Supporting Information

Size-tunable synthesis of lanthanide-doped Gd_2O_3 nanoparticles and their applications for optical and magnetic resonance imaging

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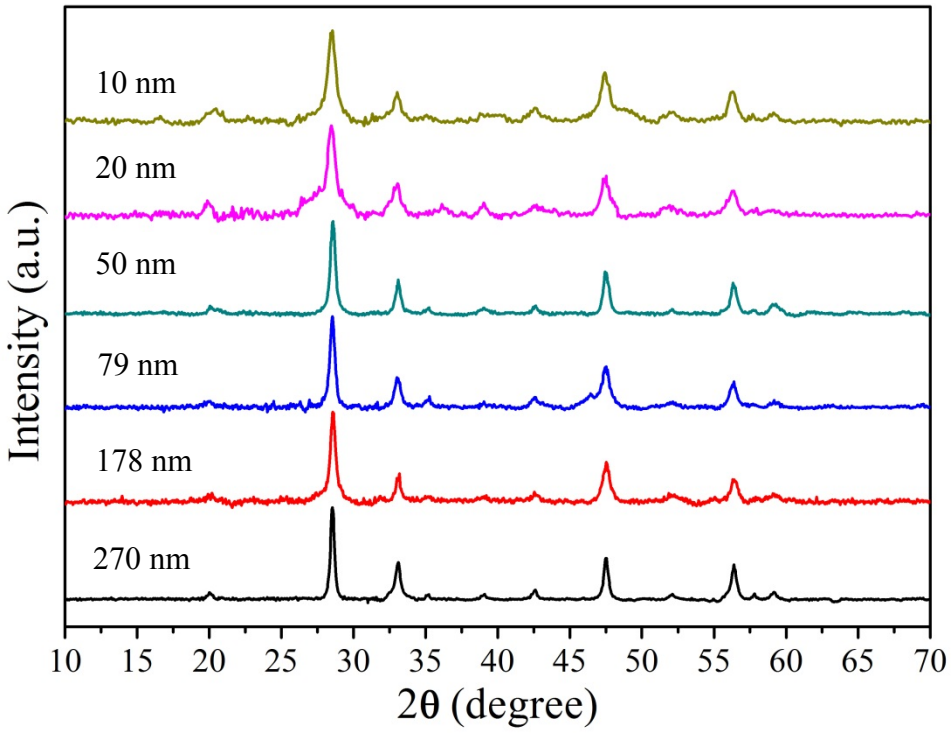

Figure S1. XRD patterns of Gd_2O_3: Yb, Er nanoparticles with different sizes.

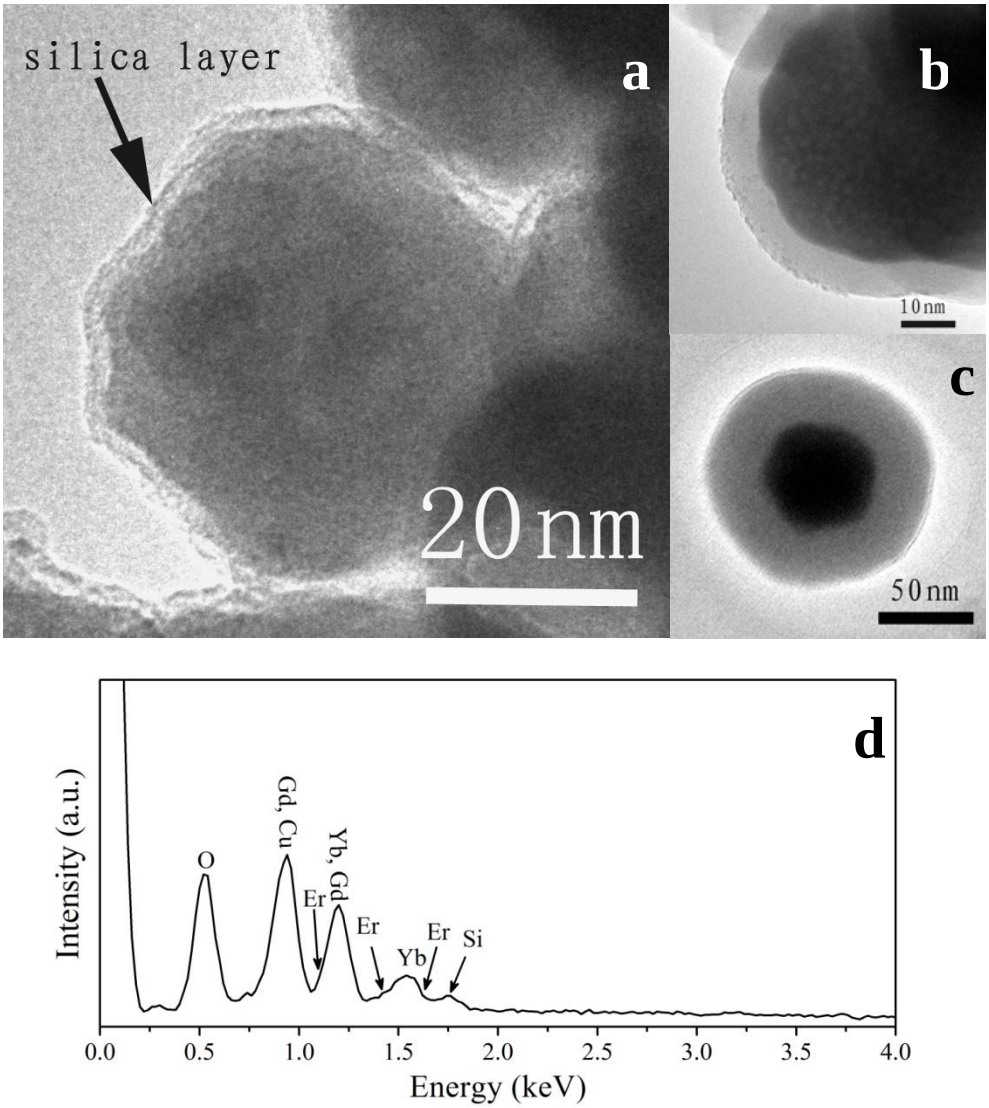

Figure S2. TEM images (a-c) of Gd_2O_3 nanoparticles coated with different thickness of silica layer. (d) The EDX spectrum obtained from Gd_2O_3: Yb, Er NPs coated with silica. Si signal comes from the silica layer and Cu signal comes from the Cu support substrate.

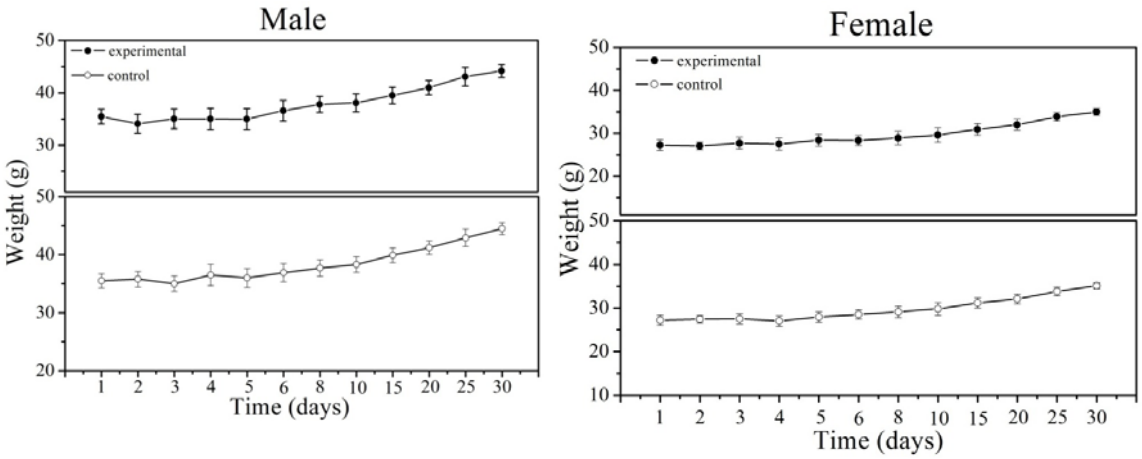

Figure S3. White Kunming mice were used to test the toxicity *in vivo* of Gd_2O_3: Yb, Er NPs. 100μL of these nanoparticles dispersed in physiological saline (1 $mg \cdot mL^{-1}$) were injected into both male and female mice very day (the number of mice in each group is 6) and the weights of mice are recorded at several time-points as shown in Figure S3.

Inductively coupled plasma mass spectrometry (ICP-MS, Thermo element X7) was used to determine the actual more ratio of the lanthanide doped Gd_2O_3 nanoparticles. From the ICP-MS data, the actual mole ratio of Gd^{3+}: Yb^{3+}: Er^{3+} is determined to be about 88.7:9.7:1for the Gd_2O_3:10%Yb,1%Er sample, which is in good agreement with the designed nominal composition. Similar results have also been obtained for Gd_2O_3:1%Er and Gd_2O_3:10%Yb, 0.2%Tm samples. The actual mole ratio of Gd^{3+}: Er^{3+} for Gd_2O_3:1%Er sample and Gd^{3+}: Yb^{3+}: Tm^{3+} for Gd_2O_3:10%Yb, 0.2%Tm is 98.7: 1 and 88.6:10:0.022, respectively.