

**EFFECT OF SOLVENT VAPOUR ANNEALING ON OPTICAL
PROPERTIES OF ZNO NANOSTRUCTURE FILMS**

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ABSTRACT

EFFECT OF SOLVENT VAPOUR ANNEALING ON OPTICAL PROPERTIES OF ZNO NANOSTRUCTURE FILMS

In this present work the optical properties of ZnO thin film have been studied and prepared by sol-gel spin coating process. Zinc acetate dihydrate, ethanol and diethanolamine were used as starting materials, solvent and stabiliser. Thin films of ZnO were prepared on glass substrate at 500°C. Its sol-gel was spin coated for 60 second at 1000 rpm, 2000 rpm and 3000 rpm for different spin coating speed rate and spin coated for 60 second at 1000 rpm with various times of solvent vapour annealing which is 0 min, 10 mins, 30 mins and 60 mins. These parameters were used to investigate the influence and effect on the fabrication on the thin films. Optical properties have been performed as well as determine the thin film surface thickness. Optical characterization was analysed using the UV-VIS spectroscopy and Photoluminescence spectroscopy. While the surface thickness was analysed using the profilometer. All film exhibits a transmittance about >90% along the visible range up to 800 nm and a sharp absorption onset about 380 nm and the optical band gap energy of the thin film is found to be around of 3.26 eV. Intense UV photoluminescence properties is observed and showed significant changes in the optical properties providing evidence for several types of intrinsic defects in ZnO thin film such as oxygen vacancy (V_o), oxygen-oxygen vacancy (V_o^+), zinc vacancy (V_{Zn}), singly charge zinc vacancy (V_{Zn}^+), antisite oxygen (O_{Zn}), antisite zinc (Zn_o), interstitial oxygen (O_i) and interstitial zinc (Zn_i) in ZnO thin film. The thicknesses of the films decreased with increase in coating speed and increase with the increasing in times of solvent vapour annealing. The intense UV emission with narrow FWHM was also obtained from the ZnO thin film.