EFFECT OF SUBSTRATE TEMPERATURE ON THE ELECTRICAL PROPERTIES OF NANOSTRUCTURED ZINC OXIDE THIN FILM FOR AMMONIA SENSOR APPLICATION

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ABSTRACT

This project focuses on the effect of substrate temperature on the electrical properties of nanostructured zinc oxide thin film for the ammonia sensor application. Nanostructured zinc oxide thin film has been deposited on the thermally oxidized SiO_2 using radio frequency (RF) magnetron sputtering at various temperatures range from room temperature to 500^{o}C. The thickness of the thin film was measured using surface profiler. The surface morphology and grain size were measured using field emission scanning electron microscopy (FESEM). The grain size were increased with the increased of substrate temperature. The effect of substrate temperature on the electrical properties and sensitivity has been investigated. The highest percentage of sensitivity is at room temperature that is 94.5%.

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CHAPTER 1

INTRODUCTION

1.1 NANOTECHNOLOGY

Nowadays, the scientists around the world have given more attentions on nanotechnology. Nanotechnology introduced new dimension to science and technology with the possibilities of manipulating atoms and molecules at the nanometer level. With nanotechnology, the application are more advance and effects of various technological domains including advance materials, biotechnology and pharmacy, scientific tools, industrial process and electronic field [1].

In new trend, scientists and researchers has aggressively got involved in the nanotechnology field through academic research and corporation directing their Research and Development activities to explore in nanotechnology field opportunities. The nanotechnology field was enabling the development of technology in instrumentation which is start to manipulating the atomic or molecular scale of nanostructure. This technology also offered industrial to create new nanoproducts with enhancement of the performance parameters of electronic, food, biological and others industries [1].