

UV-INITIATED POLYMERIZATION OF STYRENE
IN OIL IN WATER MICROEMULSION

Mr. Supachan Pichayanont

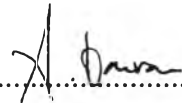
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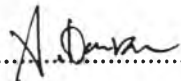
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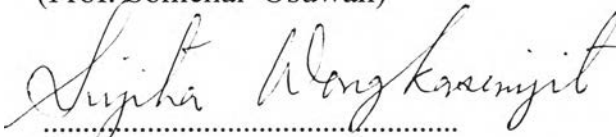
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ABSTRACT

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Microemulsion polymerization of styrene was studied in the Winsor type I (oil-in-water) microemulsion using sodium diethylhexyl phosphate (NaDEHP) as the surfactant. 0.5-3.0 % of styrene monomer solutions were initiated to polymerize by 4 and 100 watt UV light. The average molecular weight and the polydispersity index of polystyrene product were determined by GPC (gel permeation chromatography). The polymerization time significantly depended upon the radiant power of the UV lamp. The average molecular weights at the end of the polymerization phase were $0.7-1.2 \times 10^6$ and $0.9-1.0 \times 10^6$ by 4 and 100 watt UV lamp, respectively. The 100 watt UV also caused extensive depolymerization of the product after 30 minutes. The polydispersity index of polymer was found to reach a constant value of 1.5-1.6 independent of the initiation power, or monomer concentration.

บทคัดย่อ

ศุภชาร พิชยานนท์: การใช้แสงเหนือม่วงกระตุ้นปฏิกิริยาโพลิเมอไรเซชันของสไตรีนโดยใช้เทคนิคแบบไมโครอิมัลชันในชั้นน้ำมัน-น้ำ (UV-Initiated Polymerization of Styrene in Oil in Water Microemulsion) อาจารย์ที่ปรึกษา : ศ.ดร.เอโดเกน กุลาณี และ ศ.ดร. สมชาย โอสุวรรณ 37 หน้า ISBN 974-636-051-5

การศึกษาเทคนิคแบบไมโครอิมัลชันในการโพลิเมอไรเซชันสไตรีนในวินเซอร์แบบที่ 1 (Winsor Type I) ไมโครอิมัลชัน โดยใช้โซเดียมไดเอทิลเฮกซิลฟอสเฟต (Sodium diethylhexylphosphate, NaDEHP) เป็นสารลดแรงตึงผิว สไตรีนมอนอเมอร์ประมาณ 0.5 ถึง 3.0 เปอร์เซ็นต์ถูกกระตุ้นให้เกิดการโพลิเมอไรเซชัน โดยใช้หลอดแสงเหนือม่วงที่มีความเข้ม 4 และ 100 วัตต์ ค่าเฉลี่ยมวลโมเลกุลและค่าดัชนีการกระจายของมวลโมเลกุลของโพลีสไตรีนถูกวัดได้โดยใช้ เจลเพอมีเอชันโครมาโตกราฟี เวลาในการโพลิเมอไรเซชันขึ้นอยู่กับความเข้มของแสงเหนือม่วง ค่าเฉลี่ยมวลโมเลกุลของการโพลิเมอไรเซชันช่วงปลายมีค่า $0.7-1.2 \times 10^6$ และ $0.9-1.0 \times 10^6$ โดยใช้กำลังหลอด 4 และ 100 วัตต์ตามลำดับ หลอดกำลัง 100 วัตต์ยังส่งผลให้เกิดการดีโพลิเมอไรเซชัน (Depolymerization) หลังจากเวลาในการทำปฏิกิริยา 30 นาที ความเข้มของแสงหรือความเข้มข้นของมอนอเมอร์ไม่ทำให้ค่าดัชนีการกระจายของมวลโมเลกุลต่างกันมากนัก คือจะอยู่ในช่วง 1.5 ถึง 1.6

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