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Bright Luminescence in Tb^{3+}-Doped $BaMO_4$ (M: W, Mo) nanophosphors Prepared by Coprecipitation Method

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$BaMO_4$ host matrices (M: W, Mo) doped with different Tb^{3+} concentrations (2.0, 4.0, 6.0, 8.0, and 10 mol%) have been successfully prepared by the coprecipitation method at room temperature. Powder X-ray diffraction characterizing the as-prepared phosphors, showed a stable characteristic scheelite-type structure for all of the studied compounds, with no phase segregation, as confirmed by Rietveld Refinement, and average crystallite size was estimated to be about 30 nm. The optical behavior of the prepared materials was studied by Diffuse Reflectance Spectroscopy (DRS) and Photoluminescence Spectroscopy (PL) in the UV-Vis range, displaying characteristic pure green emission (Fig 1). The emission spectra of the $BaMO_4$:Tb^{3+} materials are dominated by the highest intensity narrow band of the intraconfigurational $^5D_4 \rightarrow {}^7F_5$ transitions in the green region (ca. 540 nm) arising from the Tb^{3+} ions. Furthermore, Tb^{3+} ion compounds present bands attributed to the $^5D_4 \rightarrow {}^7F_6$ transitions, in which it is noted that, with the increase in the percentage of Tb^{3+} ions, the intensity of the absorption bands characteristic of this ion also increases

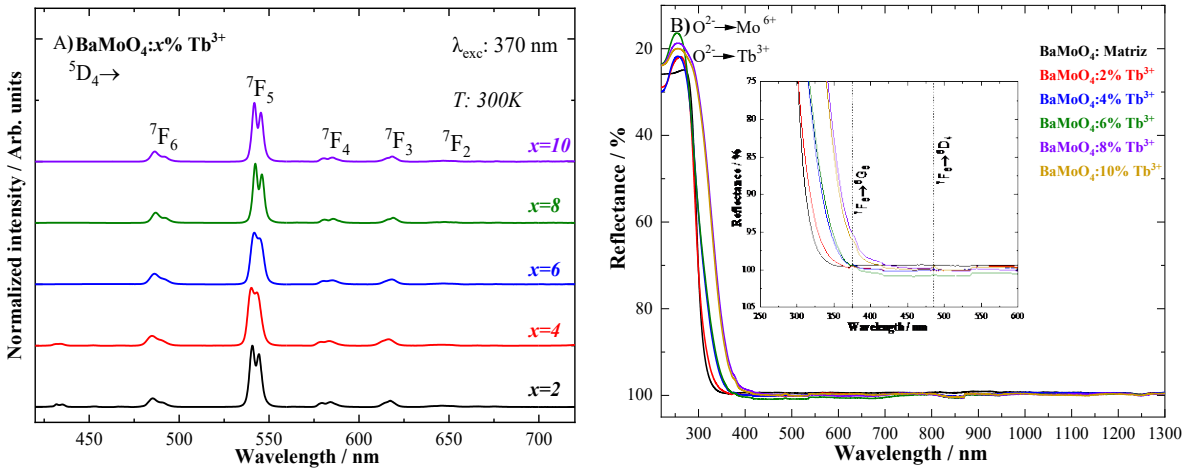

Figure 1. Emission spectra of $BaMO_4$:x% Tb^{3+} under 370 nm excitation (A) and DRS spectra of $BaMO_4$:x% Tb^{3+} materials, where x=0, 2, 4, 6, 8 and 10 mol. Inserts present Tb^{3+} intraconfigurational transitions in the UV-Vis range

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References

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