

**REACTIVE BLENDING OF LLDPE/NR WITH MALEIC  
ANHYDRIDE: CHARACTERIZATION OF GRAFT COPOLYMER**



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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

2000

ISBN 974-334-193-5

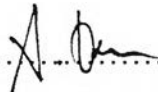
183.A. 2547

I 19300220


**Thesis Title** : Reactive Blending of LLDPE/NR with Maleic Anhydride:  
Characterization of Graft Copolymer  
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**Program** : Polymer Science  
**Thesis Advisors** : Professor Alexander M. Jamieson  
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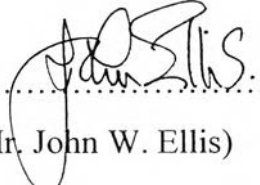
Accepted by the Petroleum and Petrochemical College, Chulalongkorn University, in partial fulfillment of the requirements for the Degree of Master of Science.

  
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## บทคัดย่อ

นางสาวเรวดี สกุลอาริยะ: การผสมแบบมีปฏิกิริยาของพอลิเอทิลีนความหนาแน่นต่ำเชิงเส้นกับยางธรรมชาติโดยใช้มาเลอิกแอนไฮไดรด์เป็นสารช่วยผสม: การวิเคราะห์พอลิเมอร์ร่วมแบบกึ่ง (Reactive Blending of LLDPE/NR with Maleic Anhydride: Characterization of Graft Copolymer) อ. ที่ปรึกษา : ศ. ดร. อเล็กซานเดอร์ เอ็ม เจมิสัน, ดร. รัตน์วรรณ มกรพันธุ์ 129 หน้า ISBN 974-334-193-5

การผสมของพอลิเอทิลีนความหนาแน่นต่ำเชิงเส้นกับยางธรรมชาติเป็นสารที่ไม่สามารถเข้ากันได้ ดังนั้นการใช้สารช่วยผสมเป็นแนวทางหนึ่งที่สามารถลดปัญหานี้ได้ มาเลอิกแอนไฮไดรด์และไดคูมิวเปอร์ออกไซด์เป็นสารช่วยผสมและตัวริเริ่มปฏิกิริยาที่ถูกใช้อย่างแพร่หลาย เนื่องจากมาเลอิกแอนไฮไดรด์เป็นสารช่วยผสมที่สามารถเกิดปฏิกิริยาตอบโต้ภายในเครื่องผสมได้ ดังนั้นอาจเกิดผลิตภัณฑ์จากการเกิดปฏิกิริยาขึ้นหลายชนิด ซึ่งผลิตภัณฑ์เหล่านี้จะส่งผลกระทบต่อสมบัติของพอลิเมอร์ผสม การเกิดผลิตภัณฑ์แบบใดขึ้นกับหลายปัจจัย ได้แก่ สภาวะที่ใช้ในการผสม และ ส่วนประกอบของพอลิเมอร์ผสม ในงานวิจัยนี้ได้เตรียมพอลิเมอร์ผสมที่สภาวะการผลิตต่าง ๆ และวิเคราะห์ชนิดและปริมาณของผลิตภัณฑ์ที่เกิดขึ้นในแต่ละวัฏภาคโดยเทคนิคฟูเรียรทรานสฟอร์มอินฟราเรดสเปกโตรสโกปี และการวิเคราะห์ทางความร้อนและน้ำหนักเพื่อให้เข้าใจการช่วยผสมที่เกิดขึ้นในขณะผสม จากการศึกษพบว่าสภาวะการผสมที่เหมาะสมคือที่อุณหภูมิ 150 องศาเซลเซียสสำหรับส่วนประกอบ 90/10 และ 50/50 และความเร็วในการผสมที่เหมาะสมคือ 50 และ 30 รอบต่อนาที สำหรับส่วนประกอบ 90/10 และ 50/50 ตามลำดับ ปริมาณเจลเพิ่มขึ้นเมื่อเพิ่มปริมาณไดคูมิวเปอร์ออกไซด์ในระบบ ปริมาณพอลิเมอร์ร่วมแบบกึ่งของมาเลอิกแอนไฮไดรด์ในพอลิเมอร์ผสมเพิ่มขึ้นเมื่อเพิ่มปริมาณมาเลอิกแอนไฮไดรด์ในระบบ

## ABSTRACT

# #4172027063 : POLYMER SCIENCE PROGRAM

KEY WORDS : Reactive Blending/ Maleic Anhydride/Dicumyl Peroxide

Rewadee Skularriya: Reactive Blending of LLDPE/NR with Maleic Anhydride: Characterization of Graft Copolymer. Thesis Advisors: Prof. Alexander M. Jamieson, Dr. Rathanawan Magaraphan, 129 pp. ISBN 974-334-193-5

Blends of linear low density polyethylene (LLDPE) and natural rubber (NR) blend is quite immiscible. Maleic anhydride (MA), added to the blend in the presence of dicumyl peroxide (DCP), acts as a reactive compatibilizer, since it improves the blend properties by producing a graft copolymer. A variety of reaction products can occur, depending on the processing conditions and the blend composition. The blends were prepared at different processing conditions and characterized each separated phase by Fourier transform infrared spectroscopy, and thermogravimetric analysis to gain insight into the *in situ* compatibilization. The blends were investigated for tensile properties and gel content. It was found that the most suitable process condition occurs at 150°C and, for LLDPE/NR compositions 90/10 and 50/50, at rotor speeds of 50 and 30 rpm, respectively. The gel content increased with increasing amount of DCP. The percentage of grafted copolymer containing MA increased as the amount of MA content increased.

## ACKNOWLEDGEMENTS

The author would like to gratefully give special thanks to her co-advisor, Professor Alexander M. Jamieson for his constructive criticism and valuable suggestions. She is also deeply indebted to her advisor, Dr. Rathanawan Magaraphan and her thesis committee, Mr. John W. Ellis for their intensive suggestions, valuable guidance and vital help throughout this research work.

She greatly appreciates all the professors who have tendered invaluable knowledge to her at the Petroleum and Petrochemical College, Chulalongkorn University.

She wishes to express her thanks to all of her friends and to the college staffs who willingly gave her warm support and encouragement.

Finally, the author is deeply indebted to her family for their love, understanding, encouragement, and for being a constant source of inspiration.

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