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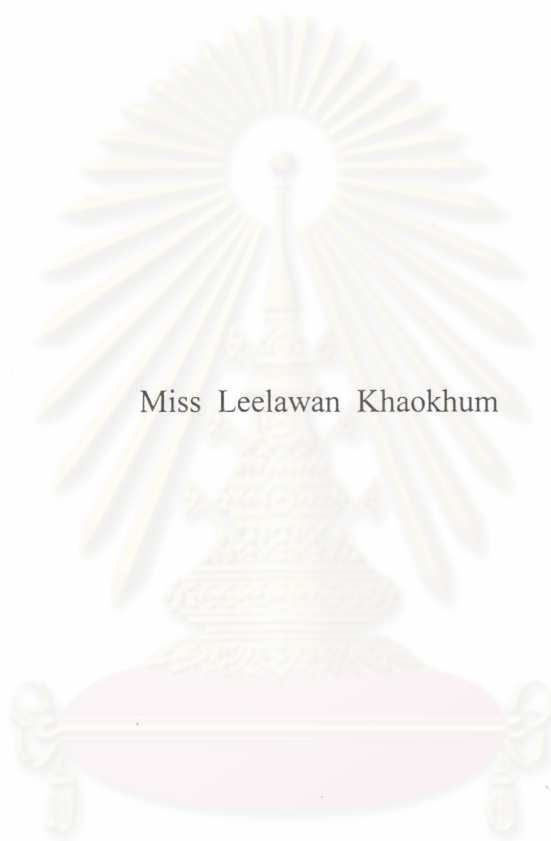
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SYNTHESIS OF VULCANIZING AGENT FROM CARDANOL



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ศูนย์วิทยทรัพยากร

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ได้สังเคราะห์คาร์ดานอลพอลิซัลไฟด์ (ซีพีเอส) ซึ่งเป็นสารวัลคาไนซ์ประเภทสารให้กำมะถัน จากการทำปฏิกิริยาของธาตุกำมะถันกับคาร์ดานอลที่แยกมาจากสารสกัดจากเปลือกเมล็ดมะม่วงหิมพานต์ที่ผ่านปฏิกิริยาดีคาร์บอกซิเลชัน ภาวะที่เหมาะสมสำหรับการเตรียมซีพีเอสใช้ธาตุกำมะถันมากเกินไป โดยปราศจากตัวทำละลายที่อุณหภูมิ 140 องศาเซลเซียส เป็นเวลา 3 ชั่วโมง ให้ปริมาณกำมะถันในซีพีเอสร้อยละ 28 โดยน้ำหนัก

งานวิจัยนี้เป็นการศึกษาผลของซีพีเอสซึ่งเป็นสารวัลคาไนซ์ที่มีต่อสมบัติของยางคอมพาวด์ พบว่าเวลาที่ใช้ในการบ่มที่เหมาะสมของยางที่ประกอบด้วยซีพีเอสลดต่ำลงและสมบัติเชิงกลของยางคอมพาวด์ที่ประกอบด้วยซีพีเอสดีขึ้น ได้ทำการทดสอบการเร่งอายุ และเปรียบเทียบผลกับชิ้นงานที่ไม่ได้เร่งอายุพบว่า ยางที่ประกอบด้วยซีพีเอสเกิดการผันกลับน้อยกว่ายางที่ไม่มีซีพีเอส งานวิจัยนี้ได้แสดงว่าซีพีเอสปรับปรุงสมบัติเชิงกลและลดการเกิดการผันกลับของยางคอมพาวด์

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LEELAWAN KHAOKHUM: SYNTHESIS OF VULCANIZING AGENT
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Cardanol polysulfide (CPS), a sulfur donor type vulcanizing agent, was synthesized from a reaction of elemental sulfur and cardanol separated from decarboxylated cashew nut shell liquid. The appropriate conditions for the preparation of CPS using an elemental sulfur without any solvent at 140 °C for 3 hrs giving 28%wt of sulfur content in CPS.

The effect of CPS as vulcanizing agent on the properties of rubber compounds was investigated. It was found that the optimum cure time of rubber containing CPS was reduced and mechanical properties were improved. Accelerated aging test was investigated and the results were compared to unaged specimens. The rubber containing CPS was found to have lower reversion. This work showed that CPS improved basic mechanical properties and reduced the reversion of rubber compounds.

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ศูนย์วิจัยทรัพยากร
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ABBREVIATIONS

ASTM	=	American Society for Testing and Materials
°C	=	Degree Celsius
CBS	=	N-cyclohexylbenzothiazole-2-sulphenamide
cm	=	centimetre
cm ³	=	cubic centimetre
CLD	=	caprolactamdisulfide
cP	=	Centipoise
CPS	=	cardanol polysulfide
DPTT	=	dipentamethylene thiuramtetrasulfide
DTDM	=	dithiodimorpholine
EV	=	Efficient vulcanization
F	=	Fahrenheit
g	=	Grams
hrs	=	hours
ISO	=	International Organization for Standardization
JIS	=	Japanese Industrial Standard
MBSS	=	2-morpholino-dithio-benzothiazole
MHz	=	Mega Pascal
min	=	Minute(s)
ml	=	Millilitre(s)
mm	=	Millimetre(s)
Mod 500%	=	Modulus 500%
MHz	=	Mega Hertz
NR	=	Natural rubber
OTOS	=	N-oxydiethylene dithiocarbadipentamyl-N'-oxydiethylene thiuramtetrasulfide
phr	=	Parts per hundred parts of rubber
psi	=	poise
rpm	=	Rounds per minute

RRI	=	Rubber Research Institute
sec	=	Second
t_{90}	=	Optimum cure time
TMTD	=	tetramethyl thiuramdisulfide
TISI	=	Thai Industrial Standard Institute
wt%	=	Weight percent
τ	=	Torque



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