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**DEVELOPMENT OF NATURAL RUBBER PRODUCT CONTAINING
CARBON BLACK FOR READY USING**

Mr.Bunthoon Laongsri

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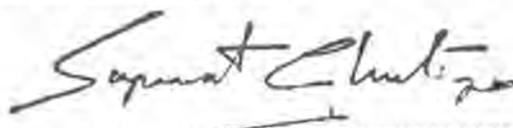
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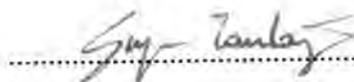
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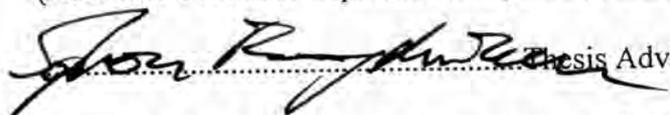
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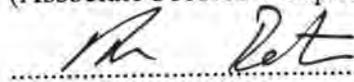
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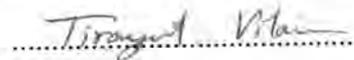
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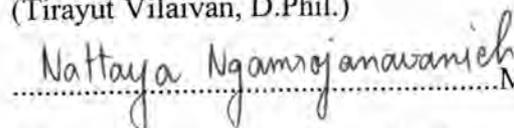
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(Assistant Professor Amorn Petsom, Ph.D.)



.....Member

(Tirayut Vilaivan, D.Phil.)



.....Member

(Nattaya Ngamrojanavanich, Ph.D.)

บรรพชURY ละของศรี : การพัฒนาผลิตภัณฑ์ยางธรรมชาติที่ประกอบด้วยคาร์บอนแบล็ก
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งานวิจัยนี้มีจุดมุ่งหมายเพื่อลดขั้นตอนการผลิตยางคอมพาวด์ โดยเริ่มการเตรียมจากน้ำยาง
ชั้นโดยตรง ยางคอมพาวด์ที่เตรียมได้มีองค์ประกอบสำคัญคือคาร์บอนแบล็ก การเตรียมจะเริ่มจากการบด
สารปรับปรุงคุณภาพในรูปของสารแขวนลอยด้วยเครื่องบอลมิลในเวลาที่เหมาะสมคือ 3 ชั่วโมง จากนั้นเติมน้ำ
ยางชั้นแล้วผสมเป็นเวลา 1/2 ชั่วโมง ทำให้ง่ายจับตัวกันด้วยกรดฟอร์มิก ศึกษาการกระจายตัวของ
คาร์บอนแบล็กของยางที่ทำให้คงรูปแล้วด้วยกล้องจุลทรรศน์และกล้องจุลทรรศน์อิเล็กตรอนแบบส่องกราด
(scanning electron microscope) ศึกษาสมบัติเชิงกลของยางคงรูปคือ ความต้านแรงดึง ความต้านแรง
ฉีกขาด มอดุลัสและความแข็ง โดยงานวิจัยศึกษาปัจจัยที่มีผลต่อสมบัติเชิงกลของยางคงรูปโดยแปรค่าองค์
ประกอบของยางคอมพาวด์ดังนี้ ชนิดคาร์บอนแบล็ก (N220 และ N330), ปริมาณคาร์บอนแบล็ก (25 – 45
ส่วนในยาง 100 ส่วน), ปริมาณกำมะถัน (0.5 – 4 ส่วนในยาง 100 ส่วน), ปริมาณสารเร่งวัลคาไนซ์ (MBT
0.5 – 2 ส่วนในยาง 100 ส่วน), ปริมาณสารโปรโมเตอร์ (ซิงค์ออกไซด์ 2 – 10 และกรดลเตอรีก 1 – 4 ส่วน
ในยาง 100 ส่วน), ชนิดสารลดแรงตึงผิว (SDS, Tergitol NP9, Tergitol NP10)

ผลการวิจัยพบว่าสูตรของยางคอมพาวด์ที่ให้สมบัติเชิงกลดีที่สุดคือ น้ำยางชั้น 100 ส่วนโดยน้ำ
หนักแห้ง คาร์บอนแบล็กชนิด N330 25 ส่วนในยาง 100 ส่วน กำมะถัน 2 ส่วนในยาง 100 ส่วน MBT 1 ส่วน
ในยาง 100 ส่วน และ Tergitol NP10 3 ส่วนในยาง 100 ส่วน และระดับการกระจายตัวของคาร์บอนแบล็ก
เท่ากับ 5.0

ภาควิชา

สาขาวิชา

ปีการศึกษา

ลายมือชื่อนิสิต

ลายมือชื่ออาจารย์ที่ปรึกษา

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

3970869223 : MAJOR PETROCHEMISTRY AND POLYMER SCIENCE

KEY WORD: CARBON BLACK / CONCENTRATED NATURAL RUBBER LATEX / COMPOUNDED RUBER

BUNTHOON LAONGSRI : DEVELOPMENT OF NATURAL RUBBER PRODUCT CONTAINING CARBON BLACK FOR READY USING. THESIS ADVISOR : ASSO. PROF. SOPHON ROENGSUMRAN, Ph.D. 151 pp. ISBN 974-332-230-2.

Compounded rubber containing carbon black was prepared by direct mixing the concentrated natural rubber latex with the additives. The aqueous dispersion of the additives was prepared by ball mill for 3 hours. After the desire time, concentrated natural rubber latex was added and mixed for ½ hours. The compounded latex was coagulated by formic acid. The compounded rubber was assessed the degree of carbon black dispersion by optical microscope and scanning electron microscope. The mechanical properties— tensile strength, tear strength , modulus and hardness— of vulcanized sheets were determined. The effects of type of carbon black (N220 and N330), amount of carbon black (25 – 45 phr), amount of sulfur (0.5 – 4 phr), amount of accelerator (MBT 0.5 – 2 phr), amount of accelerator activator (ZnO 2 –10 phr and stearic acid 1 – 4 phr), and type of surfactants (SDS, Tergitol NP9 and Tergittol NP10) on the mechanical properties were studied.

The results indicate that the formulations of compounded rubber showing the best mechanical properties are concentrated natural rubber latex 100 parts by dry weight, carbon black type N330 25 phr, sulfur 2 phr, MBT 1 phr, ZnO 5 phr, stearic acid 2 phr and Tergitol NP10 3 phr. The degree of carbon black dispersion is 5.0.

ภาควิชา.....

ลายมือชื่อนิสิต นพพร กรธองศรี

สาขาวิชา วิศวกรรมและวิทยาศาสตร์สิ่งแวดล้อม

ลายมือชื่ออาจารย์ที่ปรึกษา สุนทร งามศรี

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ABBREVIATIONS

Ave.	:	Average
DR.	:	Dispersion rating
DRC	:	Dry rubber content
HAF	:	High abrasion furnace
ISAF	:	Intermediate super abrasion furnace
MBT	:	2- Mercaptobenzothiazole
phr	:	Parts per hundred parts rubber
rpm	:	Rounds per minute
SAF	:	Super abrasion furnace
SDS	:	Sodium dodecyl sulfate
SEM	:	Scanning electron microscope