

ผลของตัวเร่งปฏิกิริยาเซอร์โคโนซีนบนตัวรองรับ MCM-41 ชนิดไบมอดอลสำหรับการโคพอลิเมอไรเซชัน  
ของเอทิลีนกับหนึ่งออกทีน

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EFFECT OF BIMODAL MCM-41-SUPPORTED ZIRCONOCENE CATALYST FOR  
ETHYLENE / 1-OCTENE COPOLYMERIZATION

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for the Degree of Master of Engineering Program in Chemical Engineering

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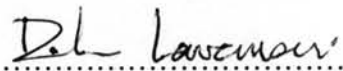
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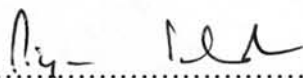
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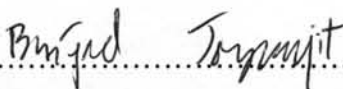
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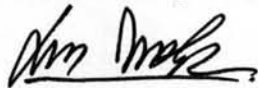
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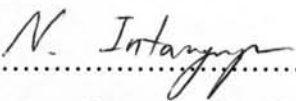
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ความสนใจในการใช้ตัวเร่งปฏิกิริยาเมทัลโลซีนสำหรับการเกิดพอลิเมอร์ในอุตสาหกรรมพอลิโอฟีนมีมากขึ้น และสาเหตุนี้เองทำให้มีการค้นคว้าวิจัยเกี่ยวกับการใช้ตัวเร่งปฏิกิริยาเมทัลโลซีนให้มีประสิทธิภาพ อย่างไรก็ตามระบบตัวเร่งปฏิกิริยาเมทัลโลซีนแบบเอกพันธ์มีข้อเสียอย่างชัดเจนอยู่สองข้อคือ ไม่สามารถควบคุมโครงสร้างของพอลิเมอร์และเกิดปัญหาการสูญเสียพอลิเมอร์ที่สังเคราะห์ได้เนื่องจากการติดอยู่ข้างดังปฏิกรณ์ ดังนั้นวิธีการอันหนึ่งที่จะปรับปรุงตัวเร่งปฏิกิริยาเมทัลโลซีนเพื่อแก้ปัญหาดังกล่าว สามารถทำได้โดยการนำสารประกอบเมทัลโลซีนมายึดติดบนตัวรองรับสำหรับงานวิจัยในครั้งนี้จะมุ่งเน้นการพัฒนาและปรับปรุงตัวเร่งปฏิกิริยาเมทัลโลซีนที่มีตัวรองรับโดยเลือกใช้ตัวรองรับ MCM-41 ที่มีโครงสร้างของรูพรุนต่างกัน นั่นคือ โครงสร้างของรูพรุนแบบยูนิมอดอลและไบมอดอล โดยจะแบ่งการศึกษาออกเป็น 2 ส่วน ในส่วนแรกจะทำการศึกษาผลของตัวเร่งปฏิกิริยาเซอร์โคโนซีนบนตัวรองรับ MCM-41 ที่มีโครงสร้างของรูพรุนต่างกันในการเตรียมปฏิกิริยาโคพอลิเมอร์ไรเซชันของเอทิลีนกับหนึ่งออกทีน และการในส่วนที่สองจะทำการศึกษาผลของโคโมโนเมอร์ที่ใช้ในการเตรียมปฏิกิริยาโคพอลิเมอร์ไรเซชันของเอทิลีนกับแอลฟาโอฟีนนั่นก็คือ 1-เฮกซีนและ 1-เดกซีน ซึ่งพบว่าในปฏิกิริยาการโคพอลิเมอร์ไรเซชันของเอทิลีน/1-ออกทีน และ เอทิลีน/1-เดกซีน โดยใช้ตัวรองรับ MCM-41 ที่มีโครงสร้างแบบไบมอดอลที่ถูกปรับปรุงด้วยครายโมดิฟายเมทัลอะลูมิเนียมออกไซด์ จะให้ค่าความว่องไวในการเกิดปฏิกิริยาสูงกว่าการใช้ตัวรองรับ MCM-41 ที่มีโครงสร้างแบบยูนิมอดอล ในขณะที่ปฏิกิริยาการโคพอลิเมอร์ไรเซชันของเอทิลีน/1-เฮกซีนโดยใช้ตัวรองรับ MCM-41 ที่มีโครงสร้างแบบไบมอดอลจะให้ค่าความว่องไวในการเกิดปฏิกิริยาค่าต่ำกว่ายูนิมอดอล และในงานวิจัยนี้ได้มีการศึกษาคุณสมบัติอื่นๆของโคพอลิเมอร์ เช่น มวลโมเลกุล อุณหภูมิหลอมเหลว อีกด้วย

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SIRINLAK BUNCHONGTURAKARN : EFFECT OF BIMODAL MCM-41-SUPPORTED ZIRCONOCENE CATALYST FOR ETHYLENE /1-OCTENE COPOLYMERIZATION. THESIS ADVISOR : ASST. PROF. BUNJERD JONGSOMJIT, Ph.D., 156 pp.

Due to the commercial interest of using metallocene catalysts for olefin polymerization, it has led to extensive efforts to utilize metallocene catalysts efficiently. However, it was found that homogeneous metallocene catalysts have two major disadvantages; (i) the lack of morphology control and (ii) reactor fouling. Therefore, binding these metallocene catalysts onto inorganic supports as supported metallocene catalysts can overcome those drawbacks. This research proposed the development and improvement of metallocene catalyst system by using MCM-41 supports with various pore structures such as unimodal and bimodal. This studied were divided into two parts. In the first part, impact of various MCM-41 supported zirconocene/dMMAO on the catalytic activities during copolymerization of ethylene/1-octene was investigated. In the second part, the impact of comonomers (1-hexene and 1-decene) employed under the corresponding condition as mentioned in the first part was further investigated. It was found that the bimodal MCM-41-supported zirconocene/dMMAO showed higher activity during copolymerization of ethylene/1-octene and ethylene/1-decene with the bimodal support whereas the lower activity during copolymerization of ethylene/1-hexene was found using the bimodal. The obtained copolymers with various pore structures of MCM-41 supports such as molecular weight , melting temperature were further characterized and discussed.

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