PHOTORESPONSE ON NANOSTRUCTURE OF ZINC OXIDE THIN FILMS PREPARE BY SOL-GEL SPIN COATING TECHNIQUE

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AMIR AKMAL BIN MD SHOKOR
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR

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Amir Akmal bin Md Shokor
Faculty of Electrical Engineering
Universiti Teknologi MARA (UiTM)
Shah Alam, Selangor Darul Ehsan
Malaysia

ABSTRACT

Zinc oxide (ZnO) thin films have been prepared by sol-gel spin coating method on glass substrate. ZnO thin films of different thickness were investigated. Optical properties measure from UV-Vis spectrophotometer shows the optical band gap increased when the thin film thickness increased. The surface roughness also increased as the thickness increased shows from atomic force microscopy (AFM) measurement. Field emission scanning electron microscopy (FESEM) images reveal the increasing of porous among grains when the ZnO thin film increased. Current-Voltage (I-V) measurement result shows there is photo response characteristic of ZnO thin film when illumination state show higher conductivity than dark state.

PHOTORESPONSE ON NANOSTRUCTURE OF ZnO THIN FILMS PREPARED BY SOL-GEL SPIN COATING TECHNIQUE

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CHAPTER 1

INTRODUCTION

This chapter contains the overview of everything related to the project and summary of the project works. This also includes background study, problem statement, objectives, scope of work and thesis organization

1.1 BACKGROUND OF STUDY

The wide range of useful properties displayed by ZnO has been recognized for a long time. Now a day zinc oxide (ZnO) is the most common material used in commercial devices due to its low cost. ZnO is a versatile n-type semiconductor finding application of gas sensors, transparent conducting electrodes to short wavelength optoelectronics devices. [1] ZnO has the characteristic of a semiconductor with a wide direct band gap (3.44eV) and have a large exciton binding energy. This large exciton binding energy indicates that efficient excitonic emission in ZnO can persist at room temperature and higher. ZnO has a large piezoelectric constant which in piezoelectric materials, an applied voltage generates a deformation in the crystal and vice versa.

These materials are generally used as sensors, transducers and actuators. ZnO also has a strong sensitivity of surface conductivity to the presence of adsorbed species which make the conductivity of ZnO thin films is very sensitive to the exposure of the surface to various gases. Other properties of ZnO are high thermal conductivity. High thermal conductivity translates into high efficiency of heat removal during device operation. One