# MEMRISTIVE BEHAVIOR OF LATERAL METAL-INSULATOR-METAL STRUCTURED ZnO THIN FILM

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# ABSTRACT

A sol gel spin coated Zinc Oxide (ZnO) based memristive device was fabricated and investigated for its memristive behavior. In this paper, the effect of spin speed and different structure of the memristor were studied. Two type of memristor structures were fabricated; vertical and lateral structures. In vertical structure, the ZnO layer was sandwiched between two Pt metal layers on the top and bottom, while in lateral structure, the ZnO layer was sandwiched by Pt metal layers on both sides, to form the metal-insulator-metal (MIM) configuration of a typical memristor. Each structure was fabricated by sol-gel spin coating method while varying the spin speed from 2500 rpm to 3500 rpm. We found the suitable method to fabricate the lateral-MIM structure by which the resistive switching behavior of ZnO thin film was observed.

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# CHAPTER 1

# INTRODUCTION

## 1.1 BACKGROUND STUDY

Memristor is the newest fundamental passive circuit element besides inductor, resistor and capacitor discovered by Prof Leon Chu Hua in 1974 [1].The memristor is basically the combination between memory and resistor. It is a two terminal circuit that creates a relationship between charge and magnetic flux [2]. A device is called a memristor when the I-V characteristics exhibit the hysteresis loop shown in Figure1.1 [3]. Since Strukov*et al.* succeeded in fabricating a memristor based on $TiO_2$ (titanium dioxide) film [4], many researchers have been interested in this field. There are many applications of memristor. One of the applications is a non-volatile memory which can replace SRAM and DRAM [5]. Besides that, a memristor can be an artificial brain because of its capability to store different resistance based on voltage pulses [6].

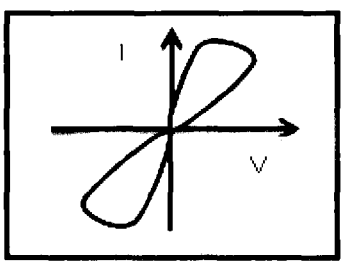


Figure 1.1: Hysteresis loop