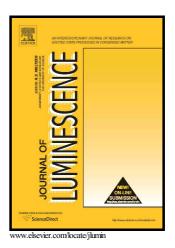
# Author's Accepted Manuscript

The synthesis and photoluminescence properties investigation of a versatile phosphor  $Sr_{10}[(PO_4)_{5.5}(BO_4)_{0.5}](BO_2): \\ Sb^{3+}/Eu^{3+}/Pr^{3+}/Dy^{3+}$ 

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## ACCEPTED MANUSCRIPT

The synthesis and photoluminescence properties investigation of a versatile phosphor

 $Sr_{10}[(PO_4)_{5.5}(BO_4)_{0.5}](BO_2)$ :  $Sb^{3+}/Eu^{3+}/Pr^{3+}/Dy^{3+}$ 

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#### Abstract

A series of versatile phosphors  $Sr_{10}[(PO_4)_{5.5}(BO_4)_{0.5}](BO_2):Sb^{3+}/Eu^{3+}/Pr^{3+}/Dy^{3+}$  were firstly synthesized

by solid-state method. The phase purity was analyzed through X-ray diffraction and their characteristic

luminescence properties were investigated. The results showed that  $Sr_{10}[(PO_4)_{5,5}(BO_4)_{0,5}](BO_2):Sb^{3+}$ 

exhibited broad blue emission centered at 459 and 467 nm, due to the selective excitation transitions

 $(^{3}P_{1/0} \rightarrow ^{1}S_{0})$  of Sb<sup>3+</sup> occupying different crystal sites in  $Sr_{10}[(PO_{4})_{5.5}(BO_{4})_{0.5}](BO_{2})$ . The emission

spectrum of  $Sr_{10}[(PO_4)_{5.5}(BO_4)_{0.5}](BO_2)$ : Eu<sup>3+</sup> consisted of a series of lines attributed to the  $^5D_0 \rightarrow ^7F_J$  (J

= 1, 2, 3, 4) transitions of Eu<sup>3+</sup>. Moreover, an unusual blue emission band was observed, which was

discussed in detail and proved to be related to the vacancy of Sr<sup>2+</sup> through the charge compensation

mechanism. In addition, red and warm white emissions could be obtained from Pr<sup>3+</sup> and Dy<sup>3+</sup> single

doped  $Sr_{10}[(PO_4)_{5.5}(BO_4)_{0.5}](BO_2)$  and their luminescence properties were discussed, respectively.

Keywords: A. optical materials; D. optical properties; D. luminescence · op

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Introduction

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