

TABLE OF CONTENTS

Acknowledgement	i
Abstract	ii
Table of Contents	iii
List of Tables	iv
List of Figures	v
CHAPTER 1 : INTRODUCTION	
1.1 Plastics	1
1.1.1 General Concept Of Plastics	1
1.1.2 Plastic Materials	1
1.1.3 Type Of Plastics	4
1.2 Tyre	5
1.2.1 General Introduction	5
1.2.2 Application Of Tyres	6
1.2.3 Tyre Components	6
1.2.4 Tyre Compounding	9
1.2.5 Tyre Industry In Malaysia	14
1.3 Plastics In Tyre Industry	15
1.4 Effect Of Plastics To Tyres	15
1.5 Objective Of Project	15
CHAPTER 2 : EXPERIMENTAL	
2.1 Material	17
2.2 Instrumentals	17
2.3 Procedure	18
2.3.1 Identification Of Materials By FTIR-Transmission	18
2.3.2 Identification Of Materials By FTIR-ATR	19
2.3.3 Thermal Analysis Of A Material By Using Differential Scanning Calorimeter	21
2.3.4 Softening Point Determination By Using The Automatic Ring And Ball Tester MC 754	23
CHAPTER 3 : RESULTS AND DISCUSSION	
3.1 FTIR Analysis	24
3.2 DSC Analysis	53
3.3 Softening Point Analysis By Ring And Ball Tester	67
CHAPTER 4 : CONCLUSION	
4.1 Findings	69
APPENDIX I	70
REFERENCES	95

LIST OF TABLES

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
1	Fillers for plastics	2
2	Compound requirements for different components in a tyre	8
3	Processing aids of rubber compound	10
4	Vulcanizing agents of rubber compound	11
5	Organic accelerators of rubber compound	12
6	Antidegradant of rubber compound	13
7	Fillers of rubber compound	14
8	The correlation of IR vibration with absorption	27
9	Test results of PE obtained by a DSC supplier, Mettler Toledo	54
10	Test results of plastics	55
11	Test results of plastics	56
12	Test results of softening point analysis	68

LIST OF FIGURES

<u>FIGURE</u>	<u>TITLE</u>	<u>PAGE</u>
1	Major components of a typical pneumatic tyre	7
2	FTIR Transmission spectrum of plastic wrapper of SDR20CV	28
3	FTIR Transmission spectrum of plastic wrapper of SDR10	29
4	FTIR Transmission spectrum of plastic wrapper of SDR 10CV	30
5	FTIR Transmission spectrum of plastic wrapper of KOSYN 1502	31
6	FTIR Transmission spectrum of plastic wrapper of KOSYN 1712	32
7	FTIR Transmission spectrum of plastic wrapper of Ubepol 150	33
8	FTIR Transmission spectrum of plastic bag of reclaimed rubber	34
9	FTIR Transmission spectrum of plastic bag of rubber crumbs	35
10	FTIR Transmission spectrum of plastic bag of curative	36
11	FTIR Transmission spectrum of plastic bag of small tyre ingredients	37
12	FTIR Transmission spectrum of plastic wrapper of SDR20CV	38
13	FTIR Transmission spectrum of plastic wrapper of SDR10	39
14	FTIR Transmission spectrum of plastic wrapper of SDR 10CV	40
15	FTIR ATR spectrum of plastic wrapper of KOSYN 1502	41
16	FTIR ATR spectrum of plastic wrapper of KOSYN 1712	42
17	FTIR ATR spectrum of plastic wrapper of Ubepol 150	43
18	FTIR ATR spectrum of plastic bag of reclaimed rubber	44
19	FTIR ATR spectrum of plastic bag of crumb	45
20	FTIR ATR spectrum of plastic bag of curative	46
21	FTIR ATR spectrum of plastic bag of chemicals	47
22	Schematic diagram of FTIR Transmission	24
23	Schematic diagram of FTIR-ATR	25
24	Penetration depth	25
25	Interference fringes	26
26	The cause of interference fringes	27
27	FTIR spectrum of low density polyethene	48
28	FTIR spectrum of low density polyethene + Butyl Acrylate	48
29	FTIR spectrum of linear low density polyethene	49
30	FTIR spectrum of linear low density polyethene	49
31	FTIR spectrum of high density polyethene	50
32	FTR spectrum of high density polyethene	50
33	Correlation of IR vibration with absorption	51
34	Correlation of IR vibration with absorption (continue)	52
35	The block diagram of DSC	53
36	DSC curve	54
37	DSC curve of PE obtained by Mettler Toledo	55
38	DSC curve of plastic wrapper of SDR 20 CV	57
39	DSC curve of plastic wrapper of KOSYN 1502	58
40	DSC curve of plastic wrapper of Ubepol 150	59
41	DSC curve of plastic bag of SDR 10	60
42	DSC curve of plastic bag of SDR 10 CV	61
43	DSC curve of plastic bag of rubber crumbs	62
44	DSC curve of small tyre ingredients	63

45	DSC curve of curative	64
46	DSC curve of plastic bag of reclaimed rubber	65
47	DSC curve of plastic wrapper of KOSYN 1712	66
48	Ring and Ball Assembly	67