Supporting Information:

Controllable In-Situ Synthesis of Magnetite Coated Silica-Core Water-Dispersible Hybrid Nanomaterials

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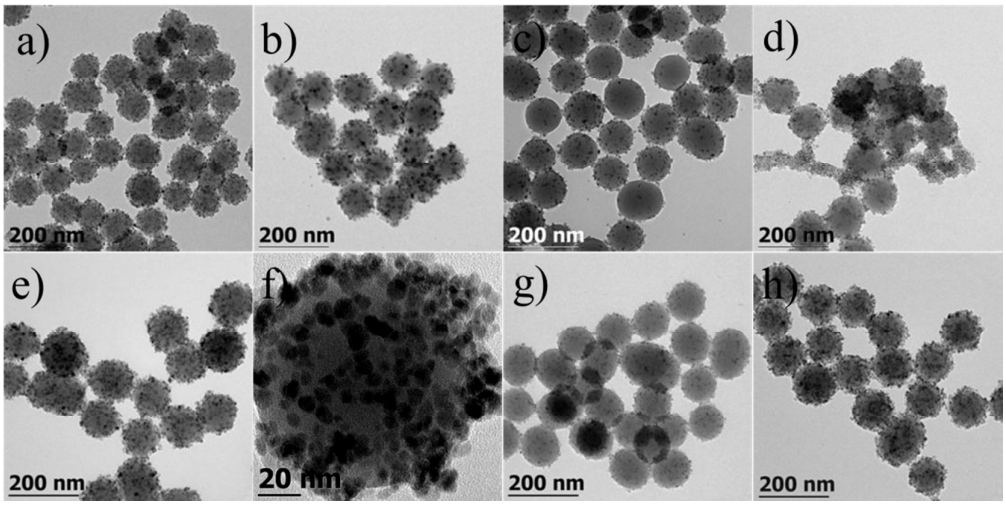

Figure S1. TEM images of 100 nm Fe_3O_4@SiO_2 prepared under different iron precursor to silica weight ratio. (a) 1.77:1 (original ratio and concentration), (b) 1.77:2, (c) 1.77:3, (d) 1.77:0.5, (e) 3.54:1, (f) single Fe_3O_4@SiO_2 prepared with a 3.54:1 iron precursor to silica ratio, (g) 0.88:1 (h) original ratio and concentration (1.77:1) and refluxing time was decreased from 3h to 1h. Note: the volume of TEG solvent was 10 ml in all preparations.

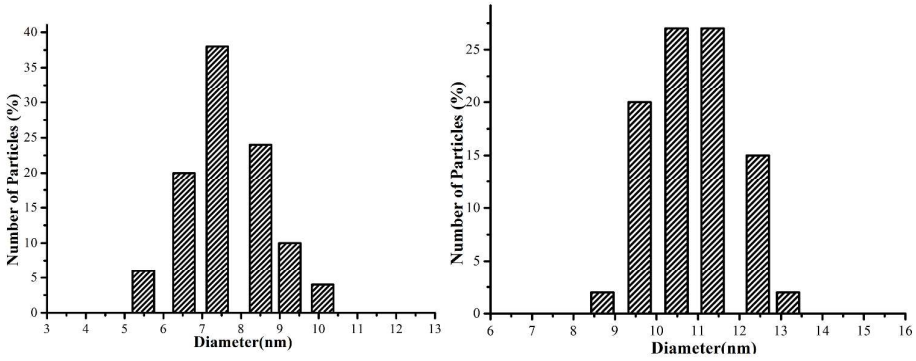

Figure S2. Histogram of magnetite nanocrystals on silica surface prepared with iron precursor to silica ratio (a) 1.77:1 (original ratio and concentration), (b) 3.54:1.

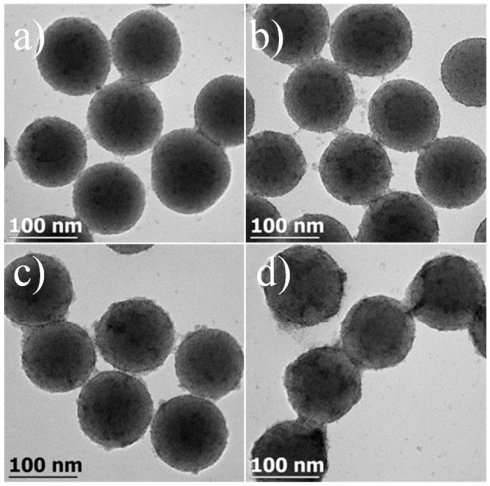

Figure S3. TEM images of samples taken at different intermediates. (a) 140 ℃, (b) 180 ℃, (c) 210 ℃, (d) after 45 min at 210 ℃.

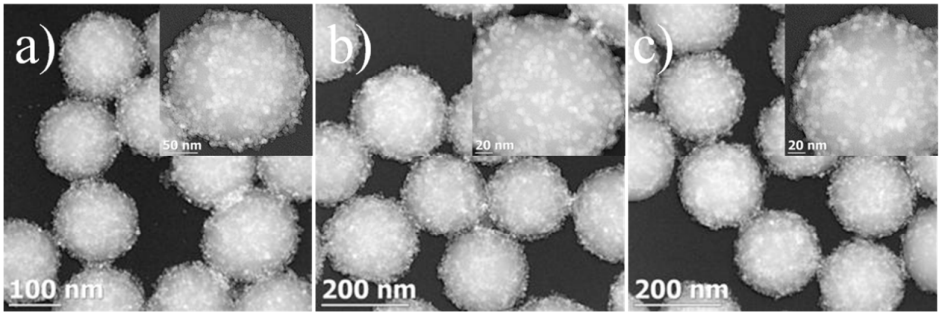

Figure S4. Electron microscopy images of 200 nm Fe_3O_4@SiO_2 (a) as-prepared, (b) sonication for 1h, (c) sonication for 5h (Insets: higher magnification)

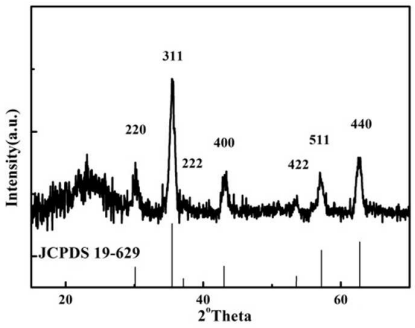

Figure S5. X-ray diffraction patterns of Fe_3O_4@SiO_2 with standard reference magnetite (JCPDS No. 19-0629)

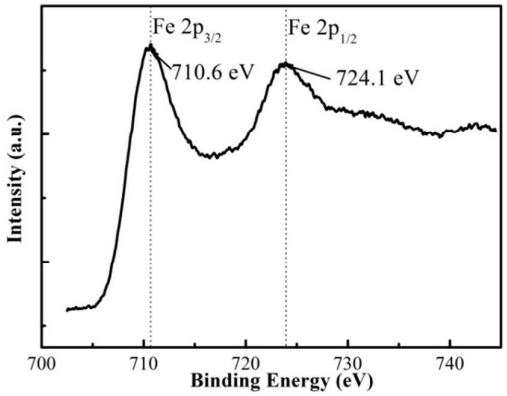

Figure S6. A typical XPS spectra of Fe_3O_4@SiO_2 nanoparticles.

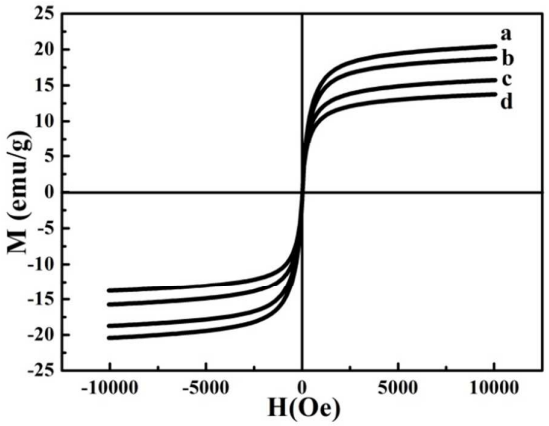

Figure S7. Room temperature hysteresis loops of (a) 60 nm, (b) 110 nm, (c) 300nm, (d) 400 nm Fe_3O_4@SiO_2.

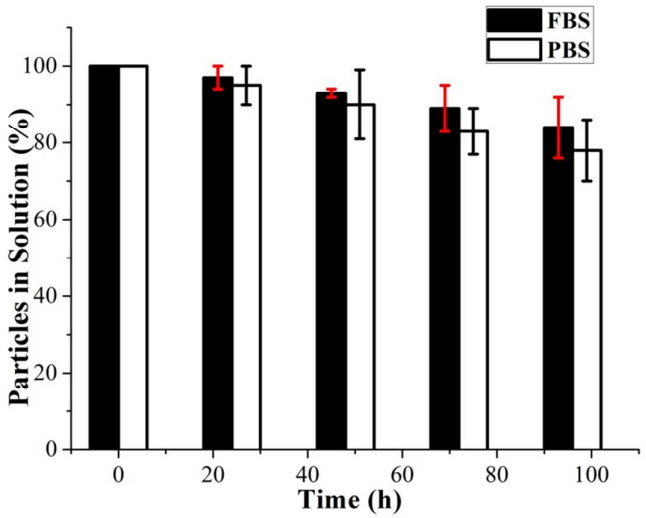

Figure S8. Stability of Fe_3O_4@SiO_2 in PBS and Serum.

The stability of functionalized materials was studied in the sedimentation test. An amount of 1 mg of different sized Fe_3O_4@SiO_2 was dispersed in 10 ml of pH 7 PBS buffer solution or bovine calf serum at room temperature. Sample solutions (upper level) were taken at different time interval after incubation. The iron concentrations were measured in ICP-AES. The Fe concentration of sample at 0 h was set to be 100%.

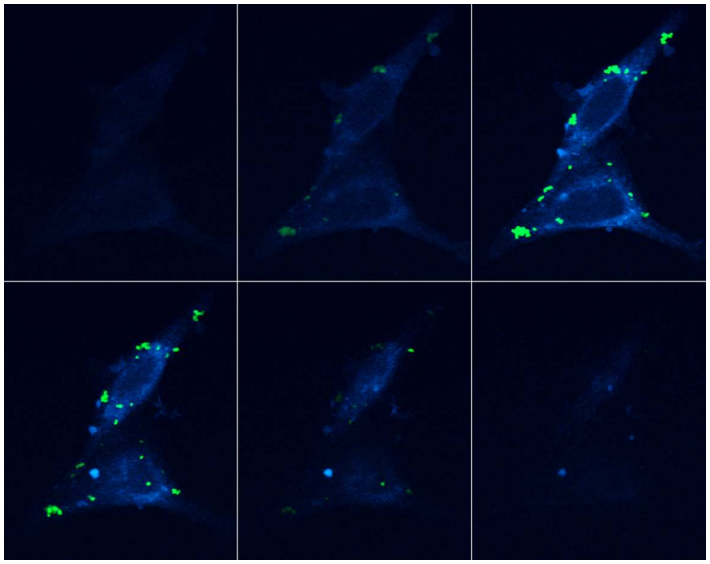

Figure S9. Confocal microscope images of Hela cell treated with dye doped Fe_3O_4@SiO_2 under sectioning mode. Cells were imaged from bottom to the top of the cells.

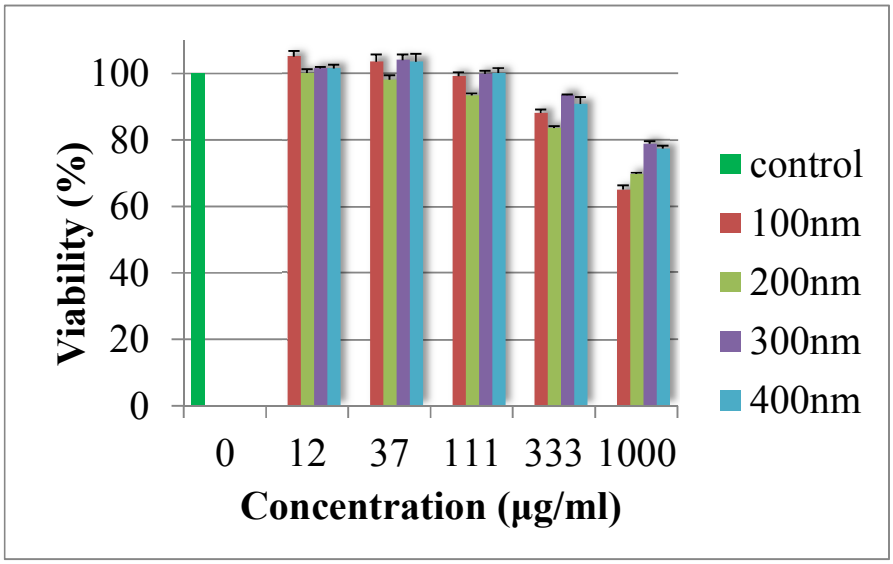

Figure S10. Cell viability test for Fe_3O_4@SiO_2 of variable sizes.