

**CURE AND MECHANICAL PROPERTIES OF FILLED NATURAL
RUBBER VULCANISATES : EFFECT OF FILLER TYPE**

Ms. Ratee Lim-ochakun

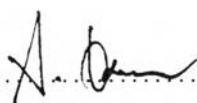
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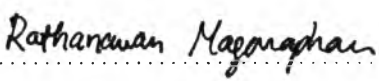
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Vulcanisates : Effect of Fillers Types
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ABSTRACT

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To improve its properties, natural rubber (NR) was compounded with filler. Calcium sulfate (Gypsum), carbon black, and precipitated silica, with different surface area, were used. The cure and mechanical properties were determined. Both properties were improved. When compared to the precipitated silica-filled NR for both the different and the same surface area, the carbon black-filled NR gave better cure time, tensile strength, modulus, hardness, and abrasion resistance. The higher elongation and resilience were shown in the precipitated silica-filled NR. The moderate cure and mechanical properties were displayed in the gypsum-filled NR. Interestingly, tan delta at 60 °C, heat build up and rolling resistance were significantly declined by the partial replacement of carbon black with gypsum and silica-filled NR compounds.

บทคัดย่อ

ราตรี ลิ้มโอชากุล : ผลกระทบจากชนิดของสารตัวเติมที่มีต่อคุณสมบัติการคงรูปและคุณสมบัติเชิงกลของสารผสมสูตรซึ่งผ่านการวัลคาไนซ์แล้วระหว่างยางธรรมชาติกับสารตัวเติม (Cure and Mechanical Properties of Filled Natural Rubber Vulcanisates: Effect of Filler Type)
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การปรับปรุงคุณสมบัติของการผสมสูตรระหว่างยางธรรมชาติกับสารตัวเติมชนิดต่างๆ ได้แก่ แคลเซียมซัลเฟตหรือยิปซั่ม เขม่าดำและตะกอนซิลิกา ซึ่งมีขนาดพื้นที่ผิวหน้าของอนุภาคแตกต่างกัน โดยพิจารณาคุณสมบัติการคงรูปและคุณสมบัติเชิงกล จากการศึกษาพบว่าคุณสมบัติทั้งสองได้มีการปรับปรุงให้ดีขึ้น เมื่อเปรียบเทียบการเสริมแรงในยางธรรมชาติของสารตัวเติมตะกอนซิลิกาและเขม่าดำที่มีพื้นที่ผิวหน้าของอนุภาคทั้งเท่ากันและแตกต่างกัน พบว่ายางธรรมชาติที่ถูกเสริมแรงด้วยเขม่าดำจะแสดงคุณสมบัติที่ดีกว่าในด้านการคงรูป ความแข็งแรงแบบเทนไซส์ โมดูลัส ความแข็งและความต้านทานการสึกหรอ แต่ยางธรรมชาติที่เสริมแรงด้วยตะกอนซิลิกาจะแสดงค่าของความยาวในการยืดจนขาดและการกระดอนที่สูงกว่า สำหรับการเสริมแรงของยางธรรมชาติด้วยยิปซั่มพบว่าสมบัติการคงรูปและคุณสมบัติเชิงกลได้ถูกปรับปรุงขึ้นปานกลาง และที่น่าสนใจคือ การลดลงของค่าแทนเคลด้า ความร้อนสะสมและความต้านทานการหมุนกลิ้งอย่างมีนัยสำคัญในยางธรรมชาติที่ถูกแทนที่ด้วยปริมาณบางส่วนของสารตัวเติมเขม่าดำด้วยยิปซั่มและตะกอนซิลิกา

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