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# Effect of Growth Techniques on the Structural, Optical and Electrical Properties of Indium doped TiO<sub>2</sub> Thin Films

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## Abstract

We have investigated the effect of the growth techniques on the structural, the electrically and optically active defects in Indium doped TiO<sub>2</sub> thin films grown by pulsed laser deposition (PLD) and sputtering techniques. X-ray diffraction (XRD) and Raman spectroscopy patterns revealed both rutile and anatase phases for the sputtering samples. On the other hand, only the anatase phase was observed for the PLD samples. The photoluminescence (PL) spectra have unveiled several peaks which were explained by defect related optical transitions. Particularly, the PL bands are fully consistent with anatase/rutile TiO<sub>2</sub> phases and the formation of In<sub>2</sub>O<sub>3</sub> during the preparation of our samples. It was also observed that at -4 V reverse bias, the PLD samples have lower leakage currents ( $\sim 1.4 \times 10^{-7}$  A) as compared to the sputtering samples ( $\sim 5.9 \times 10^{-7}$  A). In addition, the PLD samples exhibited lower ideality factors and higher barrier heights as compared to those grown by

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