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Ba가 첨가된 $SrTiO_3$:Pr,Al FED용 적색 형광체의 휘도 강화 연구
Luminescence enhancement of Ba in $SrTiO_3$:Pr,Al red phosphor for field emission display

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1. Introduction

Until now, most field emission display (FED) employs the conventional cathode ray tube(CRT) phosphors due to good efficiency of R/G/B. Compared with CRT phosphors, those of FED are required to generate at low voltage and high current density. Sulfide phosphors, however, are chemically degraded under electron-bombardment in the ultra high vacuum device and also need required to protect as aluminum back layer. In order to improve the stability for the emitter arrays of FED, non-sulfide phosphors are desired. In case of red phosphors, many researchers have investigated the luminescence efficiency on BaTiO3:Sm3+, SrTiO3:Eu3+, SrTiO3:Pr3+ and SrTiO3:Pr3+,Al3+ (or Ga3+) as perov-skite type oxides.

In this paper, we described experimental results the mechanism of luminescence enhancement. The effect of Ba-addition was examined by morphology, structure and spectrum in Sr1-xBaxTiO3:Pr3+,Al3+ red phosphor.

2. Experimental

Red emitting Sr1-xBaxTiO3:Pr3+,Al3+ phosphors were prepared by a conventional solid-state procedure. The stoichiometric amounts of SrCO3, BaCO3, Al(OH)3, Pr6O11 and TiO2 precursors were mixed uniformly with ethanol at agate mortar and then dried for 24 hours at 120?. Dried samples were fired using alumina crucible at 1250? for 3 h under air in muffle furnace. Red phosphor samples were prepared with the variation of Al contents and the substitution of Ba elements. In this time, activator concentration of Pr was constant at 0.2 mole %. The X-ray diffraction data were measured in the scattering range of 2 theta = 15 ~ 80 with Cu K' radiation with graphite monochro-mator. Field emission electron microscopy (FE-SEM) was carried out with HITACHI electron microscope operating at 30 kV. Photoluminescence (PL) excitation and emission spectra were measured by Hg lamp at room temperature. Cathodoluminescence (CL) spectra were measured under cathode-ray excitation at 5, 10 and 20 kV. The spectral variation of PL and CL was obtained by a fiber-optic coupled spectro-meter with wavelength resolution of 1nm.