

**INFLUENCE OF COMPATIBILIZER ON MOPHOLOGY AND
MECHANICAL PROPERTIES OF LLDPE/NR BLENDS PRODUCED BY
BLOWN FILM AND CHILL ROLL CAST FILM EXTRUSION**



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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
in Academic Partnership with
The University of Michigan, The University of Oklahoma,
and Case Western Reserve University

1999

ISBN 974-331-935-2

I 19337575 18 2.A. 2547

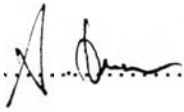
Thesis Title : Influence of Compatibilizer on Morphology and Mechanical Properties of LLDPE/NR Blends Produced by Blown Film and Chill Roll Cast Film Extrusion

By : Mr. Pornpirom Moteplay

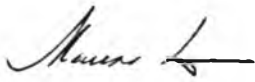
Program : Polymer Science

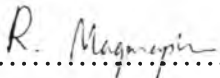
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ABSTRACT

##972018 : POLYMER SCIENCE PROGRAM

KEY WORDS : Blown Film Extrusion/ Chill Roll Cast Film Extrusion/
Molecular Orientation

(Mr. Pronpirom Moteplay): (Influence of Compatibilizer on Morphology and Mechanical Properties of LLDPE/NR Blends Produced by Blown Film and Chill Roll Cast Film Extrusion). Thesis Advisors: Prof. Ica Manas-Zloczower and Dr. Rathanawan Magaraphan, 90 pp. ISBN 974-331-935-2

The addition of Natural Rubber (NR) into Linear Low Density Polyethylene (LLDPE) significantly improved processability of LLDPE resins as evidenced by the increase of draw ratio (DR) and blow up ratio (BUR) which directly relate to the *ultimate melt strength* of LLDPE. Maleic anhydride (MA) was added in 1-5 wt% to *in-situ* compatibilize the blend. By using this technique the melt viscosity, morphology and mechanical properties of LLDPE/NR blends were affected. The biaxial orientation in blown film and uniaxial orientation in chill roll cast film processes were investigated by infrared dichroism. The crystalline orientation (f_c) was higher than amorphous orientation (f_{am}). Moreover, the molecular orientation strongly affected the mechanical properties of the film; such as tear resistance, tensile strength, impact strength. Tear resistance and impact strength also increased as NR loading increased; whereas, the tensile strength of films decreased.

บทคัดย่อ

นาย พรภิรมย์ โหมคพลาช: ชื่อหัวข้อวิทยานิพนธ์ (ภาษาไทย) อิทธิพลของตัวประสานต่อโครงสร้างสัณฐานและสมบัติเชิงกลของของผสมพอลิโอทิลีนชนิดความหนาแน่นต่ำเชิงเส้นและยางธรรมชาติโดยการขึ้นรูปแบบเป่าฟิล์มและรีด (ภาษาอังกฤษ) (Influence of Compatibilizer on Morphology and Mechanical Properties of LLDPE/NR Blends Produced by Blown Film and Chill Roll Cast Film Extrusion) อ. ที่ปรึกษา : ศ. ไอกา มานาส ชลอคโซเวอ และ อ. ดร. รัตนวรรณ มกรพันธุ์ 90 หน้า ISBN 974-331-935-2

การขึ้นรูปของพอลิโอทิลีนชนิดความหนาแน่นต่ำเชิงเส้นสามารถทำได้ง่ายขึ้นอย่างเห็นได้ชัดจากการเพิ่มขึ้นของอัตราส่วนการดึงและอัตราส่วนการเบ่ง โดยวิธีการขึ้นรูปแบบเป่าฟิล์มและรีด ภายหลังจากการผสมยางธรรมชาติและตัวประสานที่พอเหมาะ ปัจจัยที่มีความสำคัญต่อขบวนการขึ้นรูปแบบเป่าฟิล์มและแบบรีด คือสมบัติความแข็งแรงของพอลิเมอร์หลอมต่อแรงดึงระหว่างการขึ้นรูป การเติมยางธรรมชาติและตัวประสาน มาเลอิกแอนไฮไดรด์ จำนวน 1-5 กรัม/น้ำหนัก พบว่ามีผลอย่างมากต่อความหนืด สัณฐานวิทยาของของผสม และสมบัติเชิงกลของฟิล์ม การขึ้นรูปแบบเป่าฟิล์มและแบบรีดส่งผลให้การเรียงตัวของโมเลกุลแบบทิศทางเดียวและสองทิศทางสามารถตรวจสอบโดยเทคนิคการดูดกลืนรังสีอินฟราเรด ส่วนที่เป็นโครงสร้างผลึกจะเรียงตัวดีกว่าส่วนโครงสร้างอสัณฐาน การเรียงตัวของส่วนที่เป็นโครงสร้างผลึกและส่วนที่เป็นโครงสร้างอสัณฐานส่งผลอย่างมากต่อสมบัติเชิงกลของฟิล์ม เช่น สมบัติการทนแรงฉีกขาด ความแข็งแรงและความสามารถทนแรงกระแทกของฟิล์ม สมบัติการทนแรงฉีกขาดและสมบัติความสามารถทนแรงกระแทกเพิ่มมากขึ้นเมื่อเพิ่มปริมาณยางธรรมชาติในของผสม ส่วนความแข็งแรงของฟิล์มลดลงเมื่อเพิ่มปริมาณยางธรรมชาติ

ACKNOWLEDGEMENTS

The work was supported by Ratchadaphisaek Sompoch Research Fund in the year of 1998.

The author wishes to express the appreciation to Dr. Rathanawan Magarphan and Prof. Ica Manas Zloczower, who gave the inspiration to conduct this project and their valuable suggestions for the lab planning and problem solving of the instruments. Besides, his special thank was offered to Prof. I. R. Harrison (Pennsylvania State University), Dr. Wannee Chinsirikul (National Metal and Material Center (MTEC)) and Dr. Sanong Ekgasit for their kind suggestion on valuable documents and comment on his work for optical polarizing microscope and FTIR-dichroism.

The author also thanks all of his friends and the staff at the PPC who encouraged him in carrying out the experiment and this thesis writing. Finally, the author is also deeply indebted to his mother and father: Sumruay and Jumlong Moteplay for greatest love, encouragement and financial support.

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