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# Blue light emitting $Y_2O_3:Tm^{3+}$ nanophosphors with tunable morphology obtained by bio-surfactant assisted sonochemical route

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## Abstract

Modified sonochemical route was used to prepare  $Y_2O_3:Tm^{3+}$  (1-11 mol %) nanophosphor using *Mimosa pudica* (M.P.) leaves extract as bio-surfactant. The prepared samples were exhibited high crystalline nature with various morphologies. This was due to sonochemical experimental reaction took place between cavitation bubbles and nearby solution. The average crystallite sizes of the prepared samples were about 15 nm to 21 nm as obtained from PXRD and TEM analysis. The ultraviolet visible absorption spectra showed prominent bands with an energy gap varied from 5.73 eV to 5.84 eV. Photoluminescence (PL) emission spectra shows the prominent blue light emission peak at ~ 456 nm attributed to  $^1D_2 \rightarrow ^3F_4$  transitions of  $Tm^{3+}$  ions. The Judd–Ofelt intensity parameters were estimated by using PL emission spectra. The photometric characteristics of the prepared compounds were very close to the blue colour of NTSC standards. So the results were fruitful in making use of  $Y_2O_3:Tm^{3+}$  nanophosphor as an alternative material for effective blue component in WLED's.

**Keywords:** Sonochemical method; *Mimosa pudica*; Photoluminescence; Judd – Ofelt analysis.

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