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Supporting Information for

Synthesis and Characterization of Bifuntional Magnetic-Optical Fe_3O_4@SiO_2@Y_2O_3:Yb^{3+}, Er^{3+} Near-Infrared-to-Visible Up-Conversion Nanoparticles

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Table S1. The statistical data of size distribution of the samples

Samples	The average diameter (nm)	The standard deviation (nm)	The average thickness of SiO_2 spacer (nm)	The average thickness of Y_2O_3 shell (nm)
Fe_3O_4	18.43	± 0.91 (± 4.94%)	-	-
Fe_3O_4@SiO_2	69.02	± 3.55 (± 5.14%)	25.30	-
Fe_3O_4@SiO_2@Y_2O_3: Yb^{3+}, Er^{3+}	75.63	± 3.77 (± 4.99%)	25.30	3.31

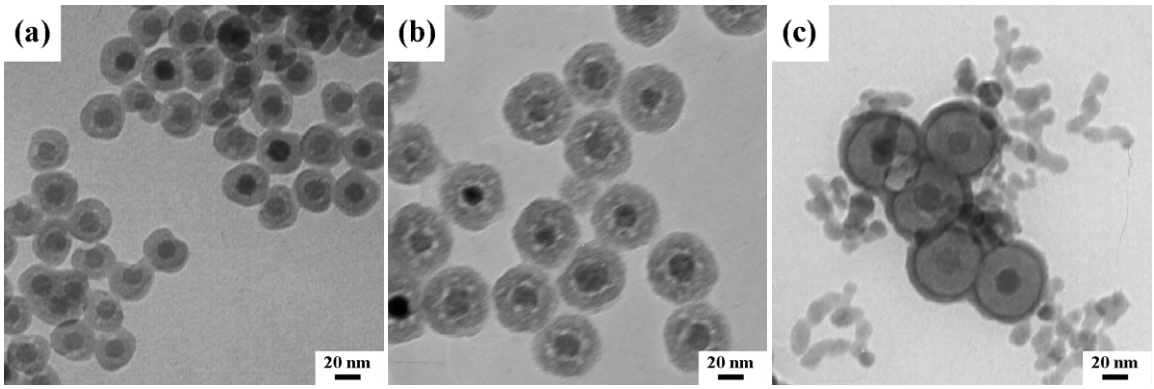

Fig. S1 The TEM images of (a)-(b) Fe_3O_4@SiO_2 (The adding amounts of TEOS are 0.025 and 0.05 mL, respectively) and (c) Fe_3O_4@SiO_2@Y_2O_3: Yb^{3+}, Er^{3+} (The adding amounts of TEOS and YCl_3 are 0.1 mL and 0.8 mmol, respectively). The average shell thicknesses of SiO_2 in (a), (b) and (c) are ~12, ~18 nm and ~25 nm, respectively. The average thickness of Y_2O_3: Yb^{3+}, Er^{3+} layer in (c) is ~7 nm.

Table S2. The statistical data of MTT viability assay

Samples	$Fe_3O_4@SiO_2@Y_2O_3$: Yb^{3+}, Er^{3+}						
Concentration (mg/L)	500	250	125	62.5	31.25	15.625	7.8125
Viability data 1# (%)	83.15	86.37	86.88	94.01	96.45	99.17	99.65
Viability data 2# (%)	82.38	88.97	83.6	93.85	96.14	99.32	99.81
Viability data 3# (%)	84.46	86.15	84.27	92.69	95.57	99.15	99.61
Viability data 4# (%)	82.66	88.63	83.33	94.01	95.19	99.48	99.13
Viability data 5# (%)	81.38	84.38	85.58	93.04	96.21	98.98	98.17
Viability data 6# (%)	85.67	84.57	86.47	92.37	95.77	99.01	99.36
Average value (%)	83.28	86.51	85.02	93.33	95.89	99.19	99.29
The standard deviation (%)	1.54	1.95	1.50	0.72	0.47	0.19	0.59

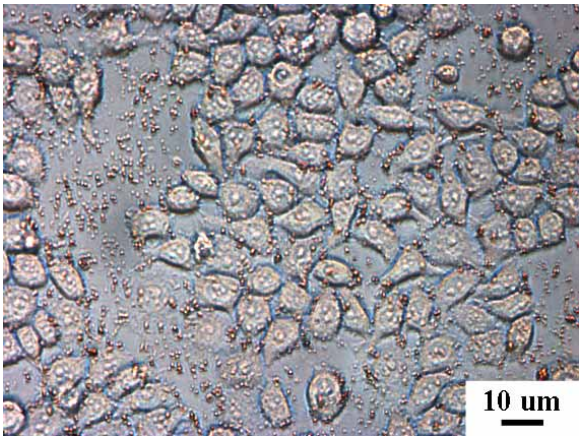

Fig. S2 The photograph of human cervical cancer cells (HeLa) incubated with $Fe_3O_4@SiO_2@Y_2O_3$: Yb^{3+}, Er^{3+} nanoparticles (the concentration is 125 mg L^{-1}) for 24 h.