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## Effect of Tb<sup>3+</sup> concentration on the structure and photoluminescence of Zn<sub>0.5</sub>Mg<sub>0.5</sub>Al<sub>2</sub>O<sub>4</sub>:x% Tb<sup>3+</sup> (0 < x ≤ 1) nanophosphor synthesized by citrate sol-gel method

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The un-doped zinc magnesium aluminate (Zn<sub>0.5</sub>Mg<sub>0.5</sub>Al<sub>2</sub>O<sub>4</sub>) and Tb<sup>3+</sup> doped nanophosphor were prepared by the citrate sol-gel method at low temperature (80 °C) and thermally treated at 1000 °C for 3 hrs. The effect of varying the x% Tb<sup>3+</sup> in the range of (0 < x ≤ 1) on the structure, morphology and optical properties of the Zn<sub>0.5</sub>Mg<sub>0.5</sub>Al<sub>2</sub>O<sub>4</sub> nanophosphors were investigated. The Energy dispersive x-ray spectroscopy (EDS) analysis confirmed the presence of the expected elements (Zn, Mg, Al, O and Tb). The x-ray diffraction (XRD) analysis confirmed that the nano-powders crystallized into the mixed cubic spinel structures of Zn<sub>0.5</sub>Al<sub>2</sub>O<sub>4</sub> and Mg<sub>0.5</sub>Al<sub>2</sub>O<sub>4</sub>. Tb<sup>3+</sup> doping influenced crystallinity of the prepared powder samples. The crystallite size and particle morphology were affected by variation in the Tb<sup>3+</sup> concentration. Different emission peaks located around 390, 490, 546, 584 and 620 nm from Tb<sup>3+</sup> transitions were observed. The most intense emission peak was found at 546 nm, which is ascribed to 4D<sub>4</sub> → 7F<sub>5</sub> transition from Tb<sup>3+</sup>. Increasing the Tb<sup>3+</sup> concentration up-to x = 0.4% lead to luminescence intensity enhancement, while further increase of Tb<sup>3+</sup> concentration lead to concentration quenching. CIE colour coordinates confirmed that the emission colour can be tuned from blueish → greenish by varying the Tb<sup>3+</sup> concentration.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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