Electronic Supplementary Information

Nano-thermometer with Thermo-sensitive Polymer Grafted USPIOs behaving as Positive Contrast Agents in low-field MRI

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Fig. S1 a) 500 MHz 1H NMR spectra of Jeffamine® M-2005 in D2O (30 mg/ml) at increasing temperatures (10, 15, 20, 25, 30, and 35°C); b) 500 MHz 1H NMR spectra of Jeffamine® M-2070 in D2O (30 mg/ml) at increasing temperatures (35, 40, 50, 60, 65, 70, 75, 80, and 85°C).
Fig. S2 FT-IR spectra of iron oxide nanoparticles obtained by coprecipitation (a) and of iron oxide nanoparticles coated with TEPSA (b).
Fig. S3 Thermogravimetric analyses (TGA) of USPIOs silanized by TEPSA (red curve), and after coupling with Jeffamine® M-2005 (green curve) and Jeffamine® M-2070 (blue curve). The graphs are normalized either by the dry weight after the plateau at 120°C (a) or by the burnt weight after the treatment at 600°C under air (b), enabling to subtract the silane content from the total organics to get the polymer weight % relatively to iron oxide, see Equation (4) in the text.
Fig. S4 a) Difference between the normalized FT-IR spectra of USPIOs coated with TEPSA before and after grafting of Jeffamine® M-2005, b) and spectrum of Jeffamine® M-2005 alone.
Fig. S5 a) Difference between the normalized FT-IR spectra of USPIOs coated with TEPSA before and after grafting of Jeffamine®, M-2070, b) and spectrum of Jeffamine® M-2070 alone.
Fig. S6 NMRD profiles of the longitudinal relaxivity vs. proton Larmor frequency for a) TEPSA-coated USPIOs, and b) USPIOs grafted with Jeffamine® M-2070 as a function of temperature.

Fig. S7 a) Outer Sphere radius $R_{\text{NMR}}$ (nm) and b) saturation magnetization $M_s$ (A·m²/kg) vs. temperature deduced by fitting the NMRD profiles for USPIOs coated by Jeffamine® M-2070 (green markers) and TEPSA only (purple markers).
Fig. S8 Longitudinal $r_1$ (a, c, e, g) and transverse $r_2$ (b, d, f, h) relaxivities of USPIOs grafted with Jeffamine® M-2005, normalized by the corresponding $r_1$ or $r_2$ of TEPSA-coated USPIOs, as functions of temperature from 10 to 50°C, for clinically relevant frequencies: 8.25 MHz (a, b), 20 MHz (c, d), 60 MHz (e, f), and 300 MHz (g, h). The vertical dotted lines show the position of the LCST of Jeffamine® M-2005, concomitant with an inflection of the curves of both the $r_1$ and $r_2$ relaxivities vs. temperature.