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**NATURAL RUBBER-G-GLYCIDYL METHACRYLATE AND STYRENE/
POLY(METHYL METHACRYLATE) BLENDS**



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ริเริ่มปฏิกิริยาแบบปรีคอกซ์ งานวิจัยนี้ศึกษาผลของความเข้มข้นของตัวริเริ่มและมอนอเมอร์ อุณหภูมิของ
ปฏิกิริยา และระยะเวลาของปฏิกิริยา ต่อประสิทธิภาพการกราฟต์และการเปลี่ยนแปลงมอนอเมอร์ ยาง
ธรรมชาติกราฟต์ตรวจสอบด้วย FT-IR สเปกโตรสโกปีและการวิเคราะห์ NMR และศึกษาสมบัติเชิงกล
แบบไดนามิกและสถานะวิทยาของยางธรรมชาติกราฟต์ ภาวะที่เหมาะสมสำหรับการเตรียมยาง
ธรรมชาติกราฟต์คือ ความเข้มข้นมอนอเมอร์ 100 ส่วน ความเข้มข้นตัวริเริ่ม 2.5 ส่วนต่อ 100 ส่วนเนื้อ
ยาง และอุณหภูมิของปฏิกิริยา 60°C เป็นเวลา 10 ชั่วโมง

ยางธรรมชาติกราฟต์สามารถใช้ตัวประสานสำหรับพอลิเมอร์ผสมเอสทีอาร์ 5L และพอลิเมทิล
เมทาคริเลต ศึกษาผลของสมบัติเชิงกล เช่นความทนแรงดึง ความยืดเมื่อขาด ความทนทานการฉีกขาด
ความแข็ง และความทนแรงกระแทก เป็นฟังก์ชันกับปริมาณยางธรรมชาติกราฟต์ พบว่าพอลิเมอร์ผสม
เอสทีอาร์ 5L และพอลิเมทิลเมทาคริเลตไม่วัลคาไนซ์และวัลคาไนซ์ให้สมบัติเชิงกลที่ดีที่ปริมาณยาง
ธรรมชาติกราฟต์ 5-10 ส่วน นอกจากนี้ได้ศึกษาสมบัติเชิงกลของพอลิเมอร์ผสมยางธรรมชาติกราฟต์
และพอลิเมทิลเมทาคริเลต พบว่าความทนแรงดึง ความทนทานการฉีกขาด และความแข็งแรงเพิ่มขึ้นเมื่อ
เพิ่มปริมาณของพอลิเมทิลเมทาคริเลต ผิวหักโดยการดึงตรวจสอบด้วยสแกนนิ่งอิเล็กตรอนไมโคร
สโคปแสดงว่ายางธรรมชาติกราฟต์เป็นสารเชื่อมโยงเฟสและให้การยึดที่ดีระหว่างสองเฟสของพอลิ
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หลักสูตร...ปีโทแรกมีและวิทยาศาสตร์พอลิเมอร์...ลายมือชื่อนิสิต.....พัชรียา สุริยะไชย
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KEY WORD: GRAFT COPOLYMERIZATION / GLYCIDYL METHACRYLATE / REDOX INITIATOR

PACHAREEYA SURIYACHAI : NATURAL RUBBER-G-GLYCIDYL METHACRYLATE AND STYRENE/POLY(METHYL METHACRYLATE) BLENDS. THESIS ADVISOR: PROF. PATTARAPAN PRASASSARAKICH, Ph.D., THESIS CO-ADVISOR PROF. SUDA KIATKAMJORNWONG, Ph.D. , 106 pp. ISBN 974-03-1047-8.

Graft copolymer of glycidyl methacrylate and styrene onto natural rubber was synthesized by emulsion polymerization using cumene hydroperoxide and tetraethylene pentamine as a redox initiator. The effects of initiator and monomer concentration, reaction temperature and reaction time on grafting efficiency and monomer conversion were investigated. The grafted natural rubber was characterized by FT-IR spectroscopy and NMR analysis. Dynamic mechanical properties and morphology of grafted natural rubber were studied. The optimum condition for the preparation of grafted natural rubber was found to be at the monomer concentration of 100 phr, the initiator concentration of 2.5 phr and temperature of 60°C for 10 hours.

The grafted natural rubber product could be used as a compatibilizer for STR5L/PMMA blends. The mechanical properties such as tensile strength, elongation at break, tear strength, hardness and impact energy were evaluated as a function of grafted natural rubber content. The good mechanical properties of unvulcanized and vulcanized of STR5L/PMMA blends were obtained at 5-10 phr of grafted natural rubber content. The mechanical properties of grafted natural rubber/PMMA blends were also studied. The tensile strength, tear strength and hardness increased with increasing of PMMA content. The tensile fracture surface examined by scanning electron microscopy showed that the grafted natural rubber acted as an interfacial agent and gave a good adhesion between the two phases of blend.

Program...Petrochemistry and Polymer Science.....Student's signature *Pachareeya Suriyachai*
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CONTENTS

	PAGE
ABSTRACT (IN THAI).....	iv
ABSTRACT (IN ENGLISH).....	v
ACKNOWLEDGEMENTS.....	vi
CONTENTS.....	vii
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xiii
ABBREVIATION.....	xvii
CHAPTER 1 : INTRODUCTION.....	1
1.1 The Purpose of the Investigation.....	1
1.2 Objectives.....	2
1.3 Scope of the Investigation.....	2
CHAPTER 2 : THEORY AND LITERATURE REVIEW.....	4
2.1 Natural Rubber.....	4
2.1.1 Natural Rubber Latex.....	4
2.1.2 Concentration of Natural Rubber Latex.....	5
2.1.2.1 Concentration by Creaming.....	6
2.1.2.2 Concentration by Centrifugation.....	6
2.2 Standard Thai Rubber.....	7
2.3 Graft Copolymer.....	9
2.3.1 Glycidyl Methacrylate.....	10
2.4 Polymer Blends.....	11

CONTENTS (Continued)

	PAGE
2.5 Compatibilization.....	14
2.5.1 The Method of Compatibilization.....	14
2.5.1.1 Thermodynamic Miscibility.....	14
2.5.1.2 Addition of Block and Graft Copolymers.....	15
2.5.1.3 Addition of Functional Polymers.....	16
2.5.1.4 Reactive Blending.....	16
2.6 Literature Review.....	17
CHAPTER 3 : EXPERIMENTAL.....	22
3.1 Chemicals.....	22
3.2 Glasswares.....	23
3.3 Equipments.....	23
3.4 Procedure.....	24
3.4.1 Purification of Monomer.....	24
3.4.2 Preparation Grafted Natural Rubber.....	24
3.5 Determiration of The Grafted Natural Rubber.....	25
3.5.1 Determiration the Conversion of Grafted Natural Rubber.....	25
3.5.2 Determiration the Percentage of Grafted Natural Rubber and Grafting Efficiency.....	26
3.5.3 Determiration of the Morphology of Grafted Natural Rubber.....	28
3.5.4 Characterization of Graft Copolymer Product.....	28
a. Fourier-Transform Infrared Spectroscopy.....	28
b. Nuclear Magnetic Resonance Spectroscopy.....	28
3.5.5 Determiration of Dynamic Mechanical Properties of Grafted Natural Rubber.....	29

CONTENTS (Continued)

	PAGE
3.6 Preparation of STR5L/PMMA/Grafted Natural Rubber Blends.....	29
3.7 Preparation of Grafted Natural Rubber/PMMA Blends.....	30
3.8 Mechanical Testing.....	30
3.8.1 Tensile Properties (ASTM D638-97).....	31
3.8.2 Tear Strength (ASTM D624-98).....	31
3.8.3 Hardness (ASTM D2240-97).....	32
3.8.4 Impact Energy (ASTM D256).....	33
3.9 Oil Absorption.....	34
3.10 Scanning Electron Microscopy (SEM).....	34
CHAPTER 4 : RESULTS AND DISCUSSION.....	35
4.1 Properties of Natural Rubber Latex.....	35
4.2 Preparation of Grafted Natural Rubber.....	36
4.2.1 Effect of Initiator Concentration.....	37
4.2.2 Effect of Reaction Temperature.....	41
4.2.3 Effect of Monomer Concentration.....	42
4.2.4 Effect of Reaction Time.....	46
4.3 Mechanism of Free Radical Grafting of Styrene and Glycidyl Methacrylate onto Natural Rubber.....	48
4.4 Grafted Natural Rubber Morphology.....	53
4.5 Characterization of Grafted Natural Rubber.....	54
4.5.1 Functional Groups in the Grafted Natural Rubber.....	54
4.5.2 Functional Groups in the Samples After Solvent Extraction.....	56
4.5.3 NMR Spectroscopy.....	59
4.5.4 Dynamic Mechanical Thermal Analysis (DMTA).....	62

CONTENTS (Continued)

	PAGE
4.6 Mechanical Properties of STR5L Blends with PMMA and Grafted Natural Rubber as a Compatibilizer.....	64
4.7 Oil Absorption.....	71
4.8 Mechanical Properties of the Grafted Natural Rubber/PMMA Blends.....	73
4.9 Scanning Electron Microscopy (SEM).....	75
CHAPTER 5 : CONCLUSIONS AND SUGGESTION.....	82
5.1 Conclusion.....	82
5.2 Suggestion for Futher Work.....	83
REFERENCES.....	85
APPENDICES.....	89
APPENDIX A.....	90
APPENDIX B.....	95
APPENDIX C.....	97
APPENDIX D.....	103
APPENDIX E.....	104
VITA.....	106

LISTS OF TABLES

TABLE	PAGE
2.1 Composition of Latex Sap.....	5
2.2 Processing Material of STR Grades.....	7
2.3 Standard Thai Rubber (STR) Scheme.....	8
2.4 Typical Physical Properties of GMA Monomer.....	10
2.5 Types of Polyblends.....	13
3.1 Experimental Variables for Graft Copolymerization.....	25
3.2 Compounding Formulations.....	30
4.1 The Properties of High Ammonia Natural Rubber Latex.....	36
4.2 Effect of Initiator Concentration on the Conversion, Grafting Efficiency, and Percentage Grafted Natural Rubber : (T = 50-70°C, Monomer = 100 phr, and Time = 10 h).....	40
4.3 Effect of Reaction Temperature on the Conversion, Grafting Efficiency and Percentage Grafted Natural Rubber : (Initiator Concentration = 2.5 phr, Monomer = 100 phr, and Time = 10 h).....	42
4.4 Effect of Monomer Concentration on the Conversion, Grafting Efficiency and Percentage Grafted Natural Rubber : (Initiator Concentration = 2.5 phr, T = 60°C, and Time = 10 h).....	44
4.5 Effect of Reaction Time on the Conversion, Grafting Efficiency and Percentage Grafted Natural Rubber : (Initiator Concentration = 2.5 phr, Monomer = 100 phr, and T = 60°C).....	46

LISTS OF TABLES (Continued)

TABLE	PAGE
4.6	Glass Transition Temperature and $\tan\delta$ of the Grafted Natural Rubber by DMTA Technique.....63
4.7	The Properties of STR5L.....66
4.8	Typical Data of PMMA (Crystallite #MF 001).....66
4.9	Properties of Unvulcanized STR5L/PMMA Blends.....68
4.10	Properties of Vulcanized STR5L/PMMA Blends.....68
4.11	The Percentage of Weight Change of Vulcanized STR5L/PMMA Blends.....72
4.12	Properties of Grafted Natural Rubber/PMMA Blends.....73
A-1	Effect of Initiator Concentration, Reaction Temperature, Monomer Concentration, and Reaction Time on the Conversion, Percentage of Grafted Natural Rubber, and Grafting Efficiency.....90
A-2	The Average of the Conversion, Percentage of Grafted Natural Rubber, Percentage of Free Natural Rubber, Percentage of Free St/GMA and Grafting Efficiency.....93
C-1	Tensile Strength of STR5L/PMMA Blends at Ratio of 70/30.....97
C-2	Elongation at Break of STR5L/PMMA Blends at Ratio of 70/30.....97
C-3	Stress @100% Modulus of STR5L/PMMA Blends at Ratio of 70/30.....98
C-4	Tear Strength of STR5L/PMMA Blends at Ratio of 70/30.....98
C-5	Hardness of STR5L/PMMA Blends at Ratio of 70/30.....99
C-6	Tensile Strength of STR5L/PMMA Blends at Ratio of 50/50.....99
C-7	Elongation at Break of STR5L/PMMA Blends at Ratio of 50/50.....100
C-8	Stress @100% Modulus of STR5L/PMMA Blends at Ratio of 50/50.....100
C-9	Tear Strength of STR5L/PMMA Blends at Ratio of 50/50.....101
C-10	Hardness of STR5L/PMMA Blends at Ratio of 50/50.....101

LISTS OF TABLES (Continued)

TABLE	PAGE
C-11 Impact Energy of STR5L/PMMA Blends at Ratio of 50/50.....	102
D-1 The Percentage of Weight Change of Vulcanized STR5L/PMMA Blends....	103
E-1 Tensile Strength of Grafted Natural Rubber/PMMA Blends.....	104
E-2 Elongation at Break Grafted Natural Rubber/PMMA Blends.....	104
E-3 Stress @100% Modulus of Grafted Natural Rubber/PMMA Blends.....	105
E-4 Tear Strength of Grafted Natural Rubber/PMMA Blends.....	105
E-5 Hardness of Grafted Natural Rubber/PMMA Blends.....	105


 ศูนย์วิทยทรัพยากร
 จุฬาลงกรณ์มหาวิทยาลัย

LIST OF FIGURES

FIGURE	PAGE
2.1 Cis-1,4-Polyisoprene.....	4
2.2 Glycidyl Methacrylate Chemical Structure.....	10
2.3 Schematic Diagram Showing Location of Block and Graft Copolymers at Phase Interfaces.....	15
3.1 The Overall Schematic Experimental Process.....	27
3.2 Schematic Diagram of Tensile Test Specimen (Type IV).....	31
3.3 Schematic Diagram of Tear Test Specimen (Die C).....	32
3.4 Dimensions of Simple Beam, Charpy Type, Impact Test Specimen.....	33
4.1 Effect of Initiator Concentration on the Conversion (Monomer 100 phr, 50-70°C, and Time 10 h).....	38
4.2 Effect of Initiator Concentration on Grafting Efficiency (Monomer 100 phr, 50-70°C, and Time 10 h).....	38
4.3 Effect of Initiator Concentration on Percentage Grafted Natural Rubber, Percentage Free Natural Rubber, Percentage Free St/GMA (Monomer 100 phr, 50-70°C, and Time 10 h).....	39
4.4a Effect of Reaction Temperature on Percentage Grafted Natural Rubber, Percentage Free Natural Rubber, Percentage Free St/GMA : T = 50-70°C, Monomer = 100 phr and Time = 10 h.....	43
4.4b Effect of Reaction Temperature on the Conversion and Grafting Efficiency : T = 50-70°C, Monomer = 100 phr and Time 10 h.....	43
4.5a Effect of Monomer Concentration on Percentage Grafted Natural Rubber, Percentage Free Natural Rubber , Percentage free St/GMA : T = 60°C, Monomer = 50-150 phr, and Time = 10 h.....	45

LIST OF FIGURES (Continued)

FIGURE	PAGE
4.5b Effect of Monomer Concentration on the Conversion and Grafting Efficiency : T = 60°C, Monomer = 50-150 phr, and Time = 10 h.....	45
4.6a Effect of Reaction Time on Percentage Grafted Natural Rubber, Percentage Free Natural Rubber, Percentage Free St/GMA : T = 60°C, Monomer = 100 phr, and Time = 4-10 h.....	47
4.6b Effect of Reaction Time on the Conversion and Grafting Efficiency : T = 60°C, Monomer = 100 phr, and Time = 4-10 h.....	47
4.7 Pathway to Prepare Core/Shell Particle.....	54
4.8 Transmission Electron Micrographs of the Particle Morphologies of Grafted Natural Rubber.....	55
4.9 The FT-IR Spectrum of Natural Rubber.....	57
4.10 The FT-IR Spectrum of Grafted Natural Rubber.....	57
4.11 The Schematic Experimental Process of Samples After Solvent Extraction....	58
4.12 The FT-IR Spectrum of Petroleum Ether Extract.....	58
4.13 The FT-IR Spectrum of Acetone Extract.....	59
4.14 The ¹ H-NMR Spectrum of Grafted Natural Rubber.....	60
4.15 The ¹³ C-NMR Spectrum of Grafted Natural Rubber.....	61
4.16 Loss Factor (tanδ) of Grafted Natural Rubber at Different Monomer Concentration.....	63
4.17 Storage Modulus of Grafted Natural Rubber at Different Monomer Concentration.....	64
4.18 Effect of Grafted Natural Rubber Content on the Mechanical Properties of Unvulcanized STR5L/PMMA Blends.....	70
4.19 Effect of Grafted Natural Rubber Content on the Mechanical Properties of Vulcanized STR5L/PMMA Blends.....	71

LIST OF FIGURES (Continued)

FIGURE	PAGE
4.20 The Percentage of Weight Change of Vulcanized STR5L/PMMA Blends.....	72
4.21 Effect of PMMA Content on the Mechanical Properties of Grafted Natural Rubber/PMMA Blends.....	75
4.22 SEM Photographs of Unvulcanized of STR5L/PMMA Blends at Ratio of 70/30 with Grafted Natural Rubber.....	77
4.23 SEM Photographs of Vulcanized of STR5L/PMMA Blends at Ratio of 70/30 with Grafted Natural Rubber.....	78
4.24 SEM Photographs of Unvulcanized of STR5L/PMMA Blends at Ratio of 50/50 with Grafted Natural Rubber.....	79
4.25 SEM Photographs of Vulcanized of STR5L/PMMA Blends at Ratio of 50/50 with Grafted Natural Rubber.....	80
4.26 SEM Photographs of NR-g-St/GMA/PMMA Blends.....	81
B-1 Dynamic Mechanical Properties of Natural Rubber.....	95
B-2 Dynamic Mechanical Properties of Grafted Natural Rubber (Monomer 50 phr).....	95
B-3 Dynamic Mechanical Properties of Grafted Natural Rubber (Monomer 100 phr).....	96
B-4 Dynamic Mechanical Properties of Grafted Natural Rubber (Monomer 150 phr).....	96

ABBREVIATIONS

HANR	:	High ammonia natural rubber
PMMA	:	Poly (methyl methacrylate)
St	:	Styrene
GMA	:	Glycidyl methacrylate
STR	:	Standard Thai Rubber
DRC	:	Dry rubber content
\bar{M}_w	:	Weight average molecular weight
\bar{M}_n	:	Number average molecular weight
T_g	:	Glass transition temperature
T_m	:	Melting temperature
EPR	:	Ethylene - propylene rubber
TEPA	:	Tetraethylene pentamine
CHPO	:	Cumene hydroperoxide
TEM	:	Transmission electron microscopy
SEM	:	Scanning electron microscopy
NMR	:	Nuclear magnetic resonance spectroscopy
FT-IR	:	Fourier–transform infrared spectroscopy
DMTA	:	Dynamic mechanical thermal analysis
ASTM	:	The American Society for Testing and Material
phr	:	Part per hundred
h	:	Hour
Avg.	:	Average
GE	:	Grafting efficiency
S.D.	:	Standard deviation