THE EFFECT OF HEAT ENERGY ON GELATION POINT OF SILICONE RUBBER

FATIN NAJWA BINTI CHE JAMIL

FACULTY OF CHEMICAL ENGINEERING

UNIVERSITY OF TEKNOLOGI MARA

SHAH ALAM

2017

ACKNOWLEDGEMENT

In preparing this project report, I would like to give my deepest appreciation to my supervisor Dr Rahida Wati Sharudin for willing to help me and contribute the ideas. She has help me a lot and giving me encouragement, guidance, and critics for me to improve myself in making this report. Without her continued support and interest, this research project would not have been the same as presented.

ABSTRACT

The study conducted was on the effect of heat energy on gelation point of silicone rubber. The test conducted will be mainly on the gelation point of silicone rubber. The objectives of this study is to determine the effect of heat energy and to determine the critical gel point. Gel point is a temperature at which substance freezes solid or no longer flow by gravity or usually act as liquid such as liquid silicone rubber. It occurs before mechanical reaction starts for example the strength, ductility, hardness, fracture or toughness. Critical gel point tc which is the time to reach gel point or the liquid-solid transition will be monitor and evaluated throughout the experiment. Gel point can only be reach by tested with different temperature. The experiment will be tested on the thermo kinetics study method by using DSC. The study had been compared with the Kamal's model for the validity of the experiment. The crosslinking process was been observed throughout the experiment.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

This study focus on effect of molecular weight on silicone rubber during gelation point. To determine gel point, consist of two methods by using thermal methods or rheological methods. Rheological method or rheo-kinetic is a method which need to monitor the evolution of network structure during gelation. The second method is a thermo kinetic study by using Differential scanning calorimetry (DSC) at different heating rates. This study is done to form crosslinks between the polymer chain to another to form covalent bond and ionic bond. Crosslinks can increase hardness and melting point but reducing the flexibility. Based on this study, it is focus on the thermo kinetic study by crosslinking kinetics liquid silicone rubber. Crosslink will be control to make it well connected and stable. The effect of molecular weight and gel fraction between crosslinks will be identified. The molecular weight between crosslinks (M_c) is a cure time that can be calculated by measuring the plateau rubber modulus of rheological properties and weight uptake of acetone (Journal of Applied Polymer Science, 2014).