DIFFUSION OF POLYSTYRENE LATEX SPHERES IN HYDROXYPROPYL CELLULOSE SOLUTIONS STUDIED BY DYNAMIC LIGHT SCATTERING AND VISCOMETRY

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บทคัดย่อ

สุวรรณา เลิศสกุลบรรลือ : การแพร่ตัวของพอลิสไตรีนลาเท็กซ์ในสารละลายไฮดรอกซีโพรพิลเซลลูโลส ศึกษาโดยใช้เทคนิคการกระจายของแสงแบบไดนามิกส์ และ การวัดความหนืด (Diffusion of Polystyrene Latexs in Hydroxypropylcellulose Studied by Dynamic Light Scattering and Viscometry) อ.ที่ปรึกษา: ศาสตราจารย์ อเล็คซานเดอร์ เอ็ม เจมิสัน (Prof. Alexander M. Jamieson) และ รศ.ดร อนุวัฒน์ ศิริวัฒน์, 56 หน้า, ISBN 974-633-603-7

สัมประสิทธิ์การแพร่ตัวของโพลิสไตรีนลาเท็กซ์ (PS) ในสารละลายไฮดรอกซีโพรพิลเซลลูโลส (HPC) ถูกศึกษาโดยใช้เทคนิคการกระจายแสงแบบไดนามิกซ์ และ การวัดความหนืด สาย HPC จะดูดซับบนพื้นผิวของลาเท็กซ์ และในกรณีของลาเท็กซ์ขนาดเล็ก และ HPC สายยาว, กลไกการเชื่อมต่อกัน (Bridging meachaism) สามารถตรวจสอบได้ เมื่อเซอร์แฟคแทนท์ชนิดไม่มีประจุ (ไตตรอน เอ็กซ์-100) ได้ถูกเติมลงไป แรงอันตรกิริยาระหว่าง HPC และลาเท็กซ์จะลดลง ณ 0.1 % โดยน้ำหนักของไตตรอน เอ็กซ์-100 การดูดซับของ HPC บนลาเท็กซ์ถูกยับยั้งอย่างสมบูรณ์ ในงานวิจัยนี้มีการหาค่าสัมประสิทธิ์การแพร่ของลาเท็กซ์เพื่อศึกษาผลกระทบของความเข้มข้นของเซอร์แฟคแทนท์, ความเข้มข้นของพอลิเมอร์ในมวลโมเลกุลที่ต่างกัน 3 ค่า และ ขนาดของลาเท็กซ์ที่ต่างกัน 3 ขนาด สเกลของการเปลี่ยนแปลงตามความเข้มข้นอยู่ในช่วง 0.5-0.8 ขึ้นอยู่กับแรงอันตรกิริยาระหว่างอนุภาคภายในระบบ

ABSTRACT

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SUWANNA LERTSKULBANLUE : DIFFUSION OF POLYSTYRENE LATEX SPHERES IN HYDROXYPROPYL CELLULOSE STUDIED BY DYNAMIC LIGHT SCATTERING AND VISCOMETRY: THESIS ADVISORS: PROF. ALEXANDER M. JAMIESON AND ASSOC. PROF. DR. ANUVAT SIRIVAT, 56 PP, ISBN 974-633-603-7.

Self diffusion coefficient of polystyrene (PS) spheres in hydroxypropyl cellulose (HPC) solution was studied by using the dynamic light scattering and viscometry techniques. HPC chains tend to absorb on the PS surface, and in the case of small sphere and long chain length of HPC, a bridging mechanism can be observed. When a nonionic surfactant, Triton X-100, is added, the interaction between HPC and PS is reduced. At 0.1 % wt. of Triton X-100, the adsorption of HPC on PS is completely inhibited. In this work, the diffusion coefficient of PS was measured to investigate the effects of Triton X-100 concentration, polymer concentration, molecular weights of HPC, and sizes of latex sphere. The exponent values of the stretched exponential function were also determined. δ varies from 0.5-0.8 depending on the interaction between the particles in the system.

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