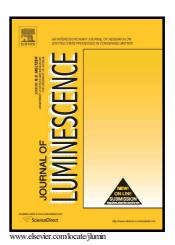
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ACCEPTED MANUSCRIPT

Using the upconversion luminescence of the $CaWO_4$: $Yb^{3+}-X^{3+}(X=Er/Ho/Tm)$ phosphors for ratiometric thermal sensing

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Abstract

Based on the luminescence ratiometric method, here we systematically investigate the relative sensitivity (Sr) of three pairs of typical thermally coupled energy levels (TCELs), that are, the ${}^2H_{11/2}/{}^4S_{3/2}$ levels of Er^{3+} , the two sub-Stark 5F_5 levels of Ho^{3+} , and the ${}^3F_3/{}^3H_4$ levels of Tm^{3+} , embedded in the CaWO₄ host. On the basis of the emission spectra of the CaWO₄:Yb³⁺ $-X^{3+}(X=Er/Ho/Tm)$ phosphors, the gaps that separate the ${}^2H_{11/2}/{}^4S_{3/2}$, the two sub-Stark 5F_5 , and the ${}^3F_3/{}^3H_4$ TCELs are calculated

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