

MEMRISTIVE BEHAVIOUR OF PLASMA TREATED TITANIA THIN FILMS

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ACKNOWLEDGMENT

In the name of ALLAH, the most Merciful and most Gracious

I would like to thanks my reserch supervisor, Dr. Sukreen Hana Herman for her guidance, advice and encouragement during the research. I also would like to thanks and appreciation to Aznilinda Zainuddin for give me the share knowlage and suport in this experiment. Spacial thanks to Universiti Teknologi MARA for NANO – Electronic Center (NET) and NANO – Science Center (NST). To technicians, Mr. Danial, Mr Azuan Mr Shahril, Mr Suhaimi and Mr Azlan for their assistance in lab. Finaly for my belove family and friends for understanding, love, encouragement and support during my research.

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January 2013

ABSTRACT

This paper demonstrates the fabrication of based memristive device by sputtering method. Titania thin film was deposited on a glass substrate sandwiched with platinum layer as its metal electrode. The sputtered titania layer was exposed to argon plasma to create the oxygen vacancies that are needed to enhance the memristive behavior. In this work the plasma treatment time was varied for 5, 10, and 15 minutes. In order to analyze the surface TiO_2 , we use scanning electron microscopy FESEM. We have also done the Raman measurement analyse phase structure of the titania layer. The reading I-V measurement was taken to analyze the memristive behavior at different plasma treatments. The current-voltage (I-V) was taken at loop 0 V to -5 V, -5 V to 5 V and 5 V to 0 V at every sample. We have observe that the sample with 5 and 15 minute plasma treat at 1 hour and sample 10 minute plasma treat at 30 minute, exhibits better memristive compared before anneal process.

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CHAPTER 1

INTRODUCTION

In this chapter will introduce about the project research. On this chapter, there are five sub sections. First, the section consist the background of study of this project. After that, the problem statement will discussed for this project in sub section two. Then we come out the related objective of the project. We will see the scope of work this project in sub section four. Last but not less we discuss the organization of thesis on the sub section.

1.1 BACKGROUND OF STUDY

As we understood, there are three basic passive devices: resistor, capacitor and inductor. In 1971, theory memristor as fourth circuit element has been discovered by Dr. Leon Chua [1]. The memristor is two terminals device [2]. The memristor's resistance depends on the magnitude and polarity of voltage apply to it and the length of time that voltages has been applied [1-2].

The memristor behave like resistor with dynamic resistance so that the memristance is constant [2]. From Figure 1.1 the theory discovered resistor has relationship with current and voltage($dv = R.di$) while the capacitor with charge and voltage($dq = C.dv$),