FABRICATION OF ZINC OXIDE THIN FILMS USING SOLUTION IMMERSION METHOD

AMIR HAFIZ BIN KHAIRUDIN

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Amir Hafiz Bin Khairudin

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ABSTRACT

FABRICATION OF ZINC OXIDE THIN FILMS USING SOLUTION IMMERSION METHOD

Zinc oxide (ZnO) nanoparticles were successfully synthesized by solution immersion method. The zinc nitrate hexahydrate was use as a precursor, hexamethylenetetramine as a stabilizer and gold seeded was used as a function of catalyser. The zinc oxide thin films obtained were annealed at different temperatures (350 °C, 400 °C, 450 °C and 500 °C). The effect of annealing temperature on the crystal structure, optical and electrical properties of the ZnO nanoparticles were characterized using X-ray diffraction (XRD), UV-Vis spectrometry, photoluminescence spectrometry and I-V measurement. XRD results showed that all the peaks obtained were corresponding to the hexagonal wurtzite structure. Photoluminescence spectrometry showed two peaks which is high intensity at wavelength of range 375 nm- 425 nm and higher at 450 nm- 800 nm and this indicates clearly two emission bands corresponding to the band edge emission and defects related emission respectively. UV-Vis spectrometry graph obviously showed high absorbance at wavelength 280 nm- 350 nm which means that all the films are highly absorbance at ultraviolet region. Meanwhile, I-V measurement exhibits the highest slope at 500 °C and then followed room temperature (RT), 350 °C, 450 °C and 400 °C. The current at a given voltage for the films at 500 °C higher than other annealed temperature. This indicates that the annealing temperature at 500 °C increases the production of electron-hole pairs.