Study of the structural and luminescent properties of Eu_2O_3 doped Calcium Boroaluminate glasses synthesized in a reducing atmosphere

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The Calcium Boroaluminate (CaBAl) glasses have good chemical stability, easy glass formation, excellent mechanical and thermal properties and transparency in the infrared spectrum. In the last decades, rare earth (RE) ions doped solid-state materials have been a subject of considerable interest due to their applicability as solid-state laser, amplifiers, phosphors, field emission displays and light emitting diodes (LEDs) [1]. The europium ion (Eu^{3+}/Eu^{2+}) presents wide emission in the visible range and the coexistence of these two valences in glass become potential to be used as white light (WL) producer in light emitting diode (LED) devices with appropriate color balance in terms of the circadian responses [2]. In this work, Eu_2O_3 doped calcium boroaluminate glasses (CaBAl) were prepared and characterized. The samples were prepared by melt-quenching technique, following the composition: $23CaO\text{-}50B_2O_3\text{-}15Al_2O_3\text{-}10CaF_2\text{-}2Eu_2O_3$. Carbon content was varied from 2.5 to 7.5% to control the ratio of Eu^{2+} and Eu^{3+} during the melting process. FTIR, X-ray diffraction, absorption, luminescence and excitation measurements were carried out on the glass CaBAl system. The chromaticity coordinates have been calculated from the luminescence spectra and analyzed with Commission International de I'Eclairage diagram.

Acknowledgments: We are thankful to the Brazilian agencies CNPq, FINEP, FAPEMA and CAPES for financial support of this study.

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