

**STUDY OF OCTANOIC ACID AS COSURFACTANT FOR SODIUM
DODECYL SULFATE/HEXANE/SODIUM CHLORIDE ALCOHOL-
FREE MICROEMULSION SYSTEM**

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for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
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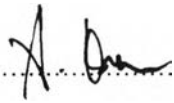
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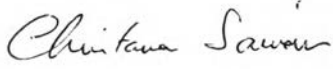
Thesis Title : Study of Octanoic Acid as Cosurfactant for Sodium Dodecyl Sulfate/Hexane/Sodium Chloride Alcohol-Free Microemulsion System
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ABSTRACT

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Pongtai Wilaireungauwan : Study of Octanoic Acid as Cosurfactant for Sodium Dodecyl Sulfate/Hexane/Sodium Chloride Alcohol-Free Microemulsion System. Thesis Advisors : Prof. Jeffrey H. Harwell and Asst. Prof. Chintana Saiwan, 127 pp ISBN 974-334-144-7

Octanoic acid, as an alcohol-free cosurfactant, was used to replace alcohol to promote microemulsion of a system containing sodium dodecyl sulfate/hexane/NaCl. The phase behavior and physicochemical properties of the microemulsion systems were studied. The systems exhibited the Winsor-type phase transition from Winsor I to Winsor III or Winsor IV and Winsor II with increasing salinity. At low surfactant concentrations a gel-like solution occurred in the excess oil phase of type I and a creamy solution in the middle phase of type III. Both phenomena decreased with increasing equilibrium time and temperature. The physicochemical properties, solubilization of oil and water, interfacial tension, and electrical conductivity were determined. As surfactant concentration increased, the solubilization parameter increased to a maximum and then decreased beyond the optimum surfactant concentration. Ultralow interfacial tension occurred in the middle phase region and further decreased with increasing surfactant concentration. The electrical conductivity of Winsor I showed water-like solution and high conductivity value, while Winsor II indicated oil-like solution and low conductivity values. All physicochemical properties showed abrupt changes at optimum salinity values.

บทคัดย่อ

ป๋องไท วิไลเรื่องสุวรรณ : การศึกษาการคอดอกตาโนอิกเป็นเซอร์แฟคแตนท์ร่วมในระบบไมโครอิมัลชันที่ปราศจากอัลกอฮอล์ที่มีส่วนประกอบของโซเดียมโดเดคซิลซัลเฟต เฮกเซน และโซเดียมคลอไรด์ (Study of Octanoic Acid as Cosurfactant for Sodium Dodecyl Sulfate/Hexane/Sodium Chloride Alcohol-Free Microemulsion System) อ. ที่ปรึกษา : ศ. ดร. เจฟฟรีย์ เอช ฮาเวล และ ผศ. ดร. จินตนา สายวรรณ 127 หน้า ISBN 974-334-144-7

การใช้กรดออกตาโนอิกเป็นเซอร์แฟคแตนท์ร่วมที่ปราศจากอัลกอฮอล์แทนสารแอลกอฮอล์เพื่อช่วยให้เกิดไมโครอิมัลชันของระบบที่ประกอบด้วยโซเดียมโดเดคซิลซัลเฟต เฮกเซนและโซเดียมคลอไรด์ เพื่อทำการศึกษาพฤติกรรมของเฟสและคุณสมบัติด้านเคมีกายภาพ ไมโครอิมัลชันที่เกิดขึ้นมีการเปลี่ยนแปลงเฟสจากวินเซอร์ชนิดที่ 1 สู่วินเซอร์ชนิดที่ 3 หรือชนิดที่ 4 และวินเซอร์ชนิดที่ 2 เมื่อเพิ่มปริมาณเกลือ ที่ความเข้มข้นเซอร์แฟคแตนท์ต่ำสารละลายมีลักษณะคล้ายเจลเกิดขึ้นในชั้นน้ำมัน ที่เหลือของไมโครอิมัลชันชนิดที่ 1 และเกิดสารละลายคล้ายครีมในชั้นกลางของไมโครอิมัลชันชนิดที่ 3 ปรากฏการณ์ทั้งสองอย่างนี้ลดลงเมื่อเพิ่มระยะเวลาการเข้าสู่สมดุลหรือเพิ่มอุณหภูมิ การวัดหาคคุณสมบัติทางเคมีกายภาพ การละลายของน้ำมันและน้ำ แรงดึงผิวระหว่างเฟสและความสามารถในการนำไฟฟ้า พบว่าเมื่อความเข้มข้นของเซอร์แฟคแตนท์มีค่าสูงขึ้น ตัวแปรการละลายเพิ่มขึ้นจนถึงจุดสูงสุดและลดลงเมื่อความเข้มข้นเซอร์แฟคแตนท์เกินจุดที่เหมาะสม แรงดึงผิวระหว่างเฟสที่มีค่าต่ำมากเกิดขึ้นในบริเวณเฟสกลางและมีค่าลดต่ำลงไปอีกเมื่อความเข้มข้นเซอร์แฟคแตนท์มีค่าเพิ่มขึ้น การนำไฟฟ้าของวินเซอร์ชนิดที่ 1 มีค่าสูงคล้ายค่าการนำไฟฟ้าของสารละลายน้ำ ในขณะที่วินเซอร์ชนิดที่ 2 มีค่าต่ำคล้ายค่าการนำไฟฟ้าสารละลายน้ำมัน คุณสมบัติเคมีกายภาพทั้งหมดแสดงการเปลี่ยนแปลงอย่างมากที่จุดเกลือที่เหมาะสม

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