Supporting Information

A ratiometric and colorimetric luminescent thermometer over a wide temperature range based on lanthanide coordination polymer

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**Fig. S1** PXRD patterns of the coordination polymers **Tbcpda**, **Eucpda** and **Tb\textsubscript{0.957}Eu\textsubscript{0.043}cpda**.

**Fig. S2** TGA curve of **Tbcpda**.
**Fig. S3** Fluorescent microscope images of **Tbcpda** illuminated with mercury lamp (a) and 365nm UV light (b) and **Tb\textsubscript{0.957}Eu\textsubscript{0.043}cpda** illuminated with mercury lamp (c) and 365nm UV light (d).

**Fig. S4.** Room temperature excitation and emission spectra of the ligand H\textsubscript{3}cpda.
Fig. S5 Excitation (black) and emission (red) spectra of Tbcpda (a), Eucpda (b) and Tb\textsubscript{0.957}Eu\textsubscript{0.043}cpda (c) at room temperature.
**Fig. S6** (a) Emission spectra of **Tbcpda** recorded between 15 and 300 K excited at 335 nm; (b) Temperature-dependent intensity of the $^5$D$_4 \rightarrow ^7$F$_2$ transition of **Tbcpda**.
Fig. S7 (a) Emission spectra of Eucpda recorded between 15 and 300 K excited at 328 nm; (b) Temperature-dependent intensity of the $^5D_0 \rightarrow ^7F_2$ transition of Eucpda.
**Fig. S8** Normalized intensities of $^5D_4 \rightarrow ^7F_5$ (Tb$^{3+}$) and $^5D_0 \rightarrow ^7F_2$ (Eu$^{3+}$) transitions in $\text{Tb}_{0.957}\text{Eu}_{0.043}\text{cpda}$ from 15K to 300K.

**Fig. S9** Emission spectra of $\text{Tb}_{0.957}\text{Eu}_{0.043}\text{cpda}$ recorded from 15K to 300K, excited at 488 nm.
Fig. S10 Temperature dependence of the $^5D_4$ and $^5D_0$ lifetime (15-300 K) for $\text{Tb}_{0.957}\text{Eu}_{0.043}\text{cpda}$. The decay curves are monitored at 546 and 615 nm, respectively, and excited at 335 nm.

Fig. S11 Temperature dependence of the $\text{Tb}^{3+}$-to-$\text{Eu}^{3+}$ energy transfer efficiency in $\text{Tb}_{0.957}\text{Eu}_{0.043}\text{cpda}$ and $\text{Eu}_{0.0069}\text{Tb}_{0.9931}$-DMBDC.
Fig. S12 Phosphorescence spectra of Gd$^{3+}$ complex of ligand H$_3$cpda at 77 K.

Fig. S13 Emission spectra of TbDMBDC recorded between 15 and 300 K excited at 355 nm.
**Fig S14.** Temperature dependence of the intensity ratio of Tb$^{3+}$ (546 nm) to Eu$^{3+}$ (615 nm) for Tb$_{0.957}$Eu$_{0.043}$cpda from 280 to 360 K.