

**FRACTURE BEHAVIOR AND MORPHOLOGY OF LLDPE/NR
BLENDS PREPARED BY REACTIVE BLENDING
WITH MALEIC ANHYDRIDE**



Ms. Buchanee Chan-ngam

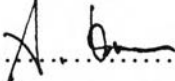
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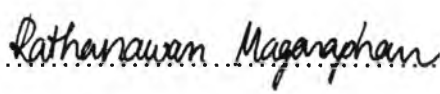
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บทคัดย่อ

บุษณีย์ จันทร์งาม : การศึกษาสมบัติการแตกหักและสมบัติรูปอสัณฐานของพอลิเมอร์ผสมระหว่างพอลิเอทิลีนชนิดความหนาแน่นต่ำเชิงเส้น และยางธรรมชาติด้วยวิธีการผสมแบบรีแอคทีฟ โดยใช้เวลาเอทิลแอนไฮไดรด์เป็นสารช่วยผสม (Fracture Behavior and Morphology of LLDPE/NR Blends Prepared by Reactive Blending with Maleic Anhydride) อ. ที่ปรึกษา: ศ. ดร. อเล็กซานเดอร์ เอ็ม เจมิสัน และ ดร. รัตนาวรรณ มกรพันธุ์ 77 หน้า ISBN 974-334-166-8

พฤติกรรมการแตกหักของพอลิเมอร์ผสมระหว่างพอลิเอทิลีนชนิดความหนาแน่นต่ำเชิงเส้น (LLDPE) กับยางธรรมชาติ (NR) โดยวิธีการผสมแบบมีอันตรกิริยา (Reactive blending) ด้วยการใช้ตัวริเริ่มปฏิกิริยาไดคูมิวเปอร์ออกไซด์ (DCP) และสารช่วยผสมมาเลอิกแอนไฮไดรด์ (MA) สามารถศึกษาได้จากสมบัติเชิงกลของพอลิเมอร์ผสมคือ คุณสมบัติการฉีกขาด, คุณสมบัติการกระแทก, ค่าความแข็งแรงดึง, การยืดแบบคราก และค่าความยืดจนขาด ต่อการเพิ่มปริมาณของ MA DCP และยางธรรมชาติ ในอัตราส่วนผสม 90/10 ของ LLDPE/NR การเพิ่มขึ้นของ MA ทำให้ความต้านทานต่อการกระแทกและการฉีกขาดเพิ่มขึ้น การใส่ DCP ทำให้ค่าการกระแทกเพิ่มขึ้นแต่ค่าการฉีกขาดลดลง สำหรับอัตราส่วนผสม 50/50 การเพิ่มขึ้นของ MA และ DCP ช่วยเสริมให้ค่าการกระแทกเพิ่มขึ้นแต่มีผลกระทบเล็กน้อยต่อค่าการฉีกขาด จากการทดสอบการยืดแบบคราก พบว่าการเติม DCP มีผลต่อการทนทานต่อการยืด ผลการทดลองแสดงให้เห็นว่า ชิ้นงานที่ผ่านสภาพอากาศแบบเร่งมีค่าความแข็งแรงดึงและค่าความยืดจนขาดลดลง สำหรับการเพิ่มขึ้นของอัตราส่วน NR ในตัวอย่างที่มีปริมาณอย่างมาก มีผลทำให้การลดลงของค่าความแข็งแรงดึงลดลง แต่ค่าการยืดจนขาดลดลงมาก ส่วนค่าการฉีกขาดลดลงเมื่อปริมาณ NR มากขึ้น สำหรับค่าการกระแทกพบว่าปริมาณ NR มีผลต่อค่าที่ได้้น้อยมาก

ABSTRACT

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Buchanee Chan-ngam: Fracture Behavior and Morphology of LLDPE/NR Blends Prepared by Reactive Blending with Maleic Anhydride.

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Fracture behavior of blends containing linear low density polyethylene (LLDPE) and natural rubber (NR) was studied via mechanical properties. The blends were prepared by reactive blending using maleic anhydride (MA) as a reactive compatibilizer and dicumyl peroxide (DCP) as an initiator. Mechanical properties such as high-speed impact strength, tear strength, tensile strength, and creep were investigated as a function of MA, DCP, and NR concentrations. For 90/10 LLDPE/NR, increasing MA increases impact strength and tear strength, while increasing DCP increases impact strength, but decreased tear strength. For the 50/50 blend, increasing MA and DCP enhances impact strength, but shows little effect on tear strength. Based on tensile creep tests, the addition of DCP enhances the resistance to deformation. After exposure to accelerated weathering, the blends exhibit decreasing tensile strength and elongation at break. With increasing NR content, a lower percent reduction in tensile strength and higher percent reduction in tensile elongation at break were found for blend with high NR content. Tear strength decreases with increasing NR content. Impact strength shows a weak dependence on NR content.

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