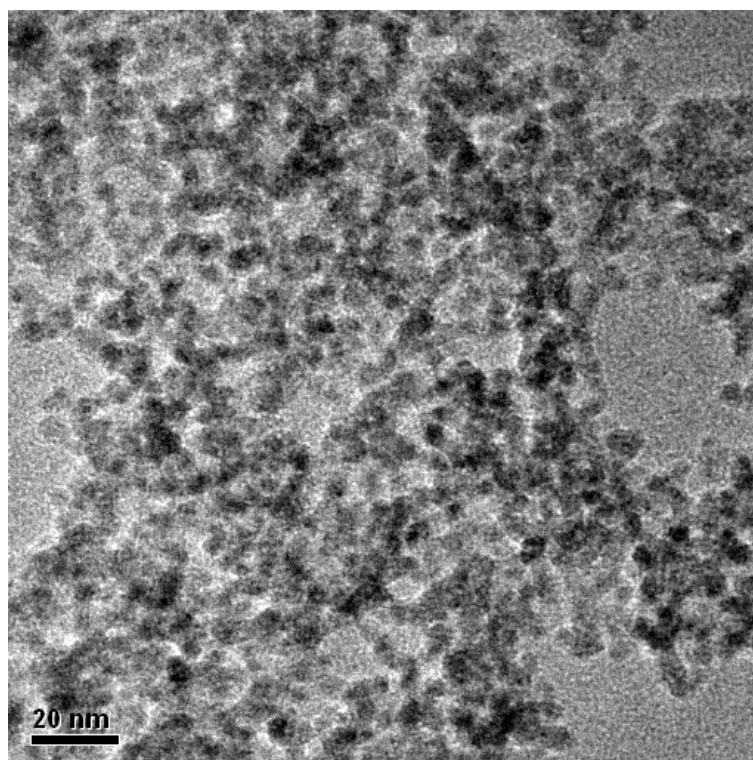


## Supporting Information

### Synthesis of ultrasmall nucleotide-functionalized superparamagnetic $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles

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**Figure S1** TEM image of the synthesized nucleotide-coated  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles

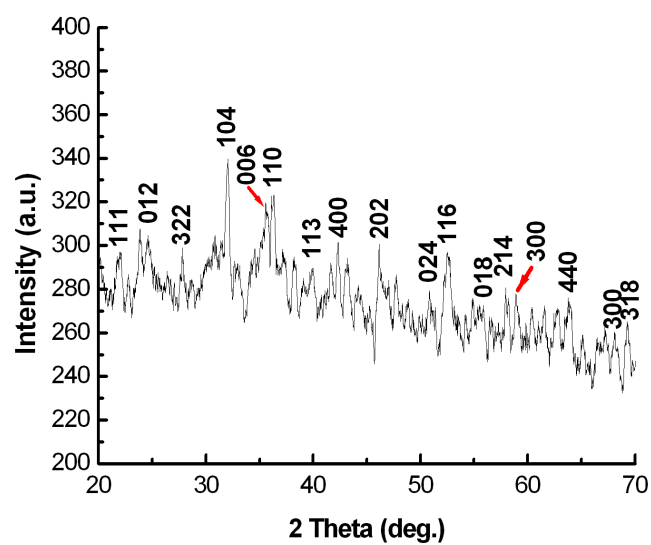


Figure S2 XRD pattern of the synthesized products

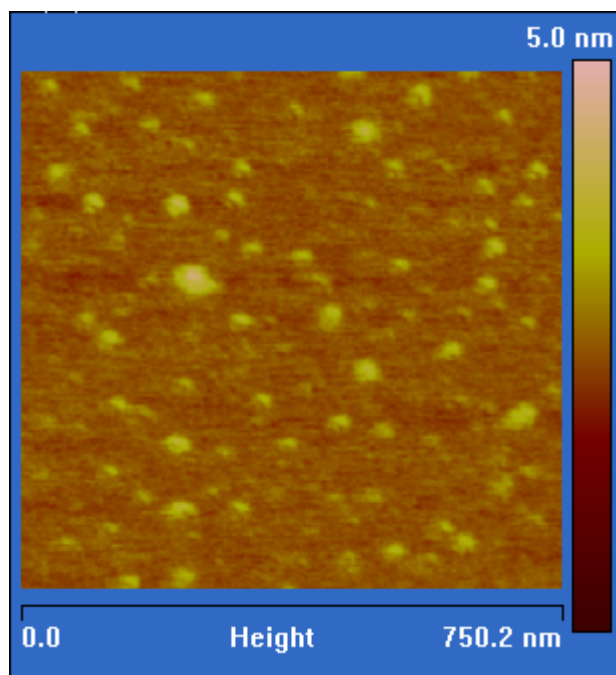
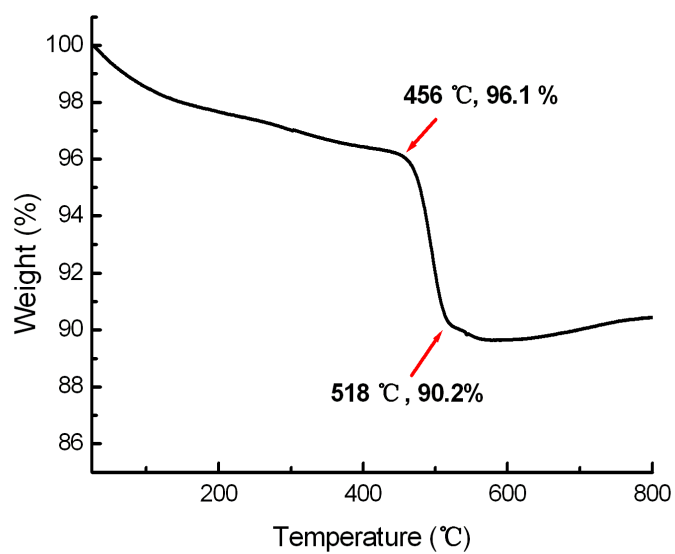
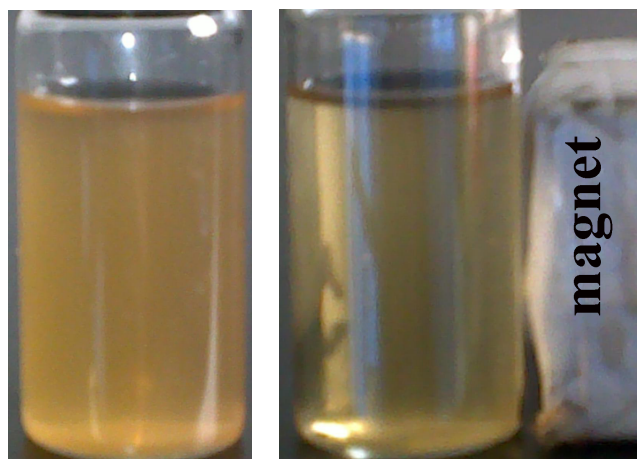


Figure S3 AFM image of the synthesized nucleotide-coated  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles

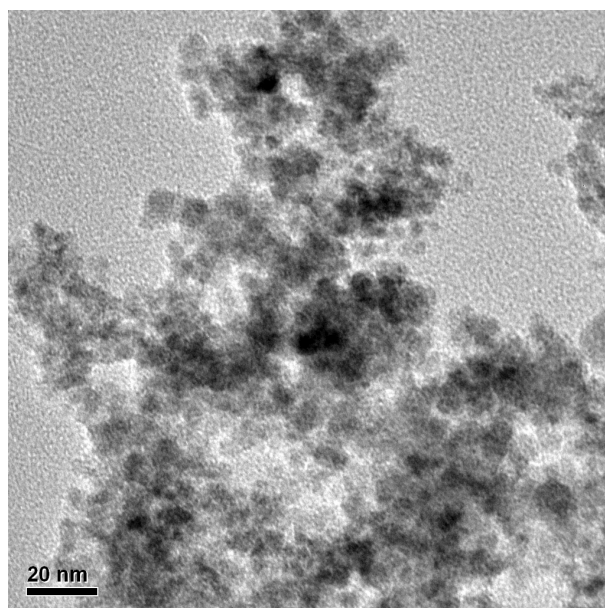


**Figure S4** TGA curve of the synthesized nucleotide-coated  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles



**Figures S5-S6** Visual image of the synthesized  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles in water (left, **Figure S5**), and separation by an external magnet within five minutes (right, **Figure S6**)

Note: 0.04 g nucleotide-coated  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles were dispersed in 20 ml water.



**Figure S7** TEM image of the synthesized Au-Fe<sub>2</sub>O<sub>3</sub> composites

(8) 3-5 nm Au nanoparticles were synthesized by the reported methods [Kim, D.; Park, S.; Lee, J. H.; Jeong, Y. Y.; Jon, S. *J. Am. Chem. Soc.* 2007, *129* (24), 7661–7665]. Au-Fe<sub>2</sub>O<sub>3</sub> magnetic composites were obtained by mixing 2 mL 0.002 g/ml Au nanoparticles (diameter of 3-5 nm) and 20 ml 0.002 g/mL  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles for 2 h at room temperature. Owing to the high affinity surface of nucleotide-coated  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles, Au nanoparticles are easily bonded with  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles. After reaction, the obtained Au-Fe<sub>2</sub>O<sub>3</sub> magnetic composites were separated by a magnet and washed by ultrapure water three times.