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Abstract

Herein, a flexible and transparent film consisting $\text{Eu}^{3+}/\text{Tb}^{3+}$ lanthanide complexes and poly(methylmethacrylate) was constructed via solution casting method, and further developed as a ratiometric luminescent thermometer with an excellent linear response to temperature variation from 77 to 297 K. The thermometer displays higher photo- and thermostability than corresponding pure complexes. Based on that the emission intensity ratio of ${}^5\text{D}_4 \rightarrow {}^7\text{F}_5$ transition (Tb^{3+}) to ${}^5\text{D}_0 \rightarrow {}^7\text{F}_2$ transition (Eu^{3+}) can be linearly related to the temperature, the resulting thermometer is not only more reliable than single Eu^{3+} (or Tb^{3+}) material based on one emission, and but also has higher sensitivity than other types of luminescent thermometers. This work highlights the practical applications of luminescent films in temperature-sensing fields.

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