

# Comparison of structural and luminescence properties of Dy<sub>2</sub>O<sub>3</sub> nanopowders synthesized by co-precipitation and green combustion routes

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## ABSTRACT

Dysprosium oxide (Dy<sub>2</sub>O<sub>3</sub>) nanopowders were prepared by co-precipitation (CP) and eco-friendly green combustion (GC) routes. SEM micrographs prepared by CP route show smooth rods with various lengths and diameters while, GC route show porous, agglomerated particles. The results were further confirmed by TEM. Thermoluminescence (TL) responses of the nanopowder prepared by both the routes were studied using g-rays. A well resolved glow peak at 353 °C along with less intense peak at 183 °C was observed in GC route while, in CP a single glow peak at 364 °C was observed. The kinetic parameters were estimated using Chen's glow peak route. Photoluminescence (PL) of Dy<sub>2</sub>O<sub>3</sub> shows peaks at 481, 577, 666 and 756 nm which were attributed to Dy<sup>3+</sup> transitions of 4F<sub>9/2</sub>!6H<sub>15/2</sub>, 6H<sub>13/2</sub>, 6H<sub>11/2</sub> and 6H<sub>9/2</sub>, respectively. Color co-ordinate values were located in the white region as a result the product may be useful for the fabrication of WLED'S.

**Keywords:** Chemical synthesis, Phosphor, Luminescence, Crystal structure