

**CONTACT ANGLE OF SURFACTANT SOLUTIONS ON
PRECIPITATED SURFACTANT SURFACES**

Ms. Natthakeeraya Luangpirom

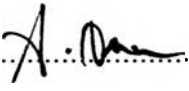
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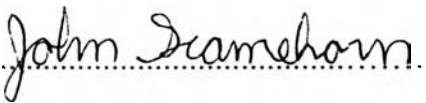
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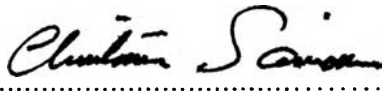
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ABSTRACT

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In this study, the contact angle of a saturated aqueous surfactant solution onto the surface of precipitate of that surfactant is investigated. Those precipitates include fatty acids (C_{10} , C_{12} , C_{14} , C_{16} , and C_{18}), sodium salts of fatty acids (C_8 , C_{10} , C_{12} , C_{14} , C_{16} , and C_{18}), calcium salts of fatty acids (C_8 , C_{10} , C_{12} , C_{14} , C_{16} , and C_{18}), and dodecyl sulfate (sodium and calcium salts). Receding contact angles are lower than advancing contact angles on fresh surfaces and receding contact angle depends on drop volume. Advancing contact angles are reduced on surfaces which have already been wet and depend on drop volume. This is interpreted to be due to surface modification of the crystals due to surfactant adsorption. On virgins surfaces, the free fatty acids and calcium salt of fatty acids have advancing contact angles (θ_A) between 75° and 90° with little dependence on alkyl chain length and the free fatty acid having a slightly higher θ_A . The sodium salt of fatty acid has a lower θ_A with a greater dependence on an alkyl chain length ($\theta_A = 45^\circ$ for C_8 to $\theta_A = 80^\circ$ for C_{18}). The calcium salt of dodecyl sulfate has a lower θ_A than the calcium salt of dodecanoic acid ($\theta_A = 55^\circ$ vs. 85°). Even though the soap scum (calcium salt of soaps) is greasy to the touch, surprisingly, this does not correspond to a high contact angle ($<90^\circ$). This brings into question the dewetting explanation for the defoaming activity of soap in hard water.

บทคัดย่อ

ณัฐกิริยา เหลืองภิรมย์ : มุมสัมผัสของสารละลายของสารลดแรงตึงผิวบนพื้นผิวตะกอนของสารลดแรงตึงผิว (Contact Angle of Surfactant Solutions on Precipitated Surfactant Surface)
 อ. ที่ปรึกษา : ศาสตราจารย์ จอห์น เอฟ สเคมิซอร์น และ ศศ. จินตนา สายวรรณ 64 หน้า ISBN 974-331-899-2

การศึกษาในเรื่องนี้เป็นการศึกษามุมสัมผัสของสารละลายอิมัลชันของสารลดแรงตึงผิวบนพื้นผิวของตะกอนของสารลดแรงตึงผิวชนิดนั้น ๆ ชนิดของตะกอนที่ศึกษาได้แก่ กรดไขมัน (ซี 10, ซี 12, ซี 14, ซี 16, และ ซี 18), กลีโกลิโคไลของกรดไขมัน (ซี 8, ซี 10, ซี 12, ซี 14, ซี 16, และ ซี 18), กลีโกลิโคไลของกรดไขมัน (ซี 8, ซี 10, ซี 12, ซี 14, ซี 16, และ ซี 18) และ โคเคซิลซัลเฟต (กลีโกลิโคไลและกลีโกลิโคไล) พบว่ามุมตอดอยมีค่าน้อยกว่ามุมก้ำวหน้าบนพื้นผิวที่ใหม่และค่ามุมตอดอยขึ้นกับปริมาตรของสารละลาย นอกจากนี้พบว่ามุมก้ำวหน้าบนพื้นผิวที่เปียกมีค่ามุมตอดอยและค่าของมุมยังขึ้นอยู่กับปริมาตรของสารละลายด้วย ที่เป็นเช่นนี้เพราะเกิดการเปลี่ยนแปลงพื้นผิวหน้าของตะกอนเนื่องจากการดูดซับของสารลดแรงตึงผิว การวัดมุมก้ำวหน้าบนพื้นผิวของตะกอนที่ใหม่พบว่า กรดไขมันและกลีโกลิโคไลของกรดไขมันมีค่าระหว่าง 75° และ 90° โดยมีค่าของมุมขึ้นกับความยาวสายโซ่เพียงเล็กน้อย และมุมก้ำวหน้าของกรดไขมันมีค่าสูงกว่าค่ามุมของกลีโกลิโคไลของกรดไขมันเพียงเล็กน้อย ส่วนกลีโกลิโคไลของกรดไขมันมีค่ามุมก้ำวหน้าต่ำกว่าและค่าของมุมขึ้นกับความยาวสายโซ่ (ซี 8 มีมุมก้ำวหน้า = 45° ถึง ซี 18 มีมุมก้ำวหน้า = 80°) กลีโกลิโคไลของโคเคซิลซัลเฟตมีค่ามุมก้ำวหน้าต่ำกว่าค่ามุมก้ำวหน้าของกลีโกลิโคไลของกรดโคเคคาโนอิค (มุมก้ำวหน้า = 55° เทียบกับ 85° ของซี 12) แม้ว่าคราบสบู่ (กลีโกลิโคไลของสบู่) จะมีลักษณะลื่นเหมือนน้ำมันเมื่อสัมผัส แต่สิ่งนี้ไม่ได้สอดคล้องกับมุมสัมผัสที่มีค่าสูง ($< 90^{\circ}$) จึงเป็นที่สงสัยการอธิบายการยับยั้งการเปียกเพื่อสลายโพลีเมอร์ของสบู่ในน้ำกระด้าง

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