

SYNTHESIS AND CHARACTERIZATION OF RARE EARTH OXYORTHOSILICATE DOPED RARE EARTH IONS POWDER AND THIN FILMS PHOSPHORS

Phosphors have many uses today in applications such as electronic information displays, solid state lighting, solar cells, advertising and theft prevention. Powder

phosphors have shown high luminescence yield compare to the thin film forms owing to the loss of light by thin films from total internal reflection. Nevertheless, thin film phosphors have some advantages such as good adhesion on substrate, minimal outgassing, possess better thermal and mechanical stability, have similar properties over covered region and better resolution and contrast. Furthermore, for LEDs lighting applications, phosphor thin films proffers superior processing methods for white lighting LEDs fabrication and can be integrated expediently with LEDs and arrays of LEDs than the powder phosphors.

By using urea-assisted solution combustion method and pulsed laser deposition (PLD) we prepared tunable multicolour and white light emitting (Fig.1) powder and thin film phosphors using rare earth ions ($Re = Dy^{3+}$, Pr^{3+} , Ce^{3+}) doped rare earth oxyorthosilicates (R_2SiO_5) (R = La, Y, Gd). Different set of single and mixed R_2SiO_5 hosts were doped with single Re ion and also co-doping with different Re ions.



Fig.1: Tunable multicolour and white light emission from mixed R₂SiO₅ doped Re ions for LEDs application