Supporting Information for

## Liquid-liquid Interface-Assisted Solvothermal Synthesis of Durian-like α-Fe<sub>2</sub>O<sub>3</sub> Hollow Spheres Constructed by Nano- polyhedrons

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Figure S1. TEM image of the products synthesized at 150  $^{\circ}$ C, the other conditions are unchanged.



**Figure S2**. XRD pattern of the sample synthesized in 40 ml of water without benzene as interface, other conditions were the same as the typical synthesis.



**Figure S3.** XRD pattern of the as-synthesized hematite precursors obtained at different reaction times: (a) 6 h, (b) 15 h, and (c) 36 h.



**Figure S4.** Fourier transform infrared (FTIR) spectra of the hematite precursors synthesized for 6h (a) and pure PVP (b).