

**A STUDY ON THE EFFECT OF
MICROWAVE RADIATION
EXPOSURE TIME ON THE
PROPERTIES OF DEVULCANIZED
EPDM WASTE**

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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TABLE OF CONTENTS

TABLE OF CONTENTS	Pages
ACKNOWLEDGEMENTS	i
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF SYMBOLS	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPETR ONE INTRODUCTION	1
1.1 Background of study	1
1.2 Problem statement	2
1.3 Significance of study	2
1.4 Objectives of study	3
CHAPTER TWO LITERATURE REVIEW	4
2.1 Ethylene Propylene Diene Monomers (EPDM)	4
2.1.1 Physicochemical properties	4
2.1.2 Recycle EPDM waste	5
2.1.3 Use of EPDM and recycle EPDM waste	5
2.2 Natural Rubber (NR)	6
2.2.1 Properties of NR	7
2.2.2 Use of NR	7
2.2.3 NR blend with Recycle EPDM	7
2.3 Method of devulcanization.	8

CHAPTER FOUR RESULTS AND DISCUSSION	22
4.1 Characterization and testing	22
4.1.1 Cure characteristics	22
4.1.2 Tensile properties	24
4.1.3 Hardness	27
4.1.4 Crosslink density and swelling behavior	28
4.1.5 Abrasion resistance	29
4.1.6 FTIR analysis	30
CHAPTER FIVE CONCLUSION AND RECOMMENDATIONS	33
5.1 Conclusion	33
5.2 Recommendations	33
CITED REFERENCES	35
APPENDICES	40
CURRICULUM VITAE	41

ABSTRACT

A STUDY ON THE EFFECT OF MICROWAVE RADIATION EXPOSURE TIME ON THE PROPERTIES OF DEVULCANIZED EPDM WASTE

The highly demanding of Ethylene-Propylene-Diene Monomer (EPDM) in industries due to its outstanding characteristic such as resistance to oxygen and ozone make the EPDM as one of the fastest-growing general purpose rubber nowadays. However, the demand may cause the increasing of the abundant waste rubber as it is difficult to dispose due to its crosslinks network which form during vulcanization. Thus, it lead to the rising of the land cost, environmental concerns and other problems. In order to manage this abundant waste rubber, a devulcanization process can be done. There are a lot of devulcanized method can be chose to handle the waste rubber. But devulcanized by microwave radiation is chosen in this research. Different exposure times (3, 5, 7 and 9 minutes) to the radiation were used. The cure characteristics, tensile properties, hardness, crosslink density, abrasion resistance and FTIR analysis of NR blends with devulcanized EPDM were measured. Results show that 5 minutes exposure time increased the tensile strength, tensile strain, hardness value and crosslink density. The formation of a new bond which is the S-O bond at 962.3 cm^{-1} 893 cm^{-1} and the disappeared of the C-S bond at 1272 cm^{-1} demonstrate by the FTIR spectra might be the factor of the best results obtained at 5 minutes of exposure time.