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# Vibrational and spectroscopic analysis of white light emitting $\text{Bi}_2\text{SiO}_5$ nanophosphor

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A series of  $\text{Dy}^{3+}$  ion activated  $\text{Bi}_2\text{SiO}_5$  nanophosphors were synthesized by the hydrothermal and coprecipitation methods. Various structural and optical characterizations were made using X-ray diffraction, Scanning and Transmission electron microscopy, UV-Visible-Infrared absorption, Raman Spectroscopy, Photoluminescence, Time resolved luminescence techniques etc.  $\text{Dy}^{3+}$  ion doped samples yields characteristic bright yellow and blue emissions, on resonant excitation with 349 nm and 386 nm. The intensity ratio of the yellow/blue peaks was found to be function of Dy ion concentration and synthesis method. We have achieved white colour emission at 1.5 mol% Dy concentration, CIE coordinate (0.36, 0.4) of which fall well within gamut of white light. The time-resolved fluorescence reveals decrease in radiative lifetime values with increasing  $\text{Dy}^{3+}$  ions concentration. A comparison between the samples synthesized by different methods, and Dy ion concentrations has been made and detail photo-physics involved is presented in the article.

**Keywords:** Photoluminescence; Vibrational Analysis; Nanophosphor; Lanthanide elements.

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