

BaMgAl₁₀O₁₇ DOPED SAMARIUM (Sm) AS A YELLOW COLOUR PHOSPHOR

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Abstract :

Barium magnesium aluminate (BAM) doped Sm phosphor synthesized by combustion method with different concentration. The 2% Sm doped phosphor exhibit good emission at the excitation of the material with 254 nm wavelengths generates a strong emission at 367, 470, 730 nm. Besides this, subsidiary maxima at 401, 451, 484 and 497 nm wavelengths in violet region are discernible with dispersion towards green region. These changes are may be possible due to added impurities.

Keywords : Photoluminescence, Emission Wavelength, Impurities

1. Introduction :

The examination of fluorescence phosphors brings out number of information and throw light on the use of materials as fluorescent lamp phosphors^(1-5,7). The well known phosphors developed are BaMgAl₁₀O₁₇:Mn:Ce, Ca{Po₄}F Cl : Sb,Mn, LaPO₄ : Tb, LiYF₄:U⁴⁺, BaMgAl₁₀O₁₇:Eu, LaPO₄ : Tb and aluminates in mono-,dia and tri-valent doped forms. In present paper, the emission and excitation spectra of synthesized phosphors have been recorded at room temperature .The emission spectra have been examined for different concentration of RE activated BaMgAl₁₀O₁₇ and the characteristic spectra are presented for discussion .The emission band is specified by the wavelength at which its peak appears. The intensities of the emission as well as excitation bands are given in absolute units.

2. Experimental :

The synthesis of Sm doped with BaMgAl₁₀ O₁₇ phosphor of different concentration have been prepared by combustion method with citric acid. ⁽⁶⁾. The appropriate oxides were thoroughly ground and fired at 1140°C for four hours. The specimens thus obtained have been characterized through standard XRD technique. Fluorescence excitation and emission spectra was recorded at room temperature by **RF-5301 PC Spectrophotofluorometer** described elsewhere. In present work, the excitation and emission spectra of synthesized phosphors have been recorded at 64% humidity and at room temperature.

3. Result and Discussions : The excitation spectra of BaMgAl₁₀O₁₇: Sm (2 %) phosphor is shown in figure 1. It represents emission band at 254, 360, 630, 585 and 695 nm wavelengths.

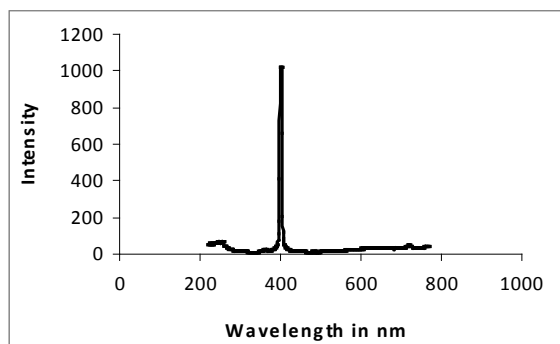


Figure 1 represents Excitation spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with Excit. at $\lambda_{400} \text{ nm}$.

Figure 2 represents emission spectra of $\text{BaMgAl}_{10}\text{O}_{17}$ aluminate doped Sm on excitation at 254 nm wavelength exhibits 470 (blue) and 729 (Red) nm wavelengths.

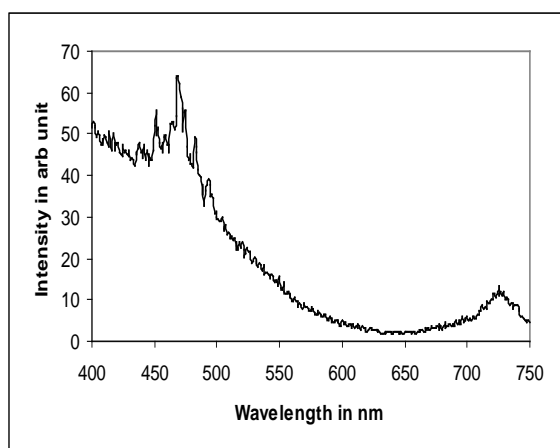


Figure 2 represents Emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with Excit. at $\lambda_{254} \text{ nm}$.

Figure 3 shows emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ at excitation of 360 nm wavelength it exhibits 422 and 721 nm wavelengths with small emission band at 470 nm wavelength.

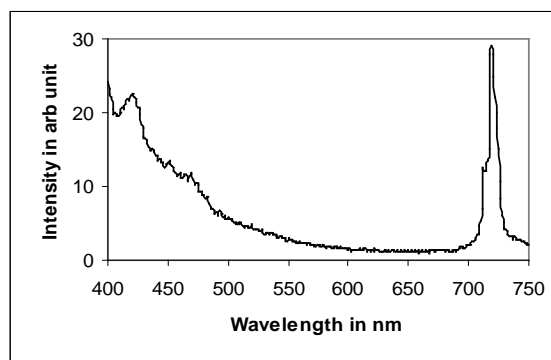


Figure 3 represents Emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with Excit. at $\lambda_{360} \text{ nm}$

But same phosphor is excited at 630 nm wavelength it gives emission bands with high intensity peak at 470, 585 and 635 nm wavelengths along with 453, 494, 529 and 701 nm wavelengths as shown in figure 4. Figure 5 represents emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with excitation at 585 nm wavelength.

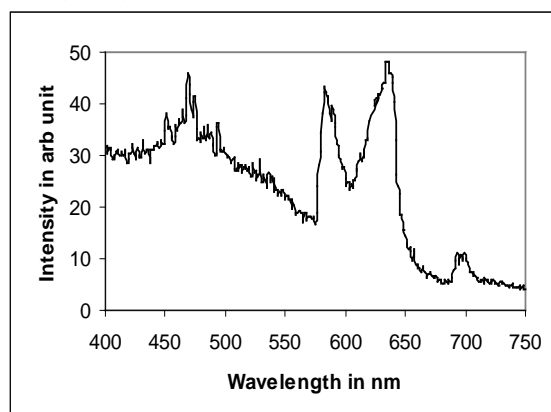


Figure 4 represents Emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with Excit. at $\lambda_{630} \text{ nm}$

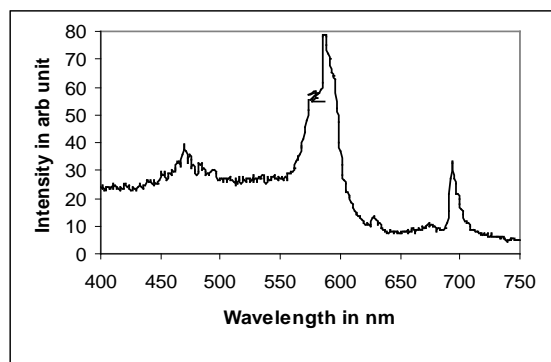


Figure 5 represents Emission spectra of $\text{BaMgAl}_{10}\text{O}_{17} : \text{Sm} (2 \%)$ with Excit. at $\lambda_{585} \text{ nm}$

It exhibits three high intensity emission peaks at 470, 587 and 693 nm wavelengths and 486, 497 and 630 nm with less intense peaks.

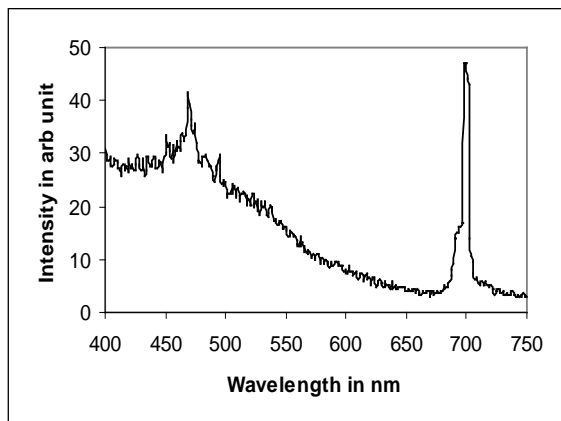


Figure 6 represents Emission spectra of BaMgAl₁₀O₁₇: Sm (2 %) with Excit. at λ_{695} nm

BAM synthesized by solid state reaction method were excited at 695 nm, it exhibits two isolated peak at 470 and 700 nm wavelengths along with small peaks at 453 and 495 nm wavelengths as shown in figure 6.

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