Magnetization Measurement

The magnetization curve $M(H)$ (Figure S1) of a suspension of monodisperse $\gamma$-Fe$_2$O$_3$ NPs can be described by Langevin’s law. Thus, fitting the Langevin curve to the experimental magnetization curve and assuming a log-normal distribution $P(d)$ (Equation (S1)), the magnetic diameter ($d_0$) and the polydispersity index ($\sigma$) of MNPs solutions are calculated:

$$P(d) = \frac{1}{\sqrt{2\pi}\sigma d} \times \exp \left( -\frac{\ln^2(d/d_0)}{2\sigma^2} \right) \quad (S1)$$

Figure S1. (a) Magnetization curve of $\gamma$-Fe$_2$O$_3$ NPs (red points, Langevin model; black points, experimental curve) at 298 K, measured by VSM. (b) Size distribution before and after size-sorting modeled from the experimental data of (a) with a lognormal law (Langevin’s function model).
TEM Analysis

Figure S2. (a) TEM image of bare, size sorted γ-Fe₂O₃ NPs. (b) Size distribution of γ-Fe₂O₃ NPs obtained by TEM image analysis (n = 200 NPs; log-normal distribution model (red line) with $d_0 = 11.5$ nm and $\sigma = 0.33$.

FTIR and DLS on MagMIP Nanoparticles

Figure S3. (A) FT-IR spectra and (B) size distribution from DLS of bare γ-Fe₂O₃ (a) and MagMIP nanoparticles (b).
Figure S4. Thermogravimetric analysis (N\textsubscript{2}: 10 °C.min\textsuperscript{-1}) of (a,b) γ-Fe\textsubscript{2}O\textsubscript{3} magnetic nanoparticles; (a) MagNanoGels-Xt% loaded with X = 0 and 37.5 wt% MNPs and (b) MagMIPs