Accepted Manuscript

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PII:	S1386-1425(18)30280-4
DOI:	doi:10.1016/j.saa.2018.03.072
Reference:	SAA 15944
To appear in:	*Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*
Received date:	12 August 2017
Revised date:	25 March 2018
Accepted date:	26 March 2018

Please cite this article as: Shuchao Xu, Zhijun Wang, Panlai Li, Ting Li, Qiongyu Bai, Zhiping Yang , Broadening emission band of $Ba_2B_2O_5$: Dy^{3+} by codoping Ce^{3+} as sensitizer and its application to white LEDs. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Saa(2017), doi:10.1016/j.saa.2018.03.072

Broadening emission band of $Ba_2B_2O_5$: Dy^{3+} by codoping Ce^{3+} as sensitizer and its application to white LEDs

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Abstract: In order to achieve broad-band white emitting phosphor, Ce^{3+}/Dy^{3+} codoped $Ba_2B_2O_5$ were synthesized by a solid-state method, and the luminescence property and energy transfer were discussed in detail. Dy^{3+} doped $Ba_2B_2O_5$ shows white emission, and the two narrow peaks which are assigned to the $^4F_{9/2}\rightarrow{}^6H_{15/2}$ and $^4F_{9/2}\rightarrow{}^6H_{13/2}$ transitions of Dy^{3+} ions, respectively. When codoped Ce^{3+} as sensitizer, the broad-band white emission can be obtained by the energy transfer from Ce^{3+} to Dy^{3+} ions in $Ba_2B_2O_5$, and the mechanism is the dipole-dipole interaction. And the CIE coordinates can be tuned from (0.2501, 0.2323) to (0.3422, 0.3799) by increase Dy^{3+} content. The emission peak blue-shift of Ce^{3+} ions in $Ba_2B_2O_5$:Ce^{3+}, Dy^{3+} was observed from the thermal spectra, and the mechanism was analyzed. A white light emitting diodes (LEDs) can be fabricated $Ba_2B_2O_5$:Ce^{3+}, Dy^{3+} with 380 nm chip, and the results show that the phosphor may be a potential application in this field.

Keywords: Luminescence; Phosphors

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