

Supporting Information

Lanthanide grafted phenantroline-polymer for physiological temperature range sensing

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S11. Synthesis and characterization (NMR) of 1,10-phenanthroline-2,9-dicarbaldehyde

The ^1H NMR spectra of the starting material was recorded at 400 MHz, on a Bruker Avance III, equipped with $^1\text{H}/\text{BB}$ z-gradient probe (BBO, 5 mm). CDCl_3 and DMSO-d_6 were used as solvent, and TMS was used as an internal chemical shift standard. NMR spectra were acquired through the standard sequences available in the Bruker pulse program library and collected data processed using TOPSPIN 3.2.

1,10-phenanthroline-2,9-dicarbaldehyde¹ - 2.1 equivalents of SeO_2 (50.4 mmol, 5.59 g), 120 mL dioxane and 3.4 mL demineralized water were placed in a round bottom flask and heated to 120 °C. When the mixture started refluxing, 1 equivalent neocuproine (24.0 mmol, 5.00 g) was dissolved in 96.6 mL of dioxane and was added to the flask. This mixture was refluxed for 2 h. After reaction, the hot mixture was filtered. The retained black solids were washed with dioxane and chloroform. Finally, the combined solvents were evaporated *in vacuo*, resulting in 5.00 g 1,10-phenanthroline-2,9-dicarbaldehyde. Yield = 88 %. orange powder. **M. p.:** 230 °C; **FTIR** $\nu_{\text{max}}/\text{cm}^{-1}$: 2850 (CH ald.) and 1695 (C=O), **$^1\text{H-NMR}$** (400 MHz, DMSO-d_6): δ = 8.30 (2H, s, $\text{H}^{5,6}$), 8.33 (2H, d, J = 8.2 Hz, $\text{H}^{3,8}$), 8.81 (2H, dd, J = 8.2 Hz, J = 0.7 Hz, $\text{H}^{4,7}$), 10.36 (2H, d, J = 0.7 Hz, CHO)

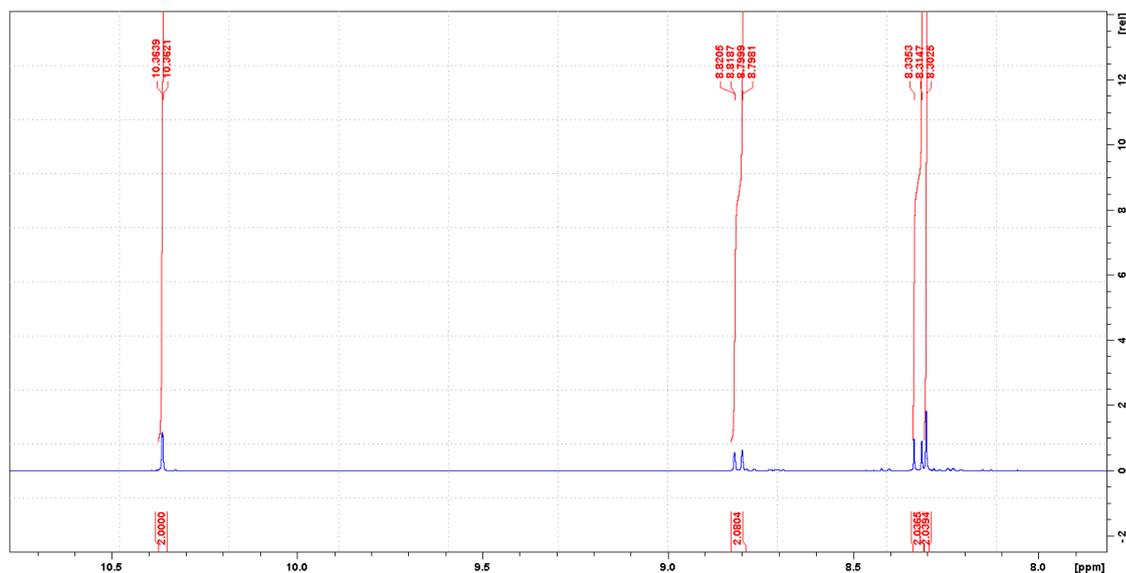
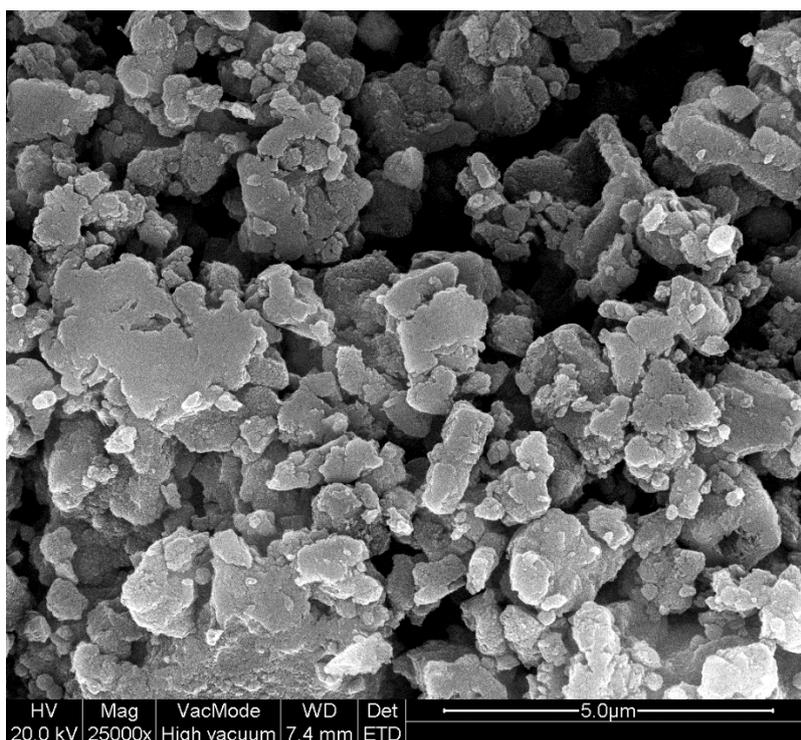
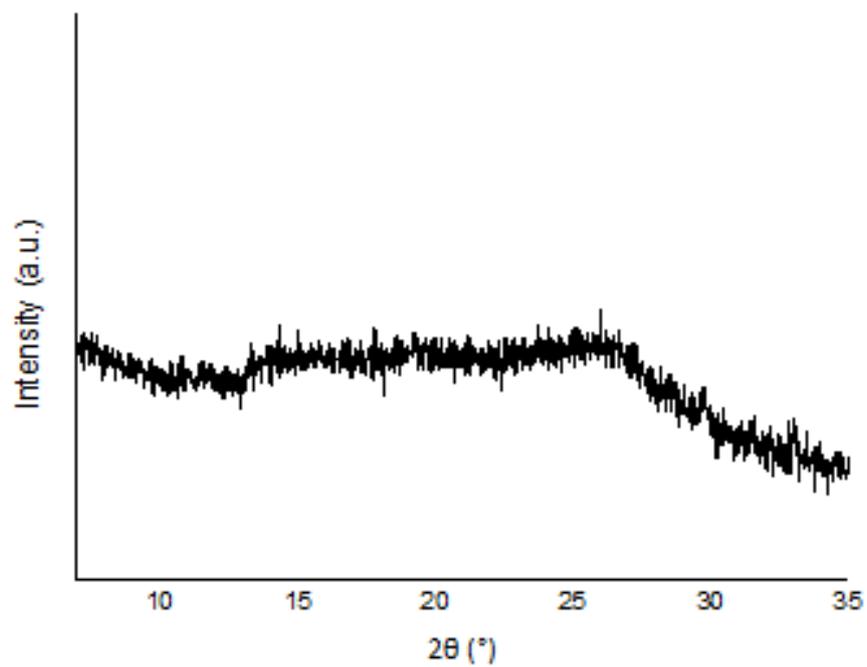


Fig. S11 Zoom of NMR spectrum

S12. SEM image of phen-polymer

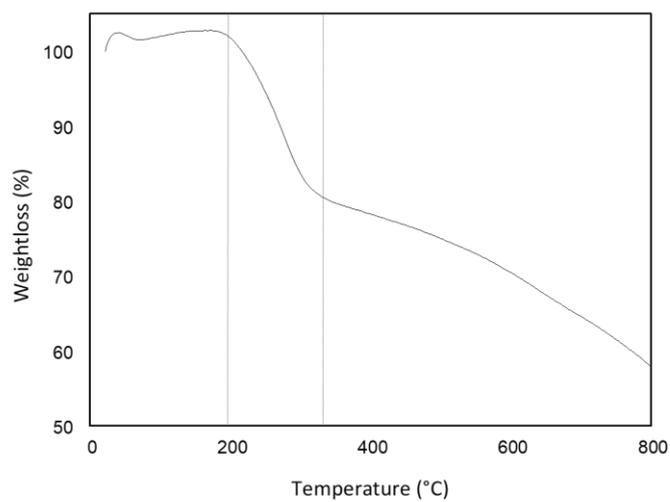


S13. PXRD of phen-polymer

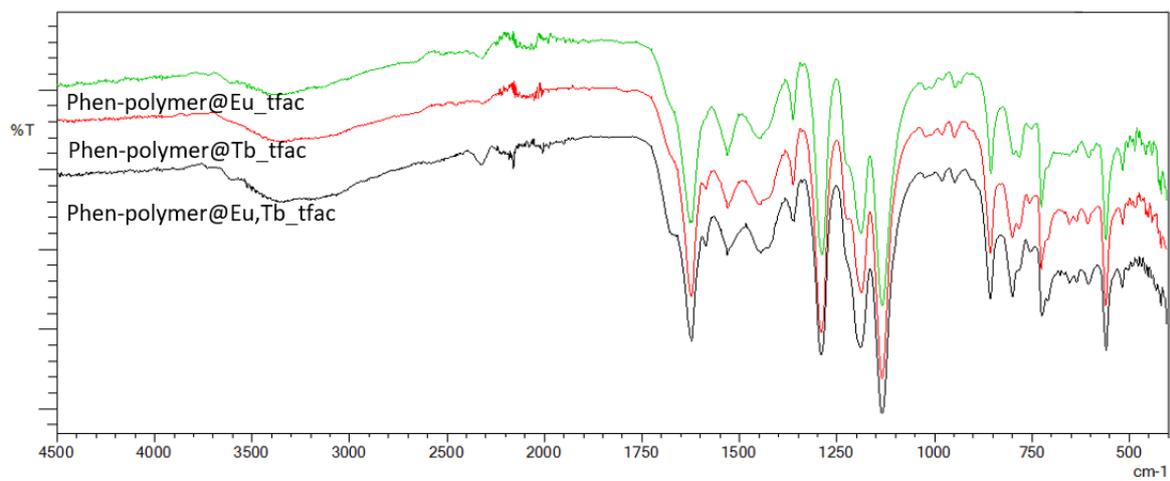


SI4. Characterization of grafted phen-polymers

SI4 A. TGA of phen-polymer@Eu_tfac

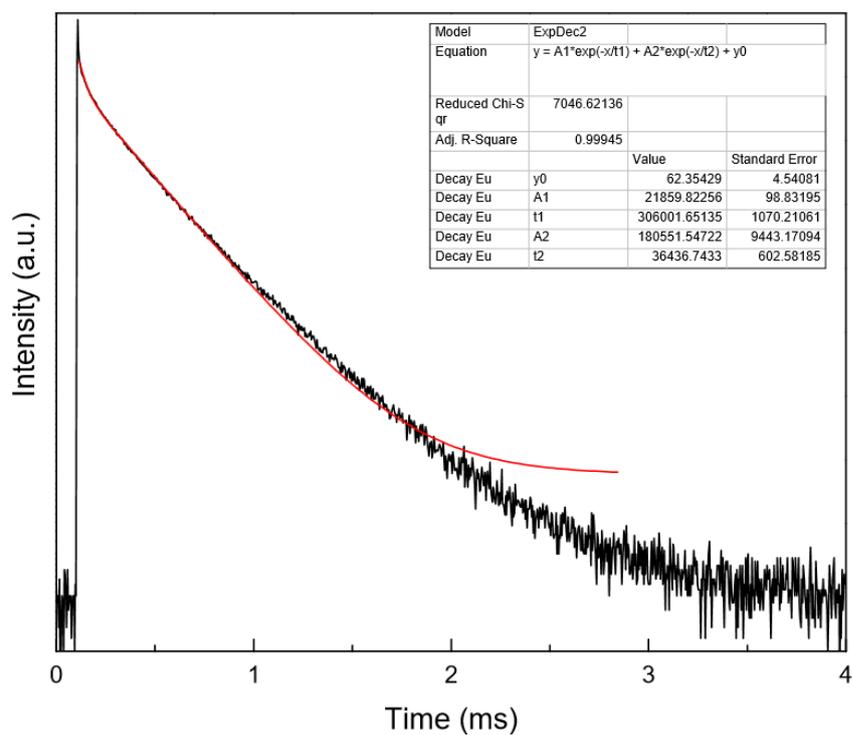


SI4 B. FTIR of grafted phen-polymers

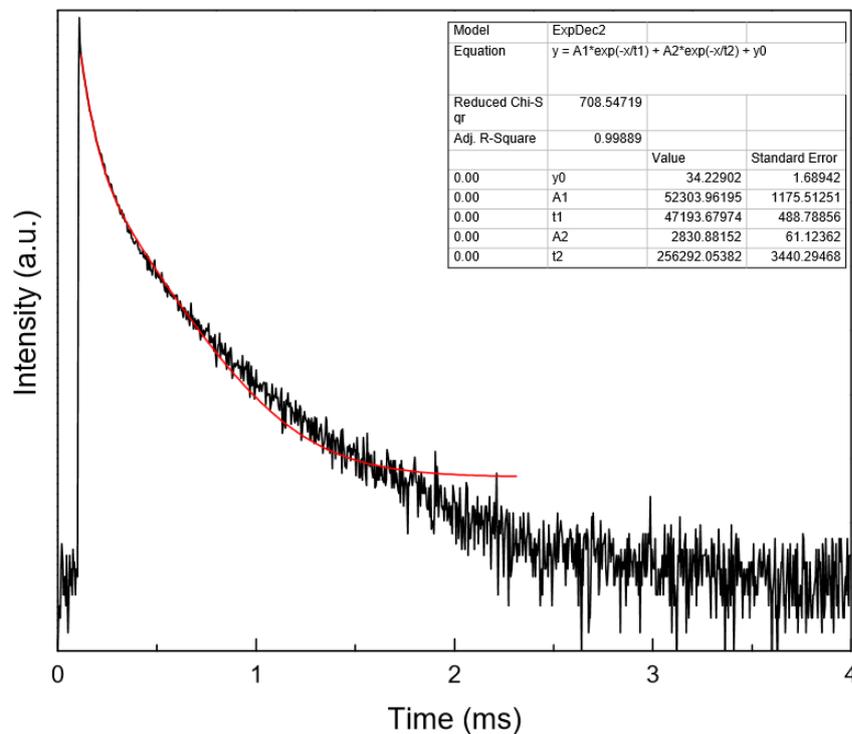


S15. Decay profiles

S15 A: Decay profile of phen-polymer@Eu_tfac

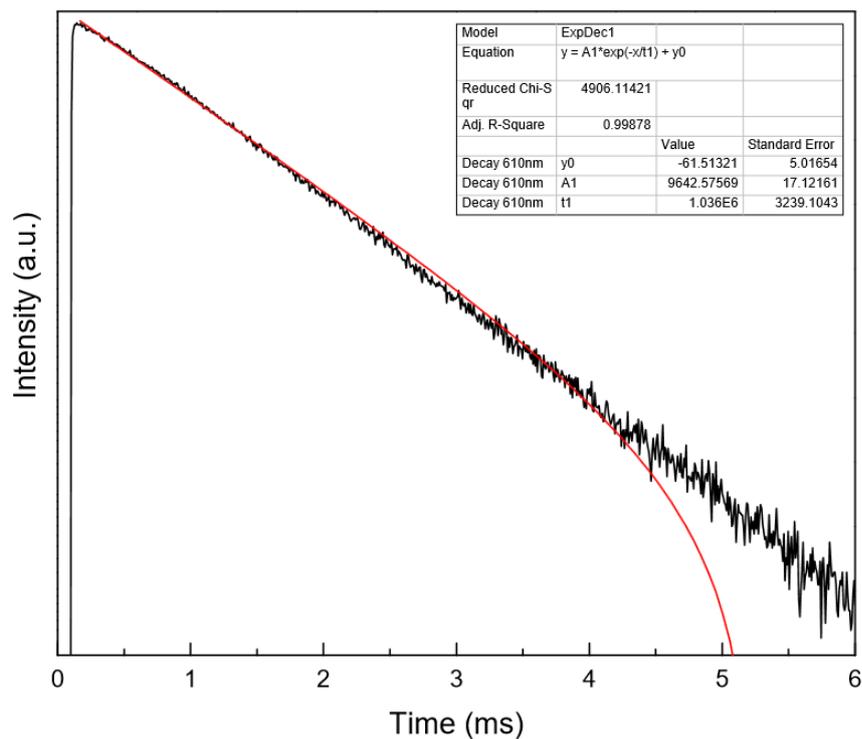


S15 B: Decay profile of phen-polymer@Tb_tfac

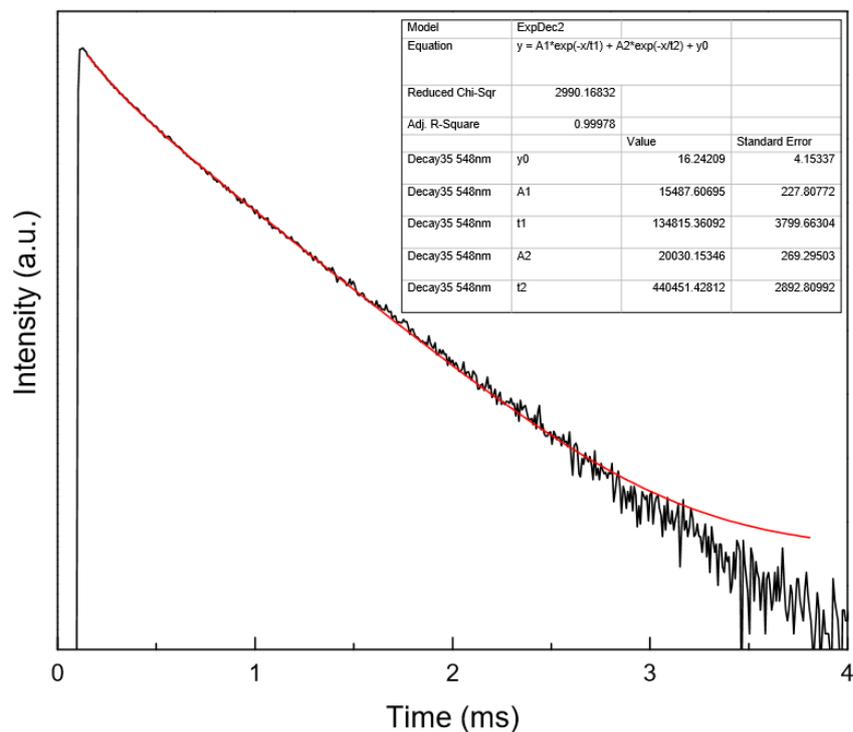


S15 C: Decay profile of phen-polymer@Eu,Tb_tfac

Decay profile of phen-polymer@Eu,Tb_tfac (observed at 610 nm)

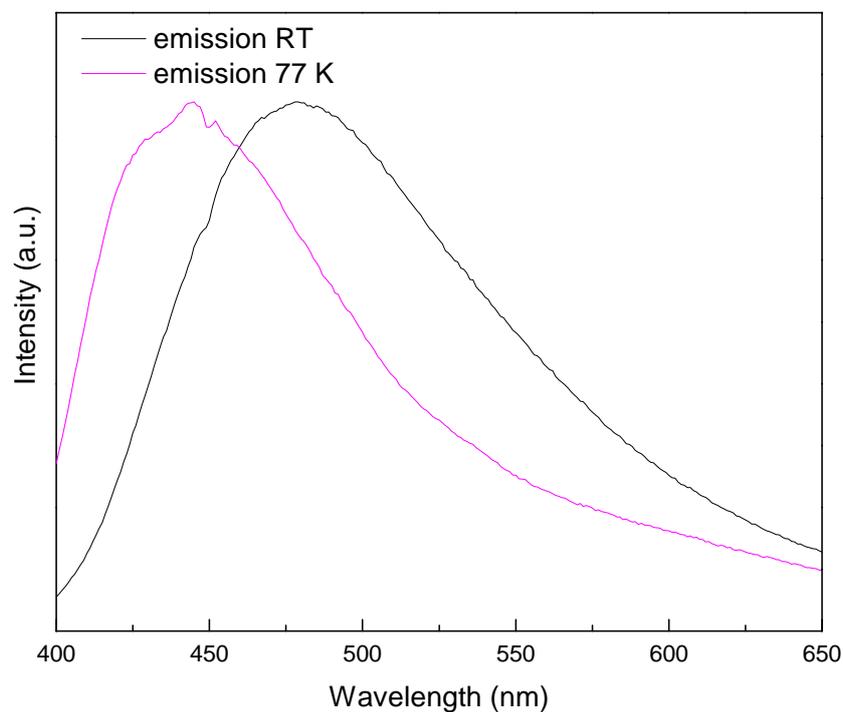


Decay profile of phen-polymer@Eu,Tb_tfac (observed at 548 nm)

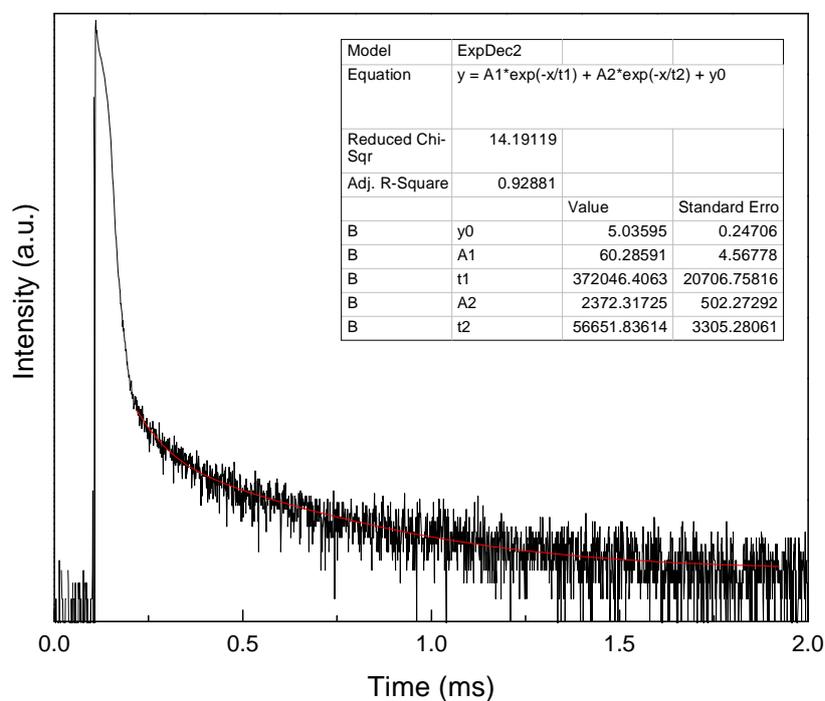


SI6 : Triplet level detremination for phen-polymer@Gd

SI6 A. Emission spectra of phen-polymer@Gd measured in ethanol : methanol (4 : 1) solution at RT and at 77 K.



SI6 B. Decay time of phen-poymer@Gd measured at 415 nm.



References

1. N. T. Coogan, M. A. Chimes, J. Raftery, P. Mocilac and M. A. Denecke, *J. Org. Chem.*, 2015, **80**, 8684–8693.