Luminescence properties of Ce-doped $(Y,Gd)_3(Al,B)_5O_{12}$ garnet Phosphor Prepared by Spray Pyrolysis

메릴추아마니퀴즈, 정경열*
공주대학교 화학공학부
(kyjung@kongju.ac.kr*)

The current commercial white pc-LEDs are made by using Ce^{3+} doped $Y_3Al_5O_{12}$ (YAG:Ce) phosphor which can convert blue LEDs radiation into a very broad band yellow emission. To meet the requisition in industrial markets, pc-LEDs need phosphors with high brightness and good color rendering index. In this work, a strategy which is boron substitution in the Al site of cerium-doped YAG has been investigated to control the luminous properties of YAG:Ce yellow phosphor. Also, the boron effect as flux material has been studied in order to confirm the effectiveness of boron substitution. A series of boron substituted or fluxed YAG phosphors $(Y,Gd)_3Al_{5-y}B_yO_{12}$:Ce and $(Y,Gd)_3Al_5O_{12}$:Ce,B were prepared by spray pyrolysis and characterized using PL analysis, XRD and SEM. It was found that the boron substitution (up to y=2) in the Al sites significantly enhances the emission intensity without any change in the peak shape and wavelength. Using boron as flux was also effective in improving the photoluminescence intensity of the YAG phosphor. More details about optical, crystallographic, and morphological properties were discussed.