EFFECT OF MGO IMMERSION TIME ON DIELECTRIC LAYER PROPERTIES OF ZNO/MGO FILMS

This thesis is presented in partial fulfilment for the award of the

Bachelor of Engineering (Hons) in Electronic

Universiti Teknologi MARA

(JAN 2013)

MOHAMMAD SYAFIQ 'AFIF BIN MOHAMMAD RASHIDI(2009794581)
Faculty of Electrical Engineering
Universiti Teknologi MARA
40450 Shah Alam, Malaysia

ACKNOWLEDGMENT

In the name of ALLAH S.W.T, the most Merciful and most Gracious

Firstly, I would like to express thanks my research supervisor, Miss Raudah Abu Bakar for her advices, encouragement and guidance throughout the research. My thesis would not be possible without her supervision. I also would like to express my sincere appreciation to Miss Habibah Zulkefle for giving her time to share knowledge and support about this experiment. My special thanks also to Universiti Teknologi MARA (UiTM) especially for the NANO – Electronic Centre (NET) and NANO - Science Centre (NST) technicians, Mr. Shahril, Mr. Suhaimi, Mr Daniel, Mr. Azwan and Mr. Azlan for their assistance in the lab. Finally I would like to express my thanks to my family and friends for their love, encouragement, understanding, and support during my entire research period.

Mohammad Syafiq ‘Afif Bin Mohammad Rashidi
Universiti Teknologi MARA

Jan 2013

ABSTRACT

This research work, focuses on the deposition of multilayer ZnO/MgO using immersion method deposited at different immersion time. The multilayer were deposited at 2, 4, 6, and 8 hours immersion time. The resistivity values obtained were varied in the range of 12.5 to 20.0 kΩ.cm which is due to the changes in carrier mobility and scattering. It was also found that, the leakage current, *J* was below than 10^{-8} A.cm^{-2} which is suitable for dielectrics. Some surface modification were observed as the immersion time increased from 2 to 8 hours which also reflect to the variation in resistivity, leakage current and *k* values obtained. The formation of flakes like structure was observed for multilayer films with 4 hours immersion time which leads to the enhancement in *k* value at high frequency region.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

This chapter describes about the introduction to this project. There are five sections in this chapter. First is the background study for this project. Followed by the discussion on the problem statement and the objectives of the project. Then the scope of works involved are explained in the following section. Lastly, the organization of thesis is described in the last section.

1.1 BACKGROUND OF STUDY

Nowadays, people are interested in low cost deposition techniques which also reflected to the deposition multilayer thin film. Multilayer thin film consists of alternating layers of two different materials [1]. Multilayer thin film are recently use for microelectronic fabrication, packaging and protection or for modifying the optical properties of a surface [2]. There are many materials that have been used to form multilayer such as multilayer ZnO/MgO and Polyimide (PI) multilayer. Recently, Sujira Promnimit and Joydeep Dutta have fabricated the multilayer thin films by Layer by Layer (LBL) method and they concluded that by increasing the number of deposition cycles, the film thickness could be increased which lead to a reduced roughness induced by filling defect structures in the films [2].