PROPERTIES OF ZINC OXIDE/GRAPHENE OXIDE NANOSTRUCTURED FOR UV SENSOR APPLICATION

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ABSTRACT

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The effect of graphene oxide (GO) on the structural and optical properties of zinc oxide (ZnO) nanorods have been investigated for UV sensor applications. GO at different weight (0.05, 0.10 and 0.15g) have been mixed with ZnO solution and deposited using aqueous solution immersion method. All the samples have been characterized using X-ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FESEM) and UV-visible (UV-vis) spectroscopy. Based on the XRD pattern, all the samples show the highest peak intensities along *c*-axis orientation of (0 0 2) plane. The GO:ZnO films prepared at 0.05g of GO weight percentage has the highest peak intensities along *c*-axis orientation of (0 0 2) plane. The diameter size of ZnO and GO:ZnO nanorods at 0.05, 0.10 and 0.15g weight percentage were 211, 64, 50 and 60 nm, respectively. The UV-vis results show that the GO:ZnO which prepared at 0.05g have the highest absorbance in UV range. Therefore, by adding GO into ZnO will influence the structural and optical properties of pure ZnO which is suitable for UV sensor applications.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

1.1.1 Zinc Oxide

Zinc Oxide (ZnO) is natively a n-type semiconductor material with a wide band gap energy of 3.37eV and a high exciton binding energy of 60 MeV. Chebil *et al.*, (2016) stated that ZnO is most popular chemical compounds that have many impressive properties such as low-cost material, non-toxicity, material stability, wide availability and high transparency. The properties of ZnO can be adjusted by controlling size and morphology (Afaah *et al.*, 2013).

ZnO is a hexagonal wurtzite structure with the divalent cation (Zinc) in tetrahedral coordination with oxygen, and each oxygen in tetrahedral coordination with four divalent cations (zinc) was clarified by researcher Partyka (2013).

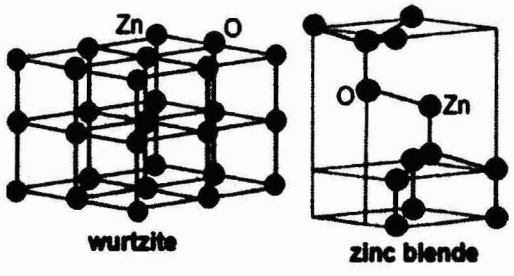

Figure 1.1.1 A schematic representation of ZnO crystal structures: wurtzite and zinc blende. The Zn and O atoms are marked with ash and blue circles respectively (Modi, 2015).