Supporting Information

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Supporting Information for “Monodisperse Magnetic Single Crystal Ferrite Microspheres”

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Synthesis of α- and β- Fe₂O₃

β-Fe₂O₃ was obtained by carefully oxidization of Fe₃O₄ under well-controlled conditions [31]. As-prepared Fe₃O₄ microspheres were dissolved in 0.01 M HNO₃ and heated with stirring at 100 ºC for 30 min to completely oxidize the particles to β-Fe₂O₃. When the reaction is completed, the black sample has been transformed to a red one, which confirmed that the transformation from Fe₃O₄ to β-Fe₂O₃ has succeeded. α-Fe₂O₃ was obtained by oxidization of Fe₃O₄ in air at 400 ºC for 3 h. These transformation reactions further confirmed that it was Fe₃O₄ that obtained by the solvothermal reactions.
Supporting Figures

Figure S1 (a). XRD patterns of as-prepared α-Fe₂O₃. (b) XRD patterns of as-prepared γ-Fe₂O₃. Inset, a partly enlarged image.

Illuminate: Figure S1A show typical reflection pattern of as-prepared α-Fe₂O₃ which was indexed to the rhombohedral structure of α-Fe₂O₃ (JCPDS No. 80-2377) with lattice constant $a = 5.04$ Å, $c = 13.75$ Å. Although the structure γ-Fe₂O₃ is similar to that of Fe₃O₄, Figure S1B can be indexed to the cubic phase of γ-Fe₂O₃ (JCPDS No. 39-1346). Comparing with the diffraction patterns of Fe₃O₄ (Figure 1a), at the large-angle peaks in Figure 1B shift slightly to higher angles, whereas at lower angles (inset in Figure 1B) there exist additional weak diffraction peaks of (110), (111), (210), and (211) that are characteristic of γ-Fe₂O₃. [30]
Figure S2. Particle size distribution of the MFe$_2$O$_4$ (M = Fe, Mn, Zn, Co) microspheres (~200 nm): (a) Fe$_3$O$_4$ (b) MnFe$_2$O$_4$ (c) ZnFe$_2$O$_4$, and (d) CoFe$_2$O$_4$. 
**Figure S3.** EDX spectra taken on the ferrite samples (a) Fe$_3$O$_4$; (b) MnFe$_2$O$_4$; (c) ZnFe$_2$O$_4$; (d) CoFe$_2$O$_4$. 
Figure S4. HRTEM image of a typical Fe₃O₄ microsphere boxed area (chosen randomly) in (a), (b), (c) and (d).
Figure S5. XPS spectra of as-prepared Fe₃O₄.