

Long lasting luminescence in TbAG:Ce phosphor

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Tb₃Al₅O₁₂ (TAG) terbium–aluminum garnet is used in optical filters based on the Faraday effect [1] and in luminescence converters of blue LED radiation to obtain light sources with a white emission spectrum [2]. An intense 5d–4f photoluminescence of Ce³⁺ on the Tb³⁺ site in Tb₃Al₅O₁₂ (TAG) powder has been reported by Kummer et al. [3], Tb₃Al₅O₁₂ activated with Ce phosphors were prepared by combustion synthesis. Reagent grade rare earth oxides/carbonates were converted to the corresponding nitrates by dissolving in nitric acid. The nitrates were dried by prolonged, gentle warming. A china dish containing the paste was inserted in a furnace preheated to 500°C. Within minutes the paste foamed and a flame was produced which lasted for several seconds.

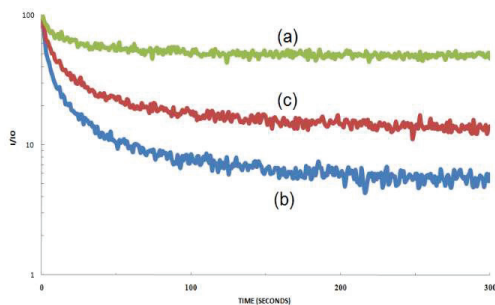


Figure 1: Long Lasting luminescence graph of Tb₃Al₅O₁₂:Ce phosphor

Green LL is observed in Ce doped Tb₃Al₅O₁₂:Ce garnet phosphors. LL is well correlated with Ce³⁺ emission and a peak around 140°C in the TL glow curve. This can be well explained by referring Figure 1 and figure 2. In comparison with the commercial phosphor YAG, the Tb₃Al₅O₁₂:Ce (TAG) is more stable and shows more intense TL properties, this phosphor can be used for dosimetric detections and measurements.

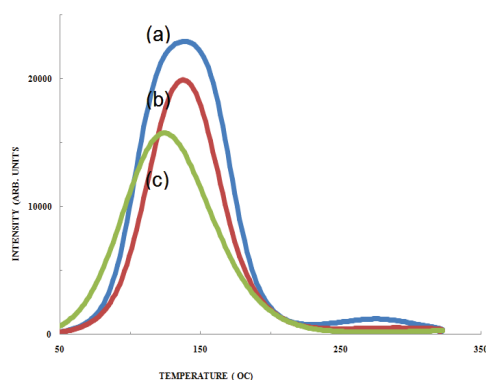


Figure 2: TL glow curve graph of Tb₃Al₅O₁₂:Ce phosphor

References

1. V. I. Chani, Mater. Sci. Eng. B 75 (2000) 53
2. HongdeLuo, et.al J. Am. Ceram. Soc., 95 (2012) 3582
3. F. Kummer, Intern. Patent Appl., WO 01/08452 (2001)