

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

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for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
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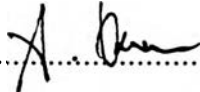
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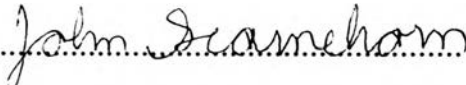
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ABSTRACT

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Nimit Dechabumphen: Contact Angle of Surfactant Solutions
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The contact angle of a saturated aqueous surfactant solution onto the precipitate of that surfactant was measured by using the sessile drop method. The surfactants used in this study were the sodium and calcium salts of alkyl sulfates (C_{12} , C_{14} and C_{18}), alkyl trimethylammonium bromides (C_{14} , C_{16} and C_{18}), fatty acids (C_{12} and C_{16}) and the calcium salts of fatty acids (C_8 and C_{12}). The sodium and calcium salts of alkyl sulfates have advancing contact angles (46° to 96°) higher than those of alkyl trimethylammonium bromides (0° to 34°). The measured advancing contact angles for several surfactant solutions did not substantially change with varying surfactant/counterion ratios; therefore, the precipitating counterion concentration (e.g., water hardness) will have little effect on the wettability. The contact angles of fatty acid solutions, which varied in pH from 4.0 to 10.0, did not show any dependence on pH. It was found in this study that the contact angles of saturated calcium dodecanoate solutions containing a second subsaturated surfactant (NaDS) decreased when increasing NaDS concentrations until reaching the CMC. These results show that a second surfactant can act as a wetting agent in these saturated surfactant systems.

บทคัดย่อ

นิमित เตะชะบำเพ็ญ : มุมสัมผัสของสารละลายของสารลดแรงตึงผิวบนพื้นผิวตะกอนของสารลดแรงตึงผิว (Contact angle of surfactant solutions on precipitated surfactant surfaces.) อ. ที่ปรึกษา : ศาสตราจารย์ จอห์น เอฟ สกมึสธอร์น และ ผศ. จินตนา สาขารณ์ 69 หน้า

มุมสัมผัสของสารละลายอิมิตัวของสารลดแรงตึงผิวบนพื้นผิวของตะกอนของสารลดแรงตึงผิวชนิดต่างๆ ถูกวัดโดยใช้วิธีเซสไซส์ครอป ชนิดของสารลดแรงตึงผิวที่ศึกษาได้แก่ กลีโโซเดียม และกลีโกลเซียมของสารซัลเฟต (ซี 12, ซี 14, และ ซี 18), กลีโโบไรไมด์ของสารไตรเมททิวแอมโมเนียม (ซี 14, ซี 16, และ ซี 18), กรดไขมัน (ซี 12, และ ซี 16), กลีโกลเซียมของกรดไขมัน (ซี 8, และ ซี 12) กลีโโซเดียม และกลีโกลเซียมของสารซัลเฟต มีค่ามุมสัมผัสระหว่าง 46° และ 96° ซึ่งสูงกว่ากลีโโบไรไมด์ของสารไตรเมททิวแอมโมเนียมที่มีค่ามุมสัมผัสระหว่าง 0° และ 34° ค่ามุมสัมผัสที่วัดได้จากสารละลายลดแรงตึงผิวหลายชนิดเปลี่ยนแปลงไม่มากนักเมื่อเปลี่ยนแปลงอัตราส่วนของสารลดแรงตึงผิวต่อประจุที่จับตัว ดังนั้นความเข้มข้นของประจุที่จับตัว (เช่น ความกระด้างของน้ำ) จึงมีผลกระทบต่อความสามารถในการทำให้พื้นผิวเปียก มุมสัมผัสของสารละลายกรดไขมันซึ่งมีค่าความเป็นกรดค้างอยู่ในช่วง 4.0 ถึง 10.0 ไม่ได้ขึ้นอยู่กับค่าความเป็นกรดค้างของสารละลาย ในการศึกษานี้ได้ถูกค้นว่ามุมสัมผัสของสารละลายอิมิตัวของกลีโกลเซียมของกรดไขมันซี 12 ซึ่งประกอบด้วยสารลดแรงตึงผิวชนิดที่สอง (โซเดียม โดเดซิลซัลเฟต) ที่มีความเข้มข้นต่ำกว่าความเข้มข้นอิมิตัว ลดลงเมื่อเพิ่มความเข้มข้นของโซเดียม โดเดซิลซัลเฟต จนกระทั่งถึงค่าซีเอ็มซี ผลการทดลองนี้แสดงให้เห็นว่าสารลดแรงตึงผิวชนิดที่สองสามารถทำหน้าที่เป็นสารช่วยทำให้เปียกในระบบสารละลายลดแรงตึงผิวเหล่านี้

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