

## Supporting Information

### Bifunctional Nanoparticles with Superparamagnetic and Luminescence Properties

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#### 1. Experimental Section

**Synthesis of CdSe@Fe<sub>2</sub>O<sub>3</sub> nanoparticles.** CdO (0.0256 g) and stearic acid (0.235 g) were loaded into a three-necked flask and pumped under vacuum for 20 min. The mixture was then heated under argon to 200 °C to form cadmium stearate. After cooling to room temperature, octadecylamine (ODA, 4.35 g) and trioctylphosphine oxide (TOPO, 4 g) were charged into the flask and heated to 280 °C before the rapid injection of Se (0.158 g) which was dissolved in trioctylphosphine (TOP, 4 mL). The reaction temperature was adjusted to 250 °C immediately after the injection, and kept for 5 min before the heat was immediately removed. After cooling to room temperature, iron stearate (Fe(St)<sub>2</sub>, 0.05 g), and methylmorpholine N-oxide (MNO, 0.012 g) were charged into the flask and heated to 300 °C, then kept at that temperature for 12 min. After the temperature was lowered to 40 °C, the nanoparticles were purified for three times with a mixture of chloroform/ethanol (volume ratio = 1:6) by centrifugation-redispersion cycles. The wet precipitate was dissolved in hexane.

**Characterizations of the nanoparticles.** Transmission electron microscopy (TEM) and high-resolution transmission electron microscopy (HRTEM) were performed on a JEM 2010 F microscope at optimum defocus with accelerating voltages of 200 kV. X-ray powder diffraction (XRD) was carried out on a XRD-6000 (Japan) X-ray diffractometer with Cu-K $\alpha$  radiation ( $\lambda=1.54060 \text{ \AA}$ ) at a scanning rate of  $0.05 \text{ }^\circ\cdot\text{s}^{-1}$ . Absorption measurements were carried out using a Varian Cary 300 UV-vis spectrophotometer. Photoluminescence spectra were recorded with a Varian Cary Eclipse fluorescence spectrophotometer with an intense Xenon flash lamp. The photoluminescence quantum yield (QY) was estimated by the “gradient method”<sup>1</sup> with Rhodamine G6 as a reference fluorescent dye. Magnetization measurements were conducted on Quantum Design Physical Properties Measurement System (PPMS) and Superconducting Quantum Interference Device (SQUID) system.

## References

- 1 S. Deka, A. Quarta, M. G. Lupo, A. Falqui, S. Boninelli, C. Giannini, G. Morello, T. Pellegrino, L. Manna, *J. Am. Chem. Soc.* **2009**, *131*, 2948-2958.