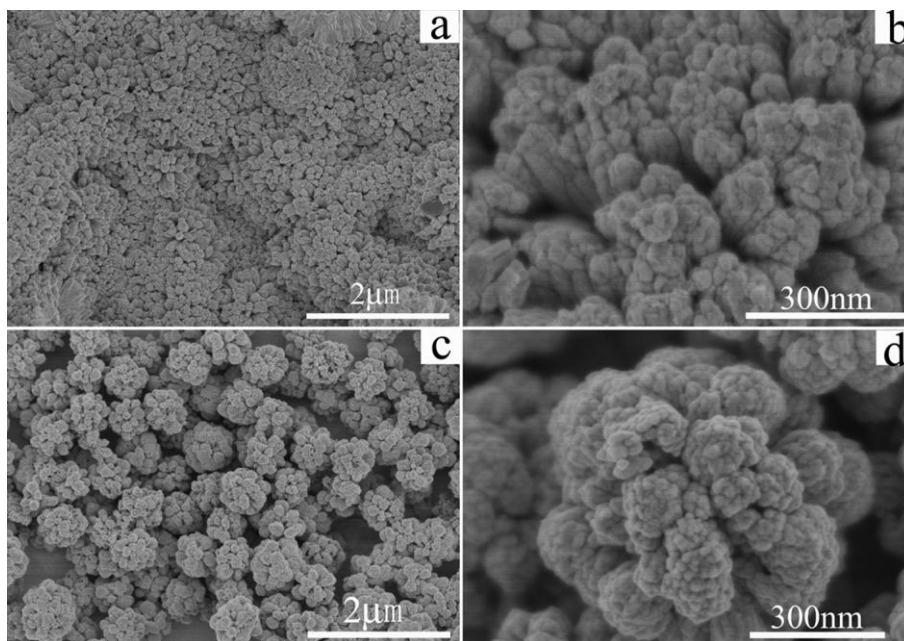
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**Synthesis of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> sample in the absence of liquid-liquid interface:** (a) 0.353g

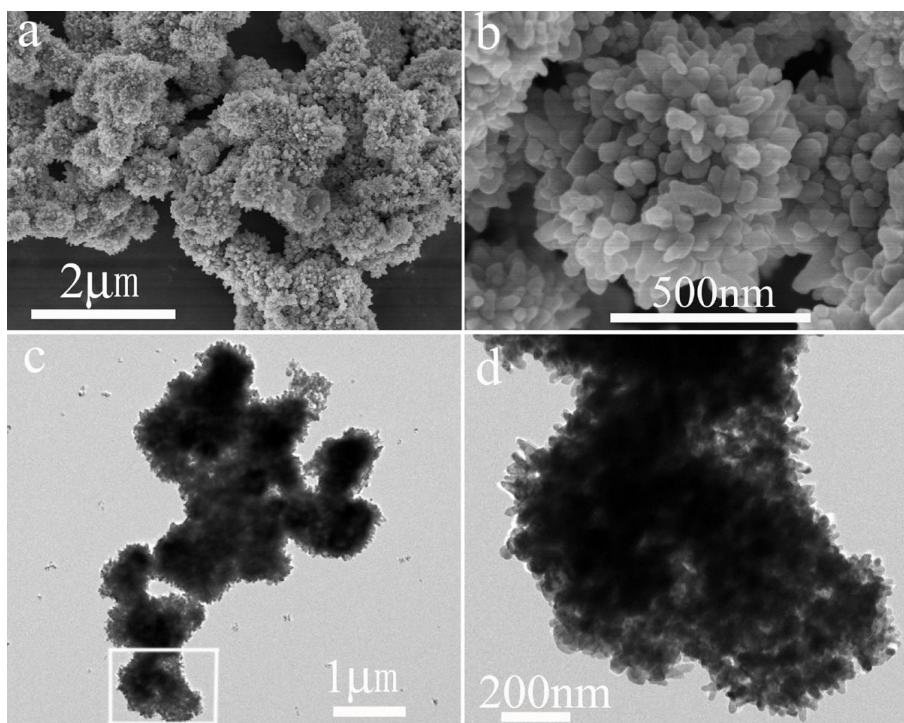
Fe(acac)<sub>3</sub>, 0.45 g urea and 1.0 g polyvinylpyrrolidone (PVP, K30) were first dissolved in 35 ml of 50 °C hot water under vigorous stirring to form a homogeneous solution. The resulting solution was then transferred into a 50 ml Teflon-line stainless autoclave, sealed and maintained at 130 °C for 24 h. After the solution was cooled to room temperature, the products were centrifuged and washed alternatively with distilled water and acetone several times, and then dried at 60 °C under air for 6 h. (b) 0.45 g urea and 1.0 g polyvinylpyrrolidone (PVP, K30) were first dissolved in 25 ml of deionized water in a 50 ml Teflon-lined autoclave to form a transparent solution at room temperature. Then, 0.353g Fe(acac)<sub>3</sub> was dissolved in 10 ml of anhydrous ethanol under continuous stirring. The resulting Fe(acac)<sub>3</sub> solution was then added to the autoclave. Subsequently, the autoclave was sealed and maintained at 130 °C for 24 h, followed by natural cooling to room temperature. Afterward, the products were centrifuged and washed alternatively with distilled water and acetone several times, and then dried at 60 °C under air for 6 h.



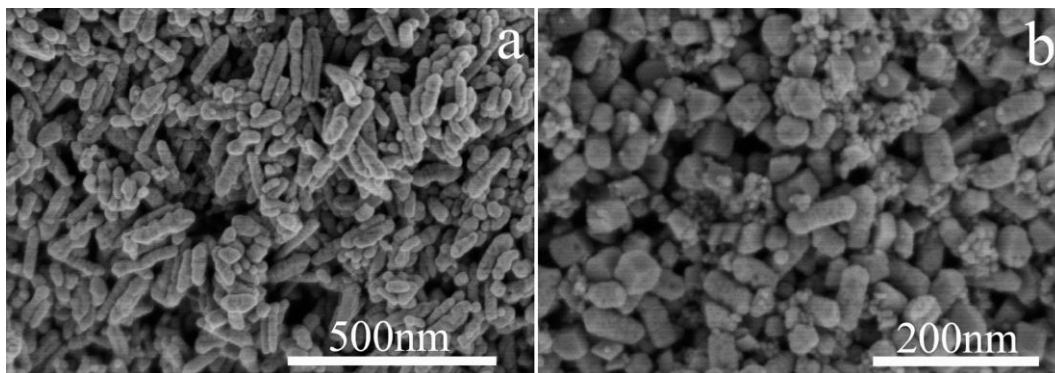
**Figure S1.** Nitrogen adsorption-desorption isotherm and the corresponding BJH pore size distribution curve (insert) for the nanobundles-built flowerlike  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>.



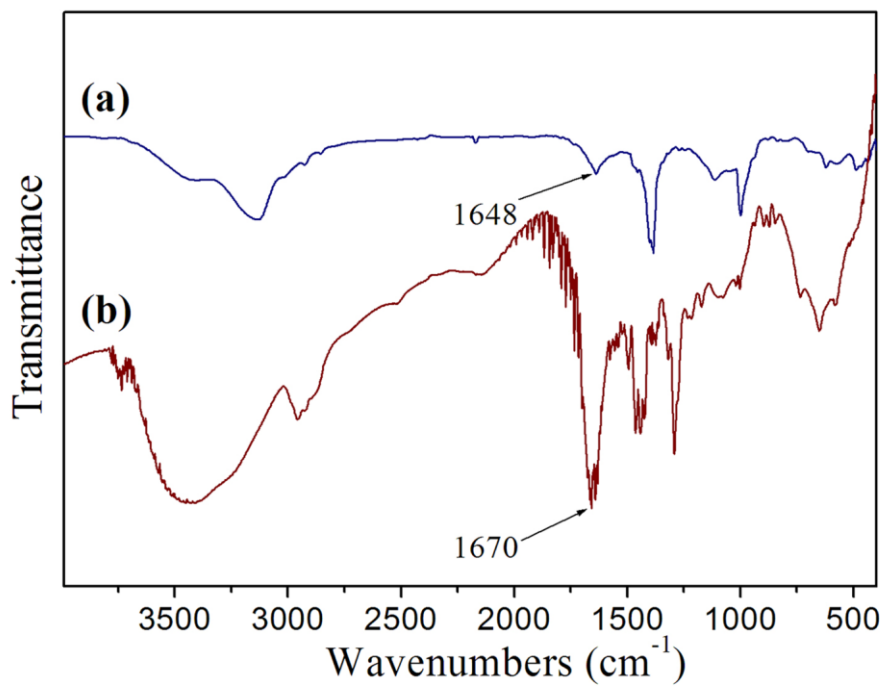
**Figure S2.** Low-magnification FESEM images of the products prepared at 130°C for 24 hours with different urea concentrations: (a) 0.15 mol/L, (c) 0.60 mol/L. High-magnification FESEM images of the products prepared at different urea concentrations: (b) 0.15 mol/L, (d) 0.60 mol/L.



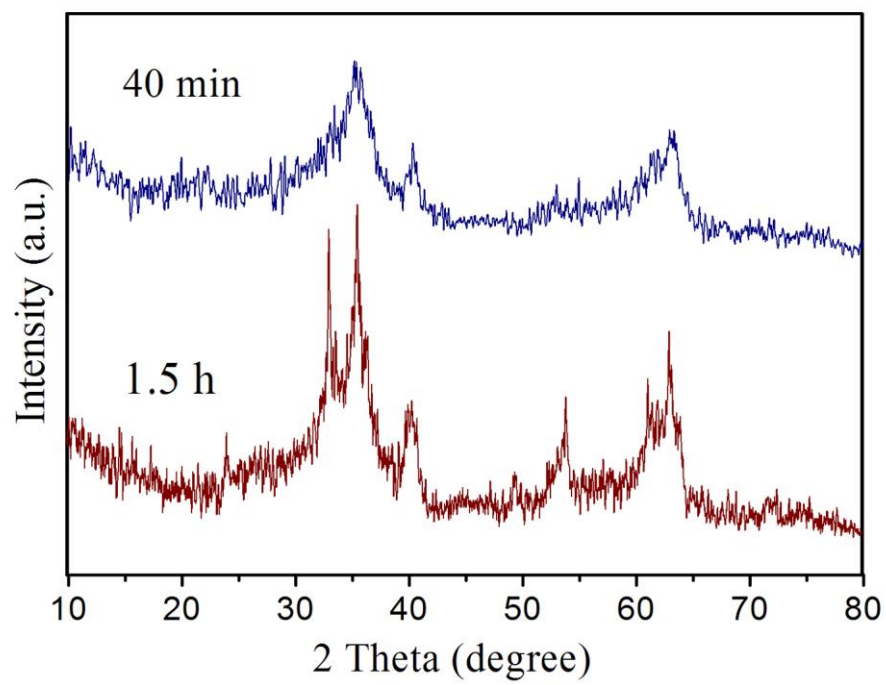
**Figure S3.** (a) Low- and (b) high-magnification FESEM images of the products synthesized without adding PVP; (c) Low-magnification TEM image, and (d) Magnified TEM image of the selected area marked with a white rectangle in (c) when no PVP was added in the reaction system while other conditions unchanged.



**Figure S4.** (a) FESEM image of the sample synthesized in 35 ml water without benzene,  
(b) FESEM image of the sample synthesized in a mixture of 10 ml of anhydrous ethanol and  
25ml water.

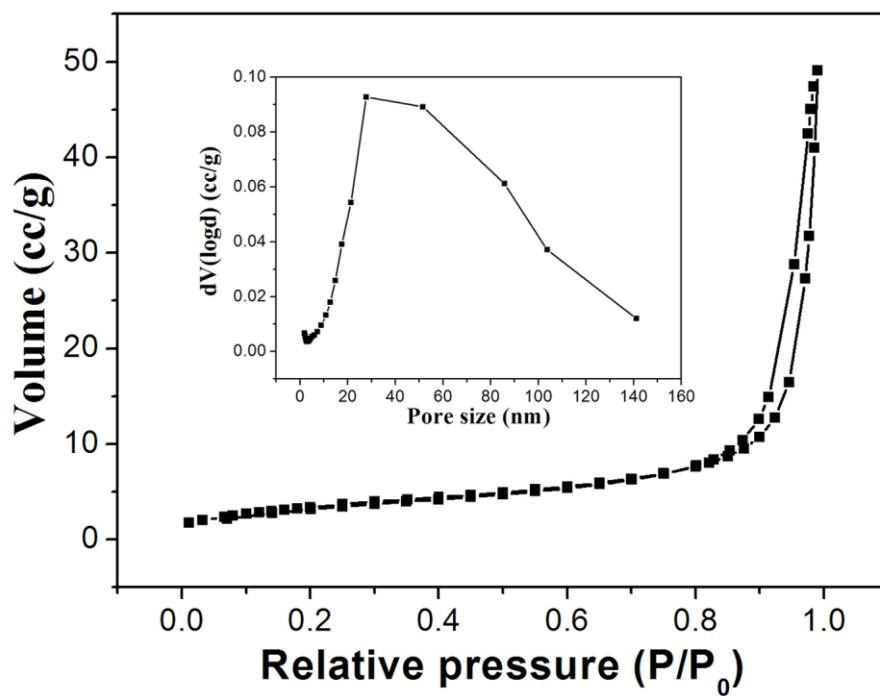


**Figure S5.** FT-IR spectra of (a) the samples synthesized for 40 min, and (b) pure PVP.



**Figure S6.** XRD patterns of the products obtained at different reaction times: (a) 40 min, (b) 1.5 h.





**Figure S7.** Nitrogen adsorption-desorption isotherm and the corresponding BJH pore size distribution curve (insert) for the commercial hematite powder.