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Structural, photoluminescence and XPS properties of Tm^{3+} ions in ZnO nanostructures

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ABSTRACT:

In the present study, a succession of thulium (Tm)-doped zinc oxide (ZnO) nanostructures samples were prepared by sol-gel method using zinc acetate dihydrate, thulium nitrate pentahydrate and sodium hydroxide species with absolute ethanol as solvent. The X-Ray diffraction (XRD) revealed phase purity (hexagonal Würtzite structure) and high crystalline nature of both Tm^{3+} doped and undoped ZnO samples. Furthermore, defects mediated levels in the samples were investigated by means of photoluminescence (PL) spectroscopy. Finally, Tm 4d core level was detected in ZnO: 0.5 mol% Tm^{3+} sample from high resolution X-Ray Photoelectron Spectroscopy (XPS) scan.