

**CUTTING OIL REMOVAL BY CONTINUOUS FROTH FLOTATION
USING AN EXTENDED SURFACTANT UNDER
MICROEMULSION CONDITIONS**

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บทคัดย่อ

อภิจราภรณ์ เนตรสว่าง : กระบวนการแยกน้ำมันหล่อเย็นออกจากน้ำเสียโดยระบบทำให้ลอยแบบต่อเนื่องด้วยสารลดแรงตึงผิวภายใต้สภาวะการเกิดไมโครอิมัลชัน (Cutting Oil Removal by Continuous Froth Flotation Using an Extended Surfactant under Microemulsion Conditions) อ. ที่ปริศึกษา : รศ. ดร. สุเมธ ชวเดช 79 หน้า

งานวิจัยนี้มีวัตถุประสงค์เพื่อกำจัดน้ำมันหล่อเย็นออกจากน้ำโดยวิธีกระบวนการทำให้ลอยแบบต่อเนื่องภายใต้สภาวะของการเกิดไมโครอิมัลชัน ชุดการทดลองกระบวนการทำให้ลอยถูกนำมาใช้เพื่อหาประสิทธิภาพในการกำจัดน้ำมันหล่อเย็นออกจากน้ำในสภาวะที่เกิดไมโครอิมัลชัน 3 ชนิด สารลดแรงตึงผิวแบบบรานซ์ อัลกอกซิล โพรพอกซีเลต ซัลเฟต โซเดียมซอลท์ (Alfoterra 145-3PO) ถูกนำมาใช้ในการศึกษาทดลองการเกิดไมโครอิมัลชันและกระบวนการทำให้ลอย ปัจจัยของความเข้มข้นสารลดแรงตึงผิว ความเค็ม และอัตราส่วนน้ำต่อน้ำมันได้ถูกศึกษาในการทดลองการเกิดไมโครอิมัลชันเพื่อหาสัดส่วนประกอบที่ทำให้เกิดไมโครอิมัลชันชนิดต่าง ๆ และให้ค่าแรงตึงผิวที่ต่ำมาก ๆ ในขณะเดียวกัน เพื่อนำไปทดลองต่อในส่วนของการทำให้ลอย ในกระบวนการทำให้ลอยได้ทำการศึกษาปัจจัยของความเข้มข้นสารลดแรงตึงผิว ความเค็ม และเวลาเก็บกักต่อการกำจัดน้ำมัน พบว่า ระบบที่ความเข้มข้นของบรานซ์ อัลกอกซิล โพรพอกซีเลต ซัลเฟต โซเดียมซอลท์ 0.3 เปอร์เซ็นต์, ความเข้มข้นของเกลือ 10 เปอร์เซ็นต์ และ เวลาเก็บกัก 20 นาที ให้ประสิทธิภาพการกำจัดน้ำมันที่สูงที่สุดเท่ากับ 83 เปอร์เซ็นต์ จากผลการทดลอง ประสิทธิภาพของการกำจัดน้ำมันในสภาวะที่เกิดวินเซอร์ไมโครอิมัลชันชนิดที่ 3 สูงกว่าสภาวะที่เกิดวินเซอร์ไมโครอิมัลชันชนิดที่ 1 และวินเซอร์ไมโครอิมัลชันชนิดที่ 2

ABSTRACT

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The objective of this study was to remove cutting oil by continuous froth flotation using an extended surfactant under microemulsion conditions. The froth flotation experiments were carried out to observe the removal efficiency of cutting oil under three types of microemulsions. Branched alcohol propoxylate sulfate sodium salt (Alfoterra 145-3PO), an extended surfactant was used to form microemulsions with cutting oil in both the phase behavior and froth flotation studies. The effects of surfactant concentration, salinity, and oil-to-water ratio on the phase behavior were investigated in order to determine the compositions required to obtain various types of microemulsions as well as the ultra-low interfacial tension conditions. In the froth flotation experiments, the effects of surfactant concentration, salinity, and hydraulic retention time (HRT) on the oil removal were examined. The system with 0.3 wt.% Alfoterra, 10 wt.% NaCl, and 500 ppm oil content at 0.30 L/min air flow rate, 31 cm foam height, and 20 min HRT gave the highest oil removal of 83%. The results showed that cutting oil removal in the Winsor III microemulsion condition was higher than those in the Winsor I and Winsor II microemulsion regions.

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