

**MORPHOLOGY INTERFACE PROPERTY RELATIONSHIPS IN
BLENDS COMPATIBILIZED BY REACTIVE PROCESSING**

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ABSTRACT

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Polyamide12 (Nylon12)/Natural Rubber (NR)/Compatibilizer blends were prepared by melt blending in the Brabender mixer with various types and content of the copolymer. The copolymers were poly[styrene-*b*-(ethylene-co-butylene)-*b*-styrene](SEBS), SEBS grafted by maleic anhydride (SEBS-*g*-MA) and polystyrene-natural rubber copolymer (PSNR05), made by free radical reaction in the Brabender mixer. The morphologies of the blends were predicted by the interfacial tension data. The effect of blend composition on morphology were studied by a scanning electron microscope (SEM) and a transmission electron microscope (TEM) and related to the mechanical properties. In [Nylon12/NR]/SEBS blends, a core-shell morphology was formed consisting of a SEBS core and a NR shell in Nylon12 matrix. On the other hand, the morphology was transformed to a NR core with a SEBS-*g*-MA shell in the [Nylon12/NR]/SEBS-*g*-MA blends because of the reaction between amine groups and maleic anhydride (MA). The optimum SEBS-*g*-MA content 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]/PSNR05 blends that could be due to the PS hard segment and NR crosslinking in the PSNR blend.

บทคัดย่อ

นายชัชวาลย์ โดธนะโกคา: ความสัมพันธ์ระหว่างลักษณะอสัณฐาน ลักษณะพื้นผิวระหว่างส่วนประกอบและคุณสมบัติในพอลิเมอร์ของผสมและทำให้เข้ากันได้โดยการผสมแบบมีปฏิกิริยา (Morphology Interface Property Relationships in Blends Compatibilized by Reactive Processing) อ. ที่ปรึกษา: ศ. ดร. อเล็กซานเดอร์ เอ็ม เจมิสัน และ ดร. รัตนวรรณ มกรพันธุ์ 86 หน้า ISBN 974-13-0730-6

พอลิเมอร์ผสมในลอนสิบสอง ขางธรรมชาติและตัวประสานได้รับการเตรียมโดยใช้เครื่องผสมบราเบนเดอร์ ตัวประสานหลากหลายชนิดและปริมาณ โดยที่นำมาใช้คือพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน] (SEBS) พอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน]-มาเลอิกแอนไฮไดรด์ (SEBS-g-MA) และ พอลิเมอร์ร่วมระหว่างพอลิสไตรีนและยางธรรมชาติ (PSNR05) ซึ่งผลิตโดยการผสมแบบมีปฏิกิริยาในเครื่องผสมบราเบนเดอร์ ลักษณะอสัณฐานในของผสมสามารถทำนายโดยใช้ค่าแรงดึงผิวระหว่างพอลิเมอร์ ผลกระทบของสัดส่วนองค์ประกอบในของผสมต่อลักษณะอสัณฐานได้ศึกษาโดยใช้เครื่องทรานสมิตชันอิเล็กตรอนไมโครสโคป (TEM) และเครื่องสแกนนิ่งอิเล็กตรอนไมโครสโคป (SEM) และได้นำไปสัมพันธ์กับคุณสมบัติของพอลิเมอร์ผสม สำหรับพอลิเมอร์ผสมในลอนสิบสอง ขางธรรมชาติและพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน] ได้แสดงลักษณะอสัณฐานแบบแกนและเปลือกโดยมีพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน] เป็นแกนในยางธรรมชาติซึ่งเป็นเปลือก ในทางกลับกันลักษณะ อสัณฐานได้เปลี่ยนเป็นยางธรรมชาติเป็นแกนในเปลือกพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน]-มาเลอิกแอนไฮไดรด์ในระบบพอลิเมอร์ผสมในลอนสิบสอง ขางธรรมชาติและพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน]-มาเลอิกแอนไฮไดรด์เนื่องจากปฏิกิริยาระหว่างหมู่เอมีนในลอนสิบสองและมาเลอิกแอนไฮไดรด์ ปริมาณพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน]-มาเลอิกแอนไฮไดรด์และตัวประสานอื่นๆที่เหมาะสมในพอลิเมอร์ผสมคือสองส่วนในหนึ่งร้อยส่วน โดยน้ำหนักของพอลิเมอร์ผสมในลอนสิบสองและยางธรรมชาติ พอลิเมอร์ผสมที่ใช้พอลิเมอร์ร่วมระหว่างพอลิสไตรีนและยางธรรมชาติแทนพอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน] และ พอลิ[สไตรีน-บลิ๊อค-(เอทีลีน-บิวทีลีน)-บลิ๊อค-สไตรีน]-มาเลอิกแอนไฮไดรด์ แสดง คุณสมบัติทางกลที่ดีกว่าเนื่องจากความแข็งแรงของพอลิสไตรีนและโครงข่ายของเจลยางธรรมชาติ

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