

# REACTIVE BLENDING OF NYLON12/NR WITH PS/NR/MA



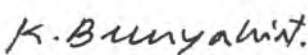
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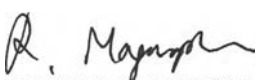
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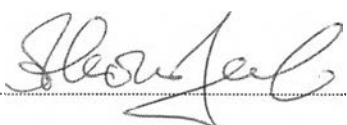
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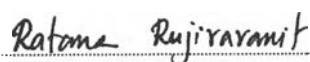
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## ABSTRACT

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Keywords : Reactive Blend/ Core-shell Morphology/ Natural rubber/ Nylon12

Polyamide12 (Nylon12)/Natural Rubber (NR)/Compatibilizer blends are prepared by melt blending in Brabender Plasticorder with various content of the compatibilizers. The compatibilizers were poly[styrene-*b*-(ethylene-co-butylene)-*b*-styrene] (SEBS), SEBS grafted by maleic anhydride (SEBS-*g*-MA), polystyrene-natural rubber (PS-NR) and polystyrene-natural rubber-maleic anhydride copolymer (PS-NR-MA), made by free radical reaction in the Brabender mixer. The effect of blend composition on morphology are studied by a scanning electron microscope (SEM) and related to the mechanical properties (tensile properties and impact energy). Moreover, the rheological properties are studied by Dynamic Mechanical Analysis (DMA). In [Nylon12/NR]/Compatibilizer blends, a core-shell morphology was formed consisting of a Nylon12 core and a NR shell in Nylon12 matrix. Compatibilizer acted as adhesive between Nylon12 core, NR shell, and Nylon12 matrix. The optimum compatibilizer content in mechanical properties was found at 2 phr by weight of [80/20] [Nylon12/NR] blend. The higher mechanical property than the SEBS and SEBS-*g*-MA blends was shown in the [Nylon12/NR]/[PSNRMA] blends that could be due to the PS hard segment and NR crosslinking in PSNRMA blend.

## บทคัดย่อ

วัศพล โปธิสุวรรณ: พอลิเมอร์ของผสมโดยการผสมแบบมีปฏิกิริยาระหว่าง ในลอนสปีสอง กับ ยางธรรมชาติ โดยใช้พอลิเมอร์ของผสมระหว่าง โพลิสไตรีน ยางธรรมชาติ และมาเลอิกแอนไฮไดร เป็นสารทำให้เข้ากันได้ (Reactive Blending of Nylon12/NR with PS/NR/MA.) อ. ที่ปรึกษา: ผศ. ดร.รัตนวรรณ มกรพันธุ์ และ ศ. ดร. อเล็กซานเดอร์ เอ็ม จามิสัน

พอลิเมอร์ผสมในลอนสปีสอง ยางธรรมชาติและตัวประสานได้รับการเตรียมโดยใช้เครื่องผสมบราเวนเดอร์ ตัวประสานหลากหลายชนิดและปริมาณ โดยที่นำมาใช้คือ พอลิ[สไตรีน-บล็อก-(เอทิลีน-บิวทิลีน)-บล็อก-สไตรีน] (SEBS) พอลิ[สไตรีน-บล็อก-(เอทิลีน-บิวทิลีน)-บล็อก-สไตรีน]-มาเลอิกแอนไฮไดร (SEBS-g-MA) พอลิเมอร์ร่วมระหว่างพอลิสไตรีนและยางธรรมชาติ (PSNR) และ พอลิเมอร์ร่วมระหว่างพอลิสไตรีน ยางธรรมชาติ และมาเลอิกแอนไฮไดร (PSNRMA) ซึ่งผลิตโดยการผสมแบบมีปฏิกิริยาในเครื่องผสมบราเวนเดอร์ ลักษณะ อัดฐานในของผสมสามารถทำนายได้โดยใช้ค่าแรงดึงผิวระหว่างพอลิเมอร์ ผสมกระทบของ สัดส่วนองค์ประกอบในของผสมต่อลักษณะอัดฐานได้ศึกษา โดยใช้เครื่องสแกนนิ่งอิเล็กตรอนไมโครสโคป (SEM) และได้นำไปสัมพันธ์กับคุณสมบัติทางกล และคุณสมบัติการไหลของ พอลิเมอร์สำหรับพอลิเมอร์ผสมในลอนสปีสอง ยางธรรมชาติและพอลิเมอร์ร่วมระหว่างพอลิสไตรีน ยางธรรมชาติ และมาเลอิกแอนไฮไดร ได้แสดงลักษณะอัดฐานแบบแกนและเปลือกโดยมีในลอนสปีสองเป็นแกนในยางธรรมชาติซึ่งเป็นเปลือก โดยมีและพอลิเมอร์ร่วมระหว่างพอลิสไตรีน ยางธรรมชาติ และมาเลอิกแอนไฮไดร เป็นตัวประสานระหว่าง แกน เปลือก และเมตริกซ์ ปริมาณตัวประสานที่เหมาะสมในพอลิเมอร์ผสมคือสองส่วนในหนึ่งร้อยส่วน โดยน้ำหนักของพอลิเมอร์ผสมในลอนสปีสองและยางธรรมชาติ พอลิเมอร์ผสมที่ใช้พอลิเมอร์ร่วมระหว่างพอลิสไตรีน ยางธรรมชาติ และมาเลอิกแอนไฮไดร แทนตัวประสานอื่นๆแสดงคุณสมบัติทางกลที่ดีกว่าเนื่องจากความแข็งแรงของแกนในลอนสปีสอง เปลือกโครงข่ายยางธรรมชาติ และจากปฏิกิริยาระหว่างหมู่เอมีนในในลอนสปีสองและมาเลอิกแอนไฮไดร

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