Electronic Supplementary Material (ESI) for Soft Matter.

Supporting information

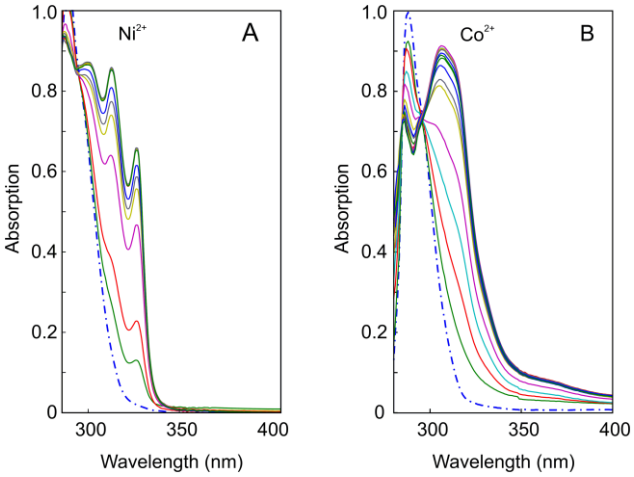

Figure S1. UV-Vis absorption spectra recorded for the titration of a 8PEG($tpy_{5.4}$)$OH_{2.6}$ solution with a $NiCl_2$ (A) and $CoCl_2$ solution (B). Dotted lines are of the uncomplexed polymer.

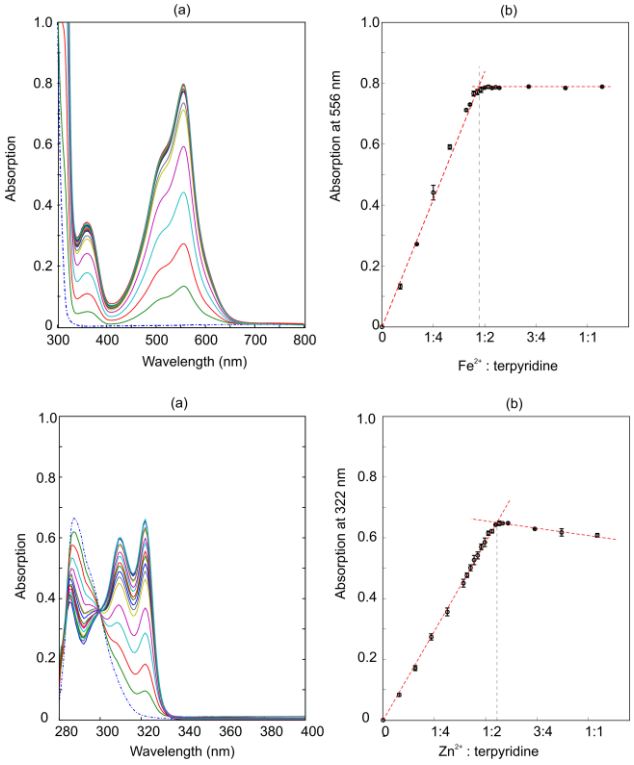

Figure S2. UV-Vis absorption spectra recorded for the titration of a 8PEG($tpy_{5.4}$)$OH_{2.6}$ solution with a $FeCl_2$ (top) and $ZnCl_2$ solution (bottom). (a) absorption spectra (b) absorption values at 556 nm (Fe^{2+}) and at 322 nm (Zn^{2+}), corrected for the absorption of 8PEG($tpy_{5.4}$)$OH_{2.6}$ (dashed lines).

S3: From the assumption that the bis(terpyridyl) complex dissociation is rate limiting it follows that the rate equation below applies for the exchange of Fe^{2+} by Ni^{2+}.

$$v = k_{-2,Fe^{2+}}[Fe^{2+}(tpy)_2]$$

Rewriting the rate equation into a differential equation and separating the variables yields the following.

$$\frac{1}{[Fe^{2+}(tpy)_2]} d[Fe^{2+}(tpy)_2] = -k_{-2,Fe} dt$$

Subsequent integration yields equation 1 as shown below.

$$\int_{[Fe^{2+}(tpy)_2]_0}^{[Fe^{2+}(tpy)_2]_t} \frac{1}{[Fe^{2+}(tpy)_2]} d[Fe^{2+}(tpy)_2] = -\int_0^t k_{-2,Fe} dt$$

→ $$\ln\left(\frac{[Fe^{2+}(tpy)_2]_t}{[Fe^{2+}(tpy)_2]_0}\right) = -k_{-2,Fe} t$$

→ $$[Fe^{2+}(tpy)_2]_t = [Fe^{2+}(tpy)_2]_0 e^{-k_{-2,Fe} t} \quad (1)$$

Similarly, during exchange of Co^{2+} by Fe^{2+}, the concentration of Co^{2+} bis(terpyridyl) complexes is given by the following equation (A).

$$[Co^{2+}(tpy)_2]_t = [Co^{2+}(tpy)_2]_0 e^{-k_{-2,Co} t} \quad (A)$$

The concentration of the Co^{2+} bis(terpyridyl) complexes can be related to the concentration of Fe^{2+} bis(terpyridyl) complexes through the equations below.

$$[Fe^{2+}(tpy)_2]_t = \frac{1}{2}([Co^{2+}(tpy)_2]_0 - [Co^{2+}(tpy)_2]_t)$$

→ $$[Co^{2+}(tpy)_2]_t = [Co^{2+}(tpy)_2]_0 - 2[Fe^{2+}(tpy)_2]_t$$

Substituting the latter equation in equation A yields the premier equation beneath. Subsequent rewriting results in equation 2.

$$[Co^{2+}(tpy)_2]_0 - 2[Fe^{2+}(tpy)_2]_t = [Co^{2+}(tpy)_2]_0 e^{-k_{-2,Co} t}$$

→ $$[Fe^{2+}(tpy)_2]_t = \frac{1}{2}[Co^{2+}(tpy)_2]_0 (1 - e^{-k_{-2,Co} t}) \quad (2)$$

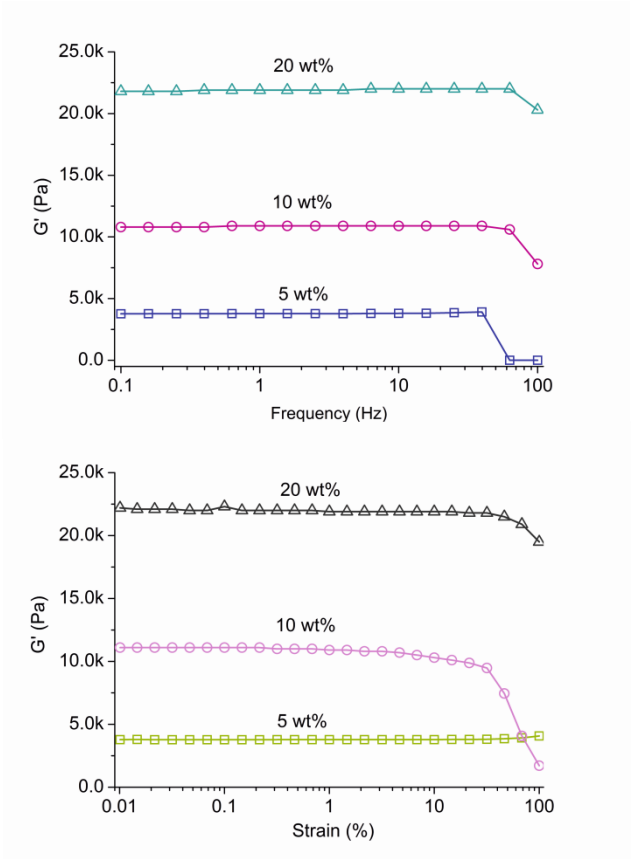

Figure S4. Frequency (A) and strain (B) sweep of Fe^{2+}-complexed gels at different concentrations.

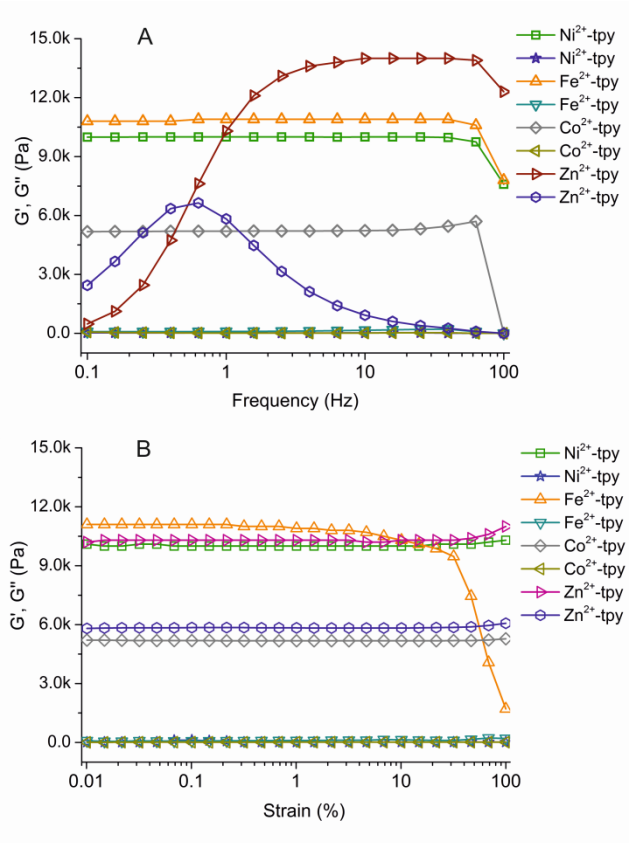

Figure S5. Frequency (A) and strain (B) sweep of different metal ions complexes of 8PEG($tpy_{5.4}$)$OH_{2.6}$ at a concentration of 10 wt%.

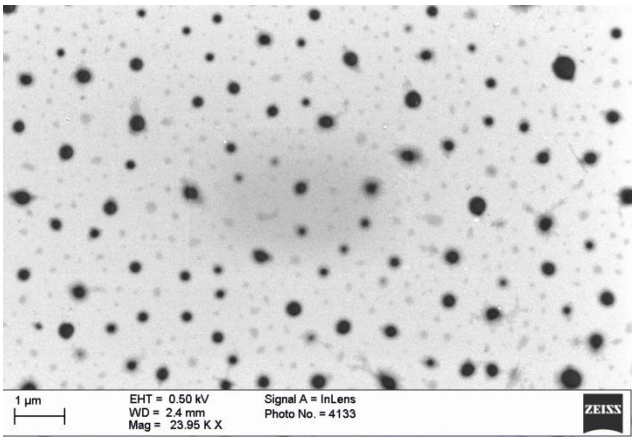

Figure S6. SEM image of the nanoparticles formed by the 8PEG($tpy_{5.4}$)$OH_{2.6}$ complex with iron (II) chloride in deionized water.