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Appendix

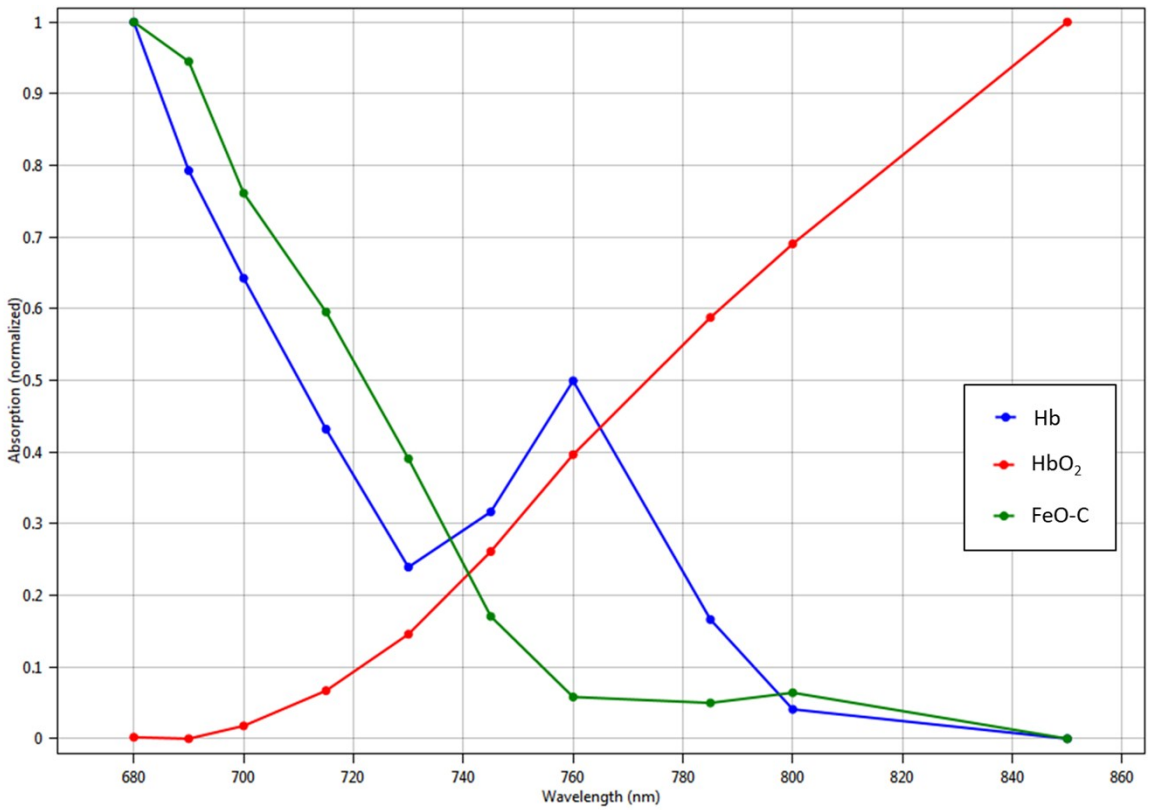

Figure 1. Optoacoustic absorption spectra for FeO-C at 100 mM. This is superimposed with the contrast of the endogenous contrast agents oxy (HbO_2) and deoxy-hemoglobin (Hb). The normalised MSOT absorption for FeO-C closely follows that of Hb meaning that spectral unmixing of the two wavelengths is not possible and FeO-C would not be suitable for *in-vivo* studies.

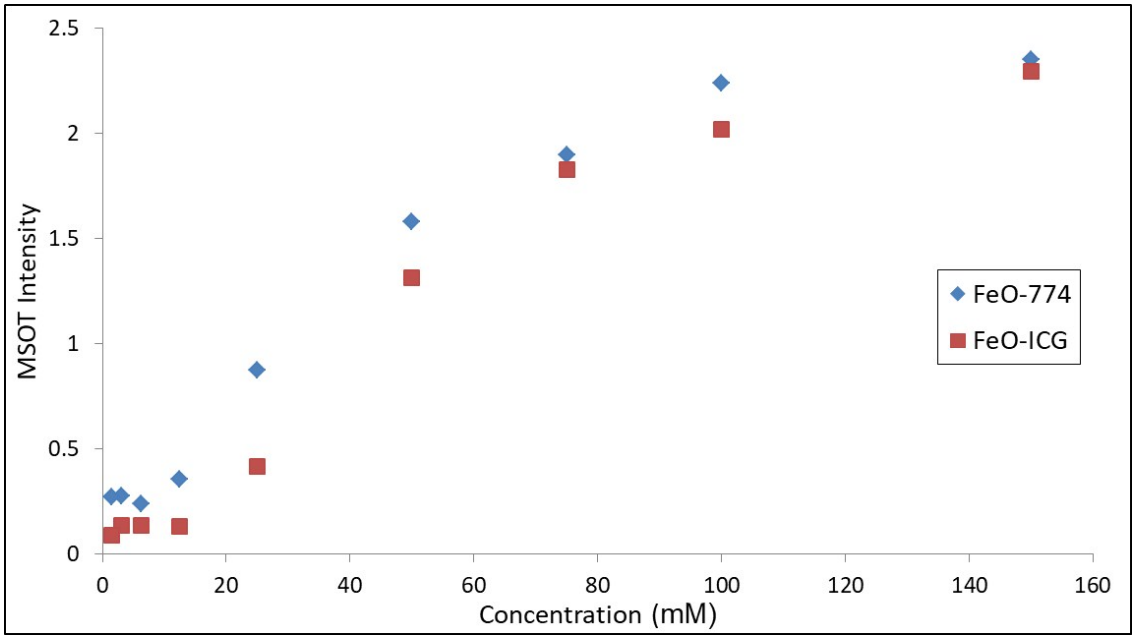

Figure 2. Full concentration gradient plot with respect to MSOT intensity to show the total saturation for the MRI-MSOT probe nanoparticles FeO-ICG and FeO-774 at 100 µM. The limit of detection is therefore calculated from the linear segment of the plot.

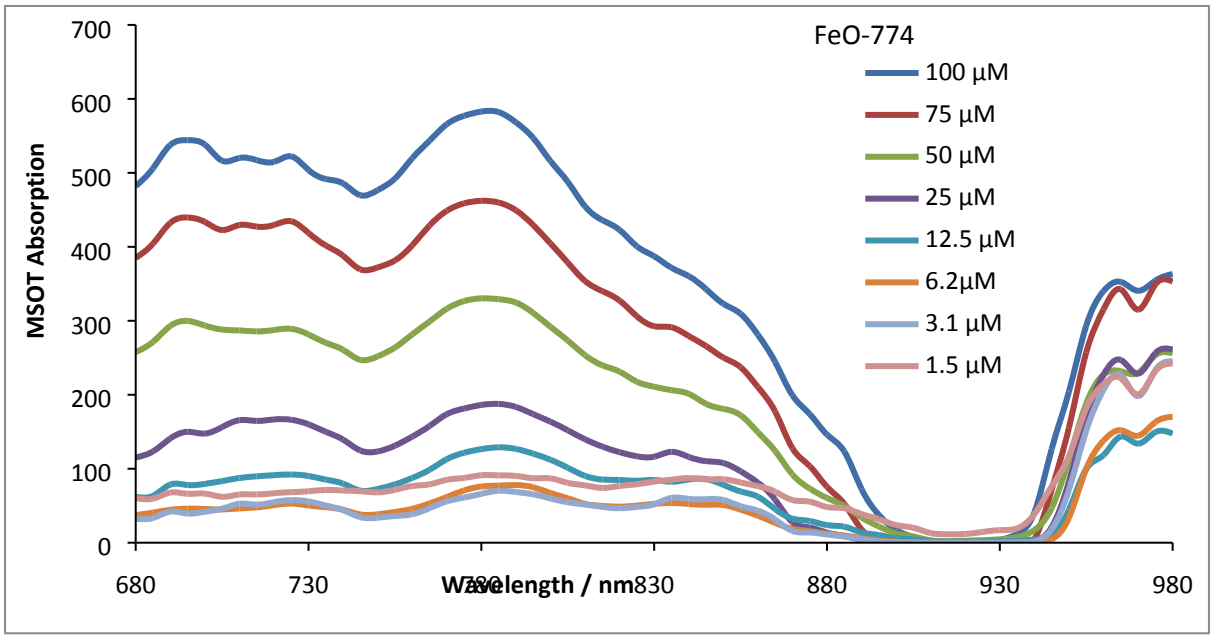

Figure 3. Concentration plot of FeO-774 to show the MSOT signal and its dependence on concentration.

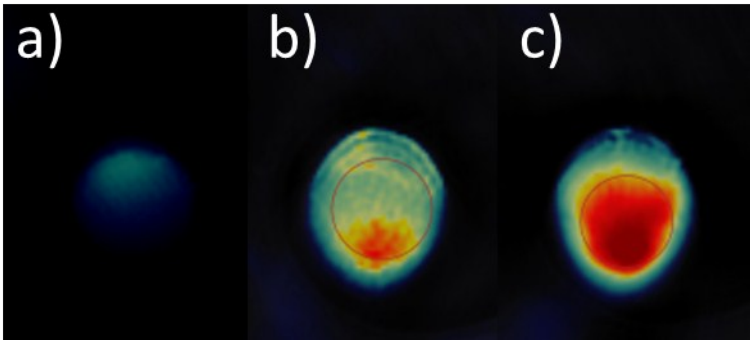

Figure 4. MSOT images of phantoms of a) H_2O, b) Fe3O4-ICG without activated ICG dye, and c) Fe3O4-ICG conjugated with activation of the ICG dye. Note that using the activated dye ICG Sulfo-NHS has produced a greater MSOT signal showing the condensation reaction leads to greater conjugation of the dye.