MEMRISTIVE BEHAVIOR DEPENDENCE ON POST-DEPOSITION ANNEALING PROCESS OF SPIN COATING TIO2 THIN FILMS

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ABSTRACT

This project is on the fabrication and electrical characteristic of memristive device with titanium dioxide (TiO_2) as an active layer on two different substrates which are indium tin oxide (ITO) and glass. The memristive device was prepared by spin coating method and deposition annealing process. This method shows that the influence of physical morphologies and to investigate on the memristive behavior of titanium dioxide (TiO_2) thin film. The spin coating time and temperature has been varied in this work. The time was varied for 20 min, 40 min and 1 hour while the temperature was 250^0C, 350^0C, and 450^0C. Current–voltage (I-V) curves of the samples were taken from the voltage loop ranging 0V to -5V, -5V to 5V then back to 0V and also from -5V to 5V then back to -5V to show the bias dependent switching characteristics that equivalent the electrical behavior reported for memristor. All the memristive device thickness has been taken using surface morphology method.

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CHAPTER 1

INTRODUCTION

Chapter 1 described us about the introduction to this project. There are five sections in this chapter. First section is elaborated about the background of study for this project. Section two is discussed about the problem statement for this project. The objective that related to the problem statement and this project was discussed in section three. The fourth section is explained about the scope of work for this project. Lastly, the organization of thesis described in the last section of this chapter five.

1.1 BACKGROUND OF STUDY

In 1971, Leoh O.Chua has found the fourth basic circuit element which is called memristor. Memristor was new two terminal circuit elements, which is a relationship between charge and flux [1]. Memristor is a memory resistor which is "to remember its history" being explained by R.Stanley Williams in IEEE Spectrum on December 2008. Recently, electrical switching in thin-film devices has concerned a lot of scientist attention, because such a technology may enable functional scaling of logic and memory circuits well beyond the limits of complementary metal–oxide–semiconductors [1]. Memristor remember its recent resistance when voltage that has been applied is turn off, if the voltage is off since that time and does not change, the resistance is still in the state where it last turn off until the next time it is turn on [2].