THE STUDY OF THERMALLY STIMULATED CURRENT ON ZnO NANOSTRUCTURES

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ABSTRACT

The Study of Thermally stimulated Current on ZnO Nanostuructures

Zinc Oxide nanostructure is the most of unique structure in the type of semiconductor. It has a specific properties and characteristics that can introduce by various morphologies. In this project, we use sol-gel method and spin coating process to characterize the properties. The XRD (X-Ray Diffraction) characterization observed the crystalline structural and the element composition of sample. This unique nanostructure we can use to get the information of the electric effect of the substrate. We use thermally stimulated current (TSC) techniques that gain the information. We found the current increased with increasing the temperature. The information is about the activation energy. We found the very small value of activation energy in the group of the below room temperature. The value of activation energy is 0.05 eV. In other word, they are all about the electric effect of the substrates.

CHAPTER 1

INTRODUCTION

1.1 Background

Nanostructured materials have received much attention because of their novel properties, which differ from those of bulk materials. Control of dimension and morphology of material has aroused the interest of researchers in the design of functional devices due to the optical and electronic properties of nanometer and micrometer sized materials, which determine their applications, can be adapted by varying their size and shape (A.Bayandori Moghaddam et al, 2008).

Nanostructured ZnO materials have received broad attention due to their distinguished performance in electronics, optics and photonics. From the 1960s, synthesis of ZnO thin film has been active field because of their applications as sensors, transducers and catalyst. With reduction in size, novel electrical, mechanical, chemical and optical properties are introduced, which are largely believed to be the result of surface and quantum confinement effects (Zhong Lin Wang, 2004).

Zinc Oxide is an organic compound and can't soluble in water. Zinc Oxide (ZnO) is an II-VI compound semiconductor in the periodic table. ZnO is largely to ionic bonding. It has a wide direct bandgap of 3.37 eV and a large excitonic binding energy of about 60 meV at room temperature (B.J Chen et al, 2004). ZnO is a hexagonal wurtzite-type cubic zinc blend semiconductor. Wurtzite zinc