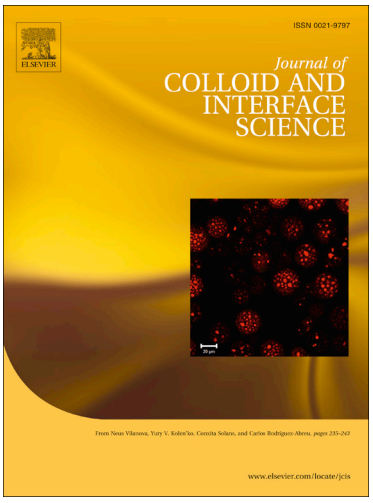

Flexible and Transparent Films Consisting of Lanthanide Complexes for Ratiometric Luminescence Thermometry

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Flexible and Transparent Films Consisting of Lanthanide Complexes for Ratiometric Luminescence Thermometry

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Abstract

Herein, a flexible and transparent film consisting Eu^{3+}/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 complexs. Based on that the emission intensity ratio of $^5D_4 \rightarrow {}^7F_5$ transition (Tb^{3+}) to $^5D_0 \rightarrow {}^7F_2$ 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.