Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

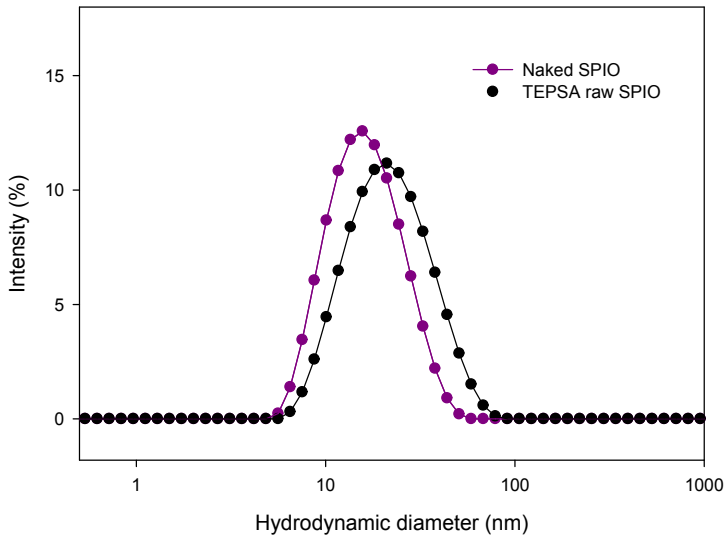




**Fig. S1**: Comparison of the hydrodynamic size distributions of naked nanoparticles *vs* TEPSA-coated objects

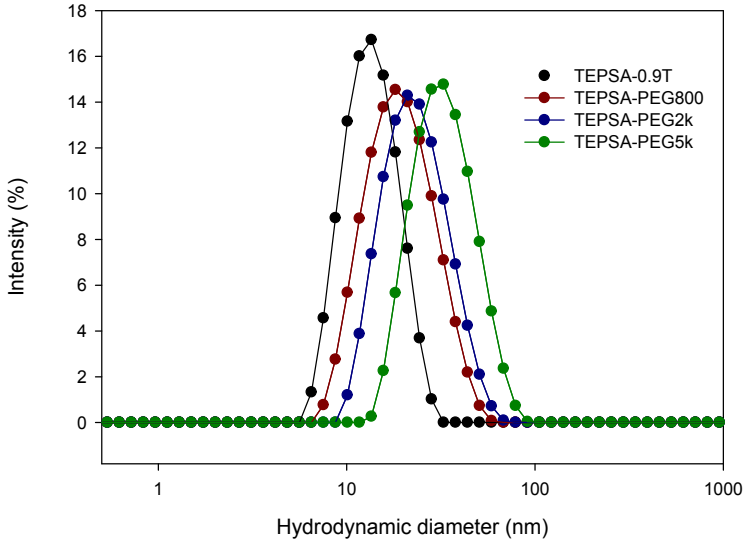



**Fig. S2:** Comparison of the hydrodynamic size distributions of the TEPSA-PEG coated SPIO-5

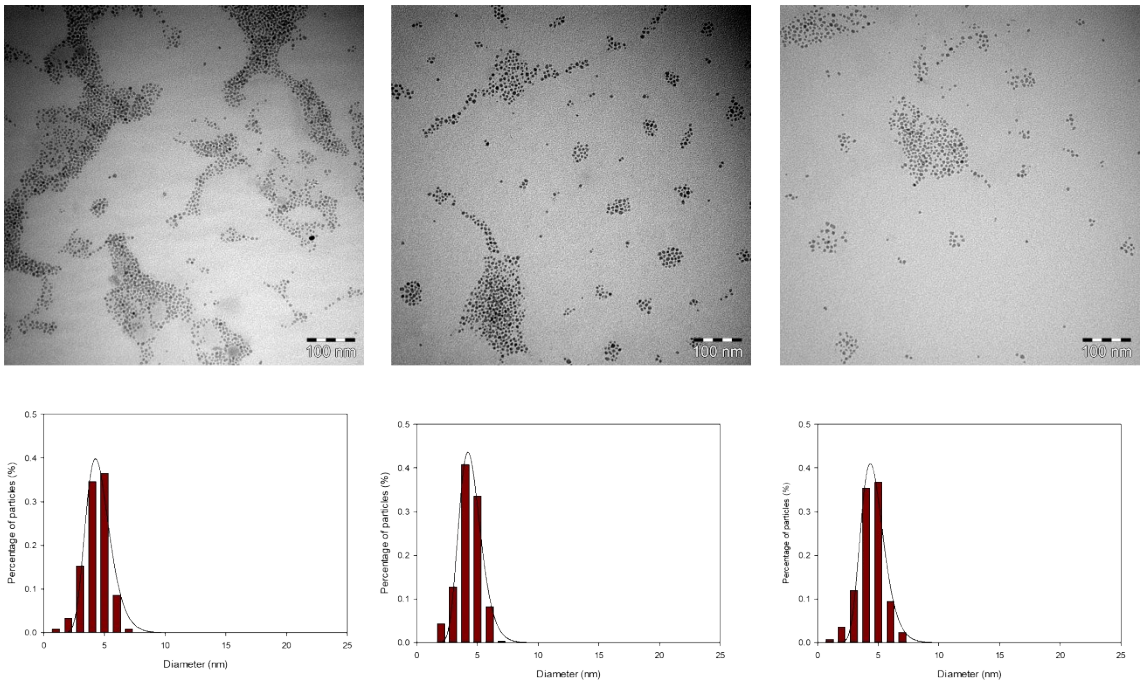



**Fig. S3:** Comparison of the TEM images and size distributions of TEPSA-PEG coated SPIO-5. From left to right : SPIO-5-800, SPIO-5-2k and SPIO-5-5k

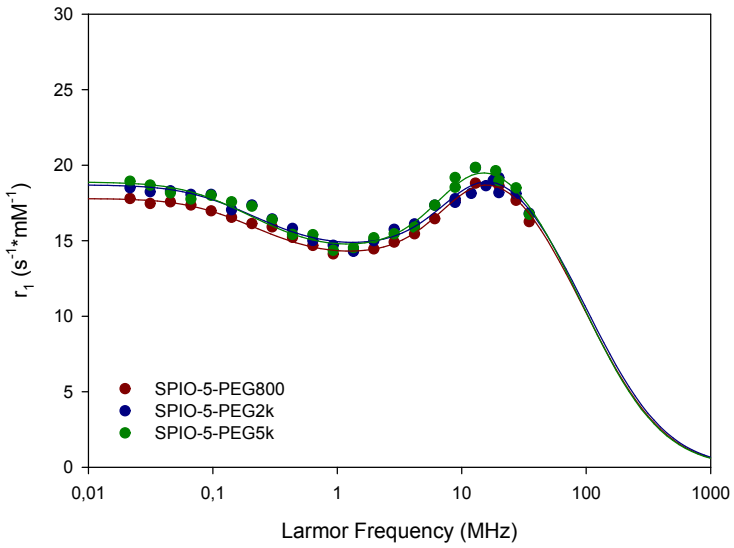



**Fig. S4:** Comparison of the NMRD profiles of TEPSA-PEG coated SPIO-5

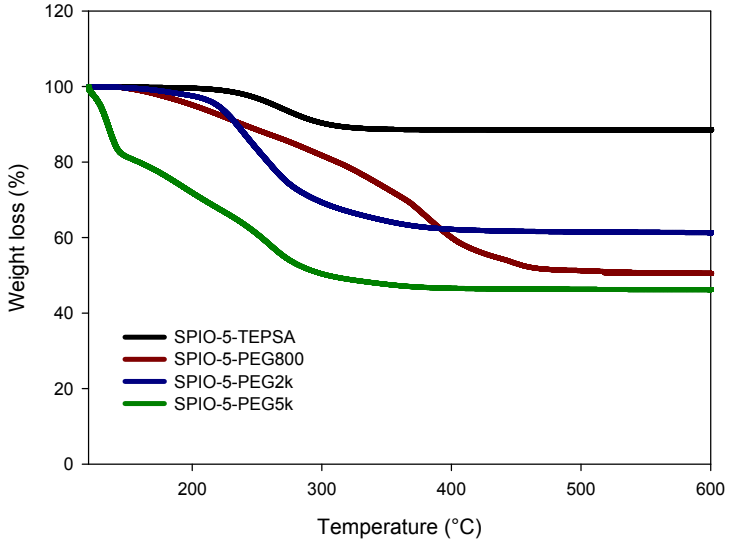



**Fig. S5:** Thermogravimetric analysis of the different TEPSA-PEG coated SPIO-5

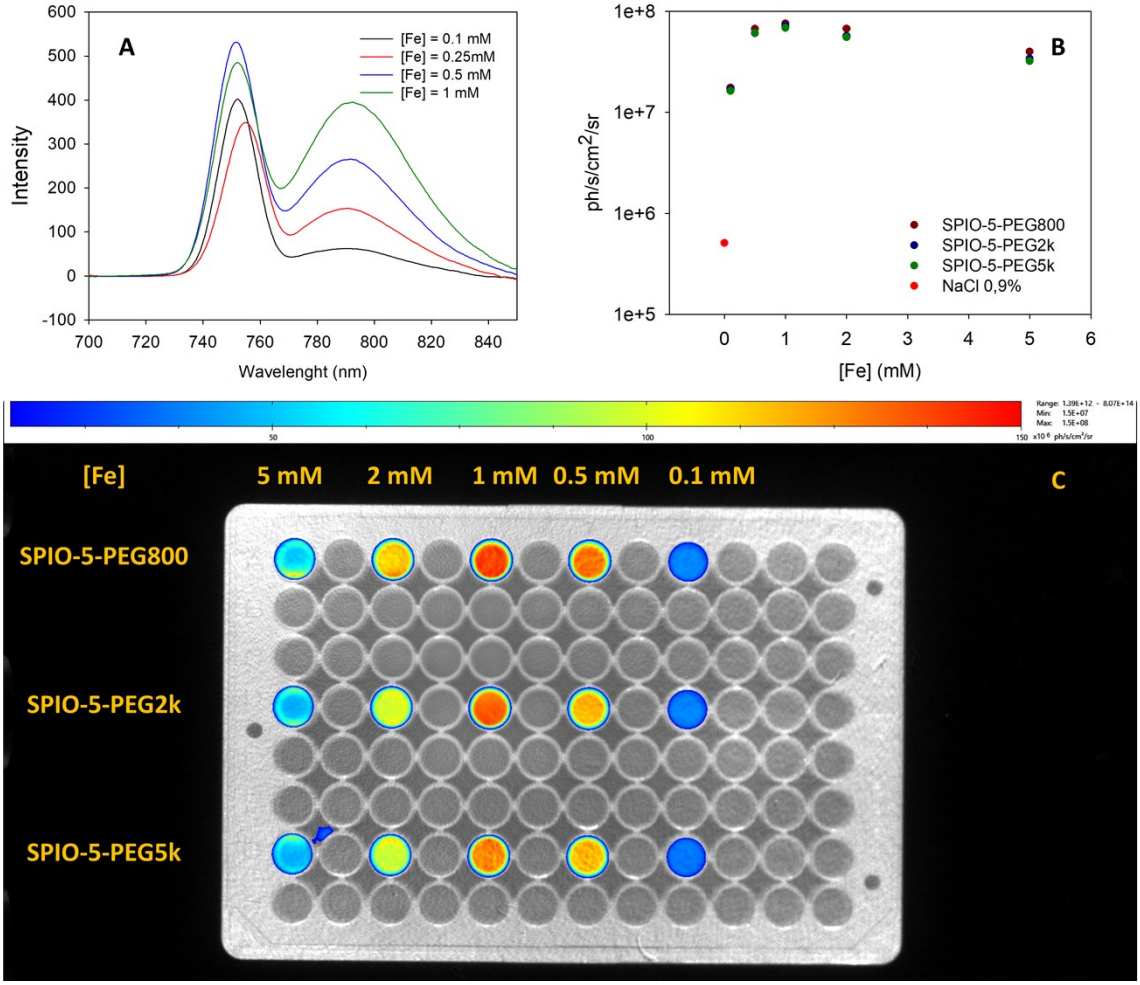
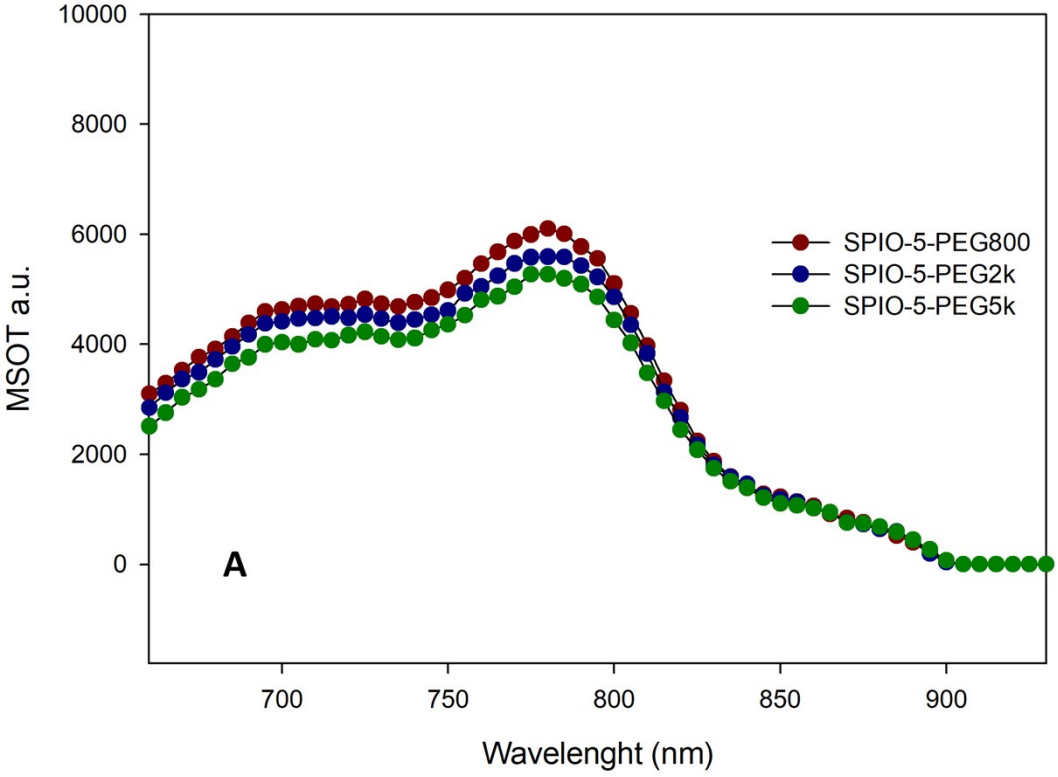



**Fig. S6**: (A) Fluorescence emission spectra ($\lambda_{exc}$=750 nm ; $\lambda_{em}$=791 nm) and *in vitro* fluorescence measurements (B-C) of SPIO at various iron concentrations in PBS (excitation wavelength: 750 nm).



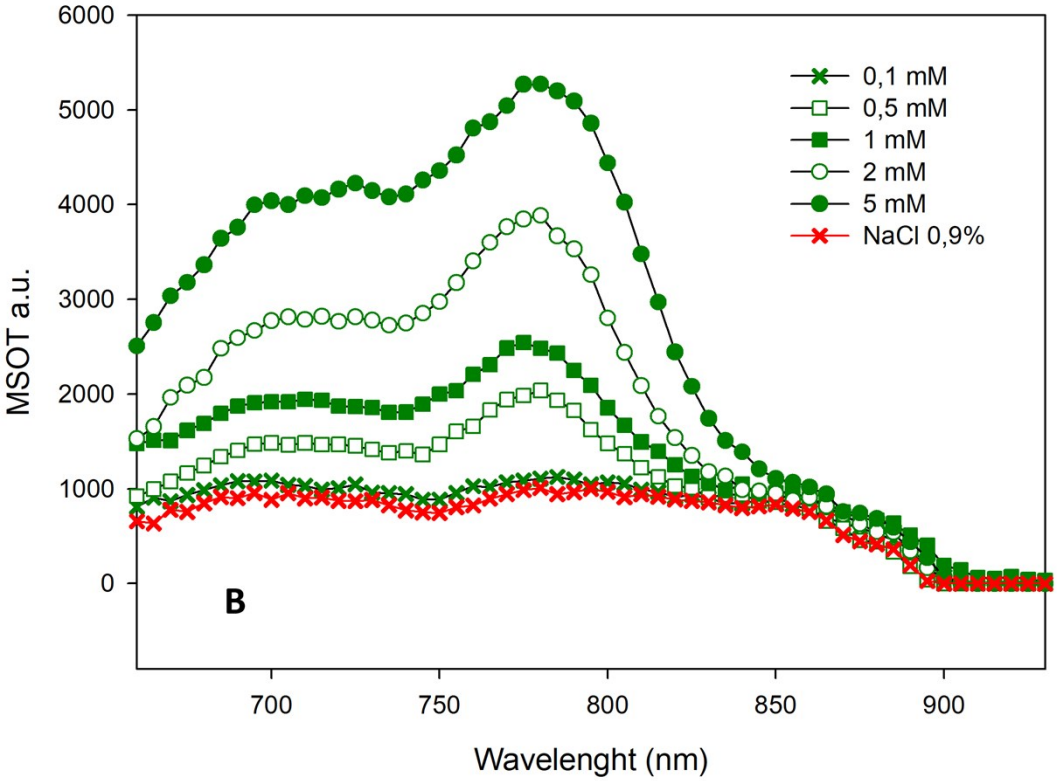




**Fig. S7**: MSOT signal recorded for PEG-coated SPIO-5 (A) and for SPIO-5-PEG5k at different concentrations of elemental iron (B)

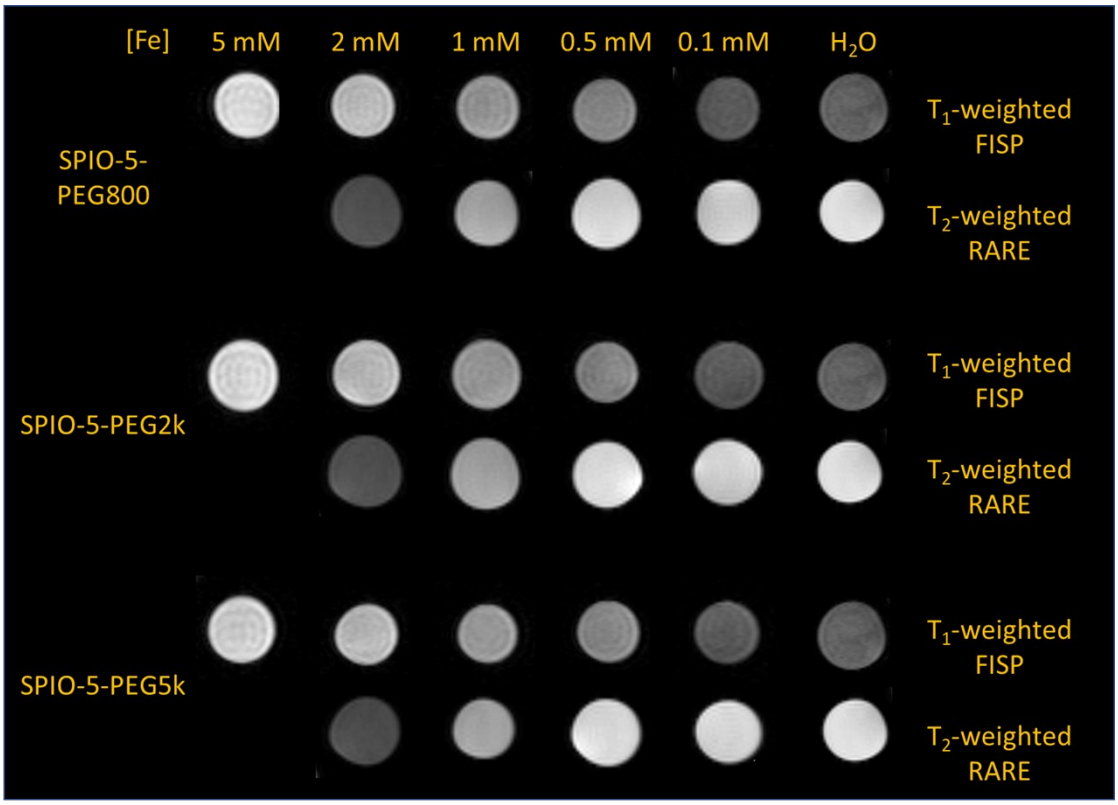



**Fig. S8**: MR images of samples of the three SPIO-5-PEG types at different concentrations (+ water) with (strongly) T1-weighted gradient-echo-based sequence (FISP) and (slightly) T2-weighted spin-echo-based sequence (RARE).

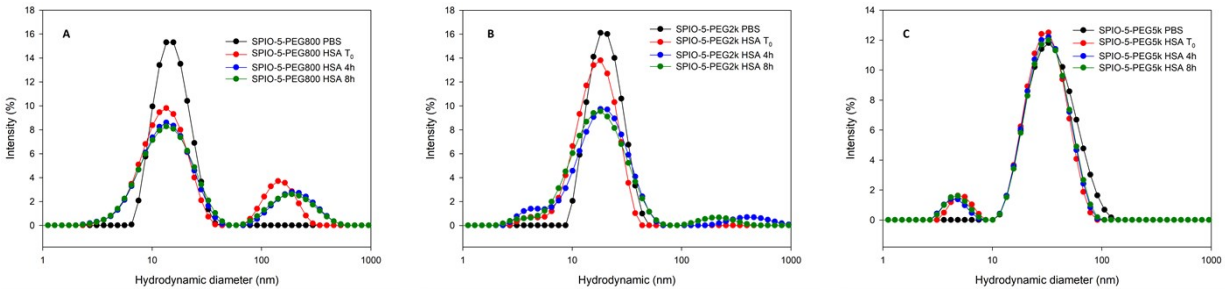



**Fig. S9**: Temporal evolution of the hydrodynamic size distributions of the different SPIO-5 batches ((A) SPIO-5-PEG800/ (B) SPIO-5-PEG2k/ (C) SPIO-5-PEG5k) after incubation with HSA (0.5 mg/mL) at 37°C during 8 hours. Each sample was compared to a suspension prepared in PBS.

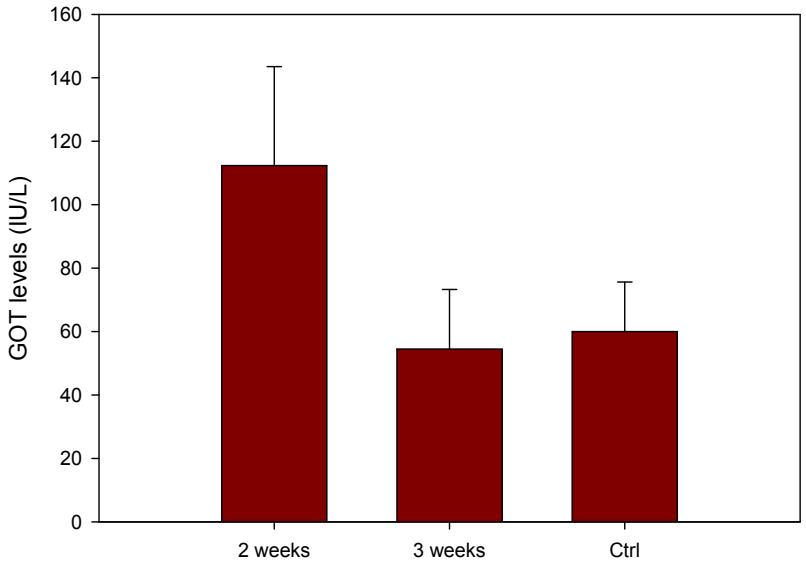



**Fig. S10**: Aspartate aminotransferase (or glutamate oxaloacetate transaminase (GOT)) mean levels in plasma of mice, 2 weeks after injection of SPIO-5-5000 (2w, n=3), or 3 weeks after injection of SPIO-5-5000 (3w, n=2), compared to control mice (n=3)