FACULTY OF ELECTRICAL ENGINEERING
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In the name of ALLAH S.W.T, the most Merciful and most Gracious

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ABSTRACT

This research presented the preparation of titanium dioxide (TiO_2) arrays that was fabricated on fluorine-doped tin oxide (FTO) glass based UV sensor. The deposition temperature influences the diameter, length, and density of the nanorod. Detection of ultraviolet (UV) light is usually based on the photoconductivity effect on semiconductor. The prepared TiO_2 nanorod arrays exhibited high sensitivity and high speed of the photoresponse. The surface morphology showed the result of a sample of nanorod array that was produced when it synthesized on the substrate by using field-emission scanning electron microscopy (FESEM). The crystallinity of TiO_2 in rutile phase were investigated via and micro-Raman spectroscopy X-ray diffraction (XRD). Moreover, these nanorod arrays exhibited the excellent absorbance at wavelength less than 400 nm in the UV light.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF STUDY

The structure and microstructure of systems containing nanoparticles have recently been investigated nowadays. Nanotechnology is science and technology where study of extremely small things and the scale range of nanotechnology is about one to hundreds nanometres [1]. Nanotechnology must be build its device from atom and molecules. Most current research nowadays is related to functional of nanotechnology. There are many applications where nanostructure material are mostly used to produce magnetic properties or optical electronics. Nowadays, titanium dioxide (TiO_2) is widely research by researchers because of the many interesting chemical, and physical properties that are very suitable for a variety of applications and it also more useful in optical device for anti-reflection coatings because titanium dioxide has higher optical transparency in visible and near infrared regions, high refractive index, and high corrosion resistance and chemical stability [2]. Other than that, titanium dioxide also widely used because it consists of three crystalline structure that are rutile, anatase, and brookite [3, 4]. There are many of approaches that have been successfully developed to prepare the anatase of TiO_2 over the few pas years ago. For example, they had been successfully to prepare anatase of nanoparticles, thin film, nanotubes, nanowires, and nanorods [5-7]. In this study, to produce an aligned TiO_2 nanorod array structure, a Schott bottle with cap clamps was used. The purpose of using this cap clamps is to compressing pressure at elevated temperature. This methods is low-cost, simple, and fast for rapid growth of TiO_2 nanorod array structure.