

FOAMING OF ANIONIC SURFACTANT/SOAP MIXTURES

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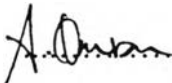
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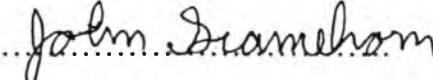
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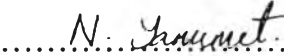
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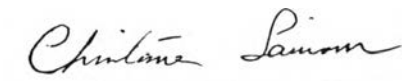
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ABSTRACT

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Foam height and foam stability of solutions containing mixtures of synthetic anionic surfactant and soap were measured using the Ross-Miles method and a newly developed Mixing method to investigate the mechanism of the antifoam properties associated with soaps. The Ross-Miles test is a standard method for studying foaming properties of surfactant while the Mixing method is designed to roughly simulate the mixing in a laundry machine. The experiments were carried out at constant temperature(30°C) and pH (pH=7), while the concentrations of the synthetic anionic surfactant, soap and water hardness were varied. Sodium dodecyl sulfate was chosen to be the synthetic anionic surfactant, sodium octanoate was used as the soap and calcium chloride was used to represent the water hardness in this study. The results show that foam height and foam stability reach a maximum in the neighborhood of CMC and remain constant above the CMC in all cases. Calcium reduces the foam height and foam stability below the CMC in the concentration range within the precipitation phase boundary. Above the CMC, foam height and foam stability are not effected by the presence of calcium. Below the CMC, soap is found to be a poorer foaming agent than SDS. However, in SDS/SOAP mixtures , the mixtures behave similarly to pure SDS in all mixture ratios indicating that SDS plays a predominant role in the foaming property of the mixtures.

บทคัดย่อ

ปิยะพล หงษ์พญา : การเป็นฟองของสารละลายผสมระหว่างสารลดแรงตึงผิวที่มีประจุลบ กับ สบู่ (Foaming of Anionic Surfactant/Soap Mixtures) อ.ที่ปรึกษา ศ.ดร. จอห์น เอฟ. สเคมีฮอร์น (Prof. John F. Scamehorn) และ ดร. นันทยา ขานูเมศ 70 หน้า ISBN 974-638-493-7

ในงานวิจัยนี้ได้มีการศึกษาความสูงฟองและความเสถียรฟองของสารละลายผสมระหว่างสารลดแรงตึงผิวที่มีประจุลบกับสบู่ โดยการวัดด้วยวิธีของรอส-ไมล์ และวิธีผสมเพื่อที่จะหาความสัมพันธ์กับความเข้มข้นของสารละลาย วิธีของรอส-ไมล์ เป็นวิธีมาตรฐานสำหรับการศึกษาฟองของสารลดแรงตึงผิว ส่วนวิธีผสมเป็นวิธีที่จำลองเพื่อศึกษาฟองของสารละลายในเครื่องซักผ้าแบบใส่ด้านบน ในการทดลองนี้ได้ทำที่อุณหภูมิคงที่ที่ 30 องศาเซลเซียส และค่าความเป็นกรด-ด่าง คงที่ที่ 7 ค่าความเข้มข้นของสารลดแรงตึงผิวที่มีประจุลบ สบู่ และค่าความกระด้างของน้ำ เป็นตัวแปรที่ทำการศึกษา สารลดแรงตึงผิวที่มีประจุลบที่ใช้คือโซเดียมโคเคซิลซัลเฟต ส่วนสบู่ใช้โซเดียมออกตาโนเอต โดยมีแคลเซียมคลอไรด์เป็นตัวให้ความกระด้างของน้ำ ผลการทดลองพบว่าทั้งความสูงและความเสถียรของฟอง จะขึ้นกับความเข้มข้นของสารละลายผสมระหว่างสารลดแรงตึงผิวกับสบู่ และ ความกระด้างของน้ำ โดยในระบบที่ปราศจากแคลเซียม ความสูงและความเสถียรของฟองจะเพิ่มขึ้น เมื่อความเข้มข้นของสารละลายผสมเพิ่มขึ้น จนกระทั่งสูงสุดที่ความเข้มข้นบริเวณค่าซีเอ็มซี และที่ความเข้มข้นของสารละลายสูงกว่าซีเอ็มซี ความสูงและความเสถียรของฟองจะลดลง เมื่อเติมแคลเซียมเข้าไปในระบบ พบว่าหลังจากความสูงและความเสถียรของฟองถึงจุดสูงสุดที่บริเวณค่าซีเอ็มซีแล้ว จะคงที่ไม่ขึ้นอยู่กับความเข้มข้นของสารละลายผสม ที่ความเข้มข้นต่ำกว่าค่าซีเอ็มซี พบว่าสบู่มีความสามารถในการเกิดฟองน้อยกว่าโซเดียมโคเคซิลซัลเฟต สำหรับสมบัติในการเกิดฟองของสารละลายผสมพบว่ามีสมบัติใกล้เคียงกับสารละลายของโซเดียมโคเคซิลซัลเฟตที่ทุกอัตราส่วนของสารผสม แสดงว่าโซเดียมโคเคซิลซัลเฟตมีบทบาทสำคัญในการเกิดฟองของสารผสม

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