

**Conformational Change of HPC-HTAB Complexes Studied  
by Dynamic Light Scattering and Viscometry**

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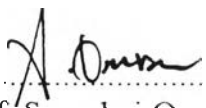
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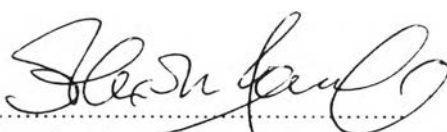
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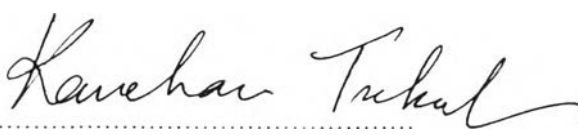
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## ABSTRACT

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KEY WORDS : HYDROXYPROPYL CELLULOSE /HPC/  
HEXADECYLTRIMETHYLTRIMETHYLAMMONIUM  
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The structure and behavior of polymer-micelles complexes formed in solutions of nonionic polymer, hydroxypropyl cellulose (HPC) and low molecular weight cationic surfactant, hexadecyltrimethylammonium bromide (HTAB) are studied by dynamic light scattering and viscometry as a function of surfactant concentration, polymer concentration, gram ratio of surfactant to polymer and ionic strength. The initial increase in the hydrodynamic radius and specific viscosity of the polymer-surfactant complex is attributed to charging up of the polymer by binding of the cationic surfactant until the polymer chain is saturated. The decrease after the binding reaches saturation is due to the effect of counterions on the polymer chain. At higher gram ratios of surfactant to polymer and higher concentrations of polymer, the system undergoes the semidilute regime. An addition of salt reduces electrostatic interactions of micelles along the polymer chain because of charge screening and results in the decrease in hydrodynamic radius and specific viscosity.

## บทคัดย่อ

สุชีรา รุจิธรรมกุล : การศึกษาการเปลี่ยนแปลงโครงสร้างของสารประกอบเชิงซ้อนของ HPC-HTAB โดยใช้เทคนิคการกระจายของแสงแบบไดนามิกส์และความหนืด [Conformation Change of HPC-HTAB Complexes Studied by Dynamic Light Scattering and Viscometry], อาจารย์ที่ปรึกษา : Prof. Alexander M. Jamieson และ รศ.ดร. อนุวัฒน์ ศิริวัฒน์, 64 หน้า, ISBN. 974-633-602-9

การศึกษาโครงสร้างและคุณสมบัติของสารประกอบเชิงซ้อนพอลิเมอร์-ไมเซลล์ที่ก่อตัวขึ้นในสารละลายของพอลิเมอร์ที่ไม่มีประจุ ไฮดรอกซีโพรพิลเซลลูโลส (HPC) และสารลดแรงตึงผิว (surfactant) ประจุบวกที่มีมวลโมเลกุลต่ำ เฮกซะเดคซิลไตรเมทิลแอมโมเนียมโบรไมด์ (HTAB) โดยการกระจายของแสงแบบไดนามิกส์และความหนืดภายใต้สภาวะต่างๆ ได้แก่ ความเข้มข้นของสารลดแรงตึงผิว ความเข้มข้นของพอลิเมอร์ อัตราส่วนโดยกรัมของสารลดแรงตึงผิวต่อพอลิเมอร์และความแน่นหนาของไอออน การเพิ่มขึ้นต้นของรัศมีที่วัดด้วยกำลังและอำนาจของของเหลว (hydrodynamic radius) และค่าความหนืดจำเพาะ (specific viscosity) ของสารประกอบเชิงซ้อนพอลิเมอร์-สารลดแรงตึงผิวเนื่องมาจากการเกิดประจุขึ้นของพอลิเมอร์โดยการเกี่ยวพันของสารลดแรงตึงผิวประจุบวกจนกระทั่งสายของพอลิเมอร์อ้อมตัว การลดลงหลังจากการเกี่ยวพันถึงจุดอ้อมตัวเกิดจากอิทธิพลของไอออนตรงกันข้าม (counterion) บนสายของพอลิเมอร์ อัตราส่วนโดยกรัมของสารลดแรงตึงผิวต่อพอลิเมอร์สูงๆและความเข้มข้นของพอลิเมอร์สูงๆ ระบบเข้าสู่บริเวณกึ่งเจือจาง (semidilute regime) การเติมเกลือจะลดแรงกระทำทางไฟฟ้าสถิตของไมเซลล์ตามสายของพอลิเมอร์เนื่องจากการก้ำกัของประจุและเป็นผลให้เกิดการลดลงของรัศมีที่วัดด้วยกำลังและอำนาจของของเหลวและค่าความหนืดจำเพาะ

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