MOISTURE AND SOLVENT UPTAKE IN VARIOUS TYPES OF RUBBER

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This report is submitted in partial fulfillment of requirement needed for the awards of Bachelor in Chemical Engineering (Hons)

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JULY 2017

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to Allah SWT for His never ending blessing throughout my life as a human and student. One of these many blessing that I will be eternally grateful for are my parents and my family. All those mental, physical and financial support that I've receive from them all these while has keep me going and turn me into a better person.

I am highly thankful to my research project's supervisor, Dr. Rahida Wati binti Sharudin whose guidances, wisdoms and patience have helps me to come out with a better thesis writing. All those critics and advices will always be the missed.

I would also like to extend my gratitude to my supplier, Syarikat Tenaga (Gemas) Sdn. Bhd. and Presco Sdn. Bhd. for providing me with rubber samples. Because of them, I am able to conduct my experiment and proceed with my thesis.

Last but not least, a special thanks to my classmates and friends who have been lending their hands and ears for me in completing this research project. May these 4 years of degree life are the best 4 years of your life.

ABSTRACT

The purpose of this study is to know the method to calculate the moisture uptake by rubber. The moisture uptake in rubber is investigated by using the equilibrium weight content method. This method helps us to find out the maximum fluid that can be absorbed by the two rubber samples, which are natural rubber and silicone rubber. The differences in water content for both rubbers are given by their matrix composition. Silicone rubber show more resistance to fluid compared to natural rubber due to its complex helical shape. Ficks' Law was also used to know the diffusity, D of fluid in of each sample. From this study too, we could find out the behavior of rubbers in different environments as well. Distilled water, toluene, ethanol, triethyl amine and ethanol amine are used as sources of fluid. The samples exhibited various behaviours such as swelling and shrinking as a result. Natural rubber dissolved in toluene and triethyl amine. Overall, the study proved that silicone rubber is a better water resistant compared natural rubber and different solvent have different effect on rubbers.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Rubber is a sticky, milky-coloured liquid obtained from plants. Rubber is categorized into two major types; natural latex rubber and synthetic rubber. Both of these types may have similarities but they also possess different chemical composition and process of making them. Natural latex rubber is made from runny, milky while liquid called latex that oozes from plant when they are cut. Many plants can produce latex but more half percent of the world's natural rubber are obtained from Heveabrasiliensis, a tree species widely known as the rubber tree. Natural rubber is a polymer of isoprene (also known as 2-methylbuta-1,3-diene) with the chemical formula $(C_5H_8)n$. Polymer are constructed from relatively small molecular fragments known as monomers that are combined together. The one third water and one third rubber particles is held in a form known as a colloidal suspension. Product made from natural rubber have enhanced properties and purity added to it which make it more flexible, has exceptional elongation, tear properties and recovery [1].

(a) (b)

Figure 1.1 Plants from which rubber can be made.

a) Partheniumargentatum, guayule, b) Heveabrasiliensis, rubber tree [1,3].