Green phosphor Y_2O_3 Tb^{3+} nanostructured powders prepared by the combustion method

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Phosphors are technologically important materials for display applications such as fluorescent lamps, display monitors FEDs *etc*. The phosphor materials fabricated in the form of nanostructures made of rare-earth ion-doped oxides would be better for luminescent applications because they exhibit interesting physical properties and increased luminescence efficiencies, which are different from those of their bulk counterparts. Therefore, they possess diverse potential applications in nanoscale electronics and advanced photonics [1].

Nanostructured powders of yttrium oxide doped with terbium Y_2O_3:Tb^{3+} (green phosphor) were synthesized by the thermochemical method (combustion) under the conditions of oxidation–reduction of nitrate salts of yttrium and terbium in the presence of urea and hexamethylene-tetramine as a complex fuel. The combustion at the temperature of ignition 350°C and calcination 650°C provides the powders preparation with the average size particles 102 nm. The products were characterized by X-ray diffraction, scanning electron micro-scopy, and IR-spectroscopy.

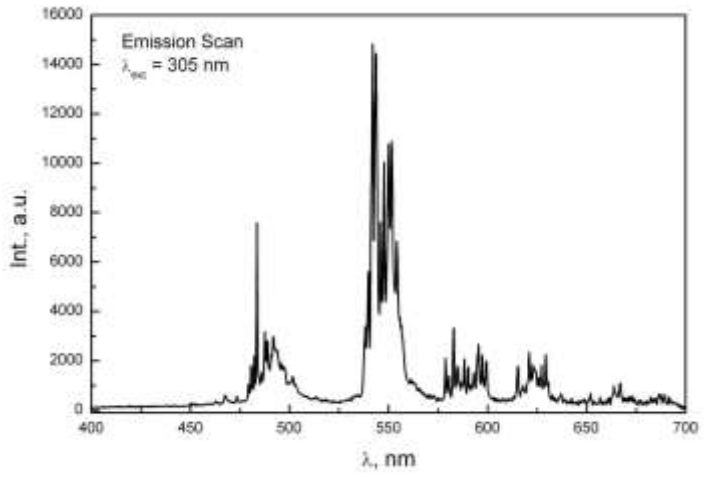

Fig. Luminescent spectra Y_2O_3:Tb^{3+}at excitation of 305 nm

The doping of yttrium oxide by terbium ions causes multiband luminescence with bands in green region (537–563 nm) at excitation wavelength of 305 nm (Fig.).

1. R. Withnall, M.I. Martinez-Rubio, G.R. Fern *et al.* J. Opt. A: Pure Appl. Opt. **5** (2003) S81.