Morphology and properties of silica-based coatings with different functionalities for Fe$_3$O$_4$, ZnO and Al$_2$O$_3$ nanoparticles

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Fig. S1. Dynamic light scattering (DLS) of (a) uncoated Fe$_3$O$_4$ nanoparticles, (b) APTES coated Fe$_3$O$_4$ nanoparticles
**Fig. S2.** TEM images of functional silane coated Fe$_3$O$_4$ nanoparticles. (a)-(c) APTES coating with the ammonia hydroxide amount of 50, 85, 190 μL, respectively; (d)-(f) MTES coating with the ammonia hydroxide amount of 50, 85, 190 μL, respectively; (g)-(i) OTES coating with the ammonia hydroxide amount of 50, 85, 190 μL, respectively; (j)-(l) TEOS coating with the ammonia hydroxide amount of 50, 85, 190 μL respectively. All the scale bars in the TEM images are 20 nm.
Fig. S3. Fe₃O₄ nanoparticles coated the silane volume of 0.36 mL, (a) APTES, (b) MTMS, (c) OTES.
Fig. S4. SEM image and corresponding EDS of (a) OTES coated Fe$_3$O$_4$ nanoparticles; (b) TEOS coated Fe$_3$O$_4$ nanoparticles. Si/Fe ratio: 0.022 and 1.8 (average), respectively.