GENERATION OF RFIC ELECTRODE PATTERNS USING ELECTRON BEAM LITHOGRAPHY AND WET ETCHING CHARACTERISTIC OF PZT THIN FILM

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

Bachelor of Electrical Engineering (Hons.)

UNIVERSITI TEKNOLOGI MARA

SURIATI BINTI MUHAMAD

Faculty of Electrical Engineering

UNIVERSITI TEKNOLOGI MARA

40450 SHAH ALAM, SELANGOR

ACKNOWLEDGEMENT

All praises be to mighty Allah S.W.T., the Most Gracious, Most Merciful and Most Beneficent for giving me strength and blessing me through out the entire research and completion of this project. Peace upon our Prophet Muhammad S.A.W. who has given light to mankind.

Firstly, I wish to express my sincere appreciation and gratitude to my supervisor, Assoc. Prof. Dr. Zaiki Awang for the consistent consultation and invaluable advice throughout the preparation and completion of the project.

Secondly, I would like to thank to Cik Raudah Bt Abu Bakar for her cooperation, continuous support, guidance and willingness in sharing knowledge toward the accomplishing in this project.

My thanks also go to all lectures in Faculty of Electrical Engineering UiTM and to those who have devoted their time either directly or indirectly, especially friends for their ideas, support and a lot of contribution towards the success of this project.

Finally, I would like to express my love and thanks to my family for their encouragement and moral support throughout the years. You are the source of my strength and inspiration.

ABSTRACT

This thesis reports on the fabrication technique of electrode pattern using e-beam lithography and wet etching process on lead zirconate titanate (PZT) thin film. The patterns were created using *Raith* software. Polymethyl methacrylate (PMMA) resist was used in e-beam lithography process to form the pattern on the surface of the sample. The purpose of PMMA is to protect the PZT layer.

In order to find the most suitable etchant for PZT, the exposed areas on the PZT thin film were etched in various composition of wet etchant and were examined using scanning electron microscope (SEM). From the SEM images obtained, it was found that etching with the combination of $0.5HF:5HCl:10NH_4Cl:50H_2O$ for 10 second showed the best etching characteristic.

TABLE OF CONTENTS

CHAPTER 4 RESULTS AND DISCUSSION

CHAPTER 5 CONCLUSION AND FUTURE DEVELOPMENT