EFFECT OF ZINC OXIDE AND LEAD OXIDE ON THE PHYSICAL PROPERTIES OF BORATE BASED GLASS

MUHAMAD FARID ROSLI

Final Year project submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Physic
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JANUARY 2015

ACKNOWLEDGEMENTS

Upon my completion of this project, I would like to express my gratitude to many parties. Highest praise to Almighty Allah S.W.T for the blessing, guidance, and giving me strength to accomplish my Final Year Project (FYP). My heartfelt thanks go to my supervisor, Dr. Azman Kasim for his guidance and encouragement in completing my FYP. I would like to express my gratitude to Mr. Muhamad Sukri Muda, Kaharudin Bin Osman @ Omar, Mr. Abul Khamis and Master Students who facilitate my requirement and their advice during completing my dissertation. I also would like to express my gratitude to the Universiti Teknologi MARA in providing the instruments and the chemicals that I need to run my experiments.

My appreciation also goes to my parents for giving their supports along with Du'a during the completion this project. Finally, I am forever indebted to my supportive friends as they encourage me and share their ideas in completing my FYP.

Thank you,

Muhamad Farid Bin Rosli

ABSTRACT

EFFECT OF ZINC OXIDE AND LEAD OXIDE ON THE PHYSICAL PROPERTIES OF BORATE BASED GLASS

The glass samples were prepared using melt-quenching technique with chemical composition of $x(ZnO\text{-}PbO) \cdot (100\text{-}x)B_2O_3$ where x= 0, 5, 10, 15, 20, and 25 mol% to study the density, molar volume, corrosion rate, FTIR and XRD. The glass samples were prepared with certified reagent grade of PbO (purity 99.0%), ZnO (purity 99.0%), and H_3BO_3 (purity 99.8%). The densities of the glass samples are found increases as the PbO and ZnO concentration increase. Meanwhile, the molar volume decreases linearly with increasing of PbO and ZnO content. From the FTIR spectra results, there are several peaks that correspond to the stretching and vibrational of borate base glass functional group. The result on corrosion rates shows that acid solution has stronger corrosion capability than base solution. It was proven that the glass immersed with pH 4 solutions has the higher corrosion rate compare to the glass immersed in pH 9 solution. Meanwhile, the XRD result shows the absence of Bragg's peak thus confirmed the amorphous nature in all glass samples.

TABLE OF CONTENTS