

**DETERGENCY OF OILY SOIL: EFFECTS OF HARDNESS
AND BUILDERS**

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ABSTRACT

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The objective of this study was to investigate the effects of hardness and builders on both the phase diagrams of microemulsions with motor oil and the detergency performance of oily soil removal. A mixed surfactant system of 0.1 wt.% branched alcohol propoxylate sulfate sodium salt (Alfoterra 145-3PO) and 5 wt.% secondary alcohol ethoxylate (Tergitol 15-S-5) was used to form microemulsions with motor oil under the presence and absence of hardness and/or builders. Under this mixed surfactant system, the optimum salinity slightly decreased with increasing hardness and the microemulsion diagrams did not change with hardness. From the detergency results, the total oil removal decreased with increasing hardness for all three types of fabrics (pure cotton, polyester/cotton [65/35] blend and pure polyester) and the total oil removal was improved with increasing hydrophilicity of the fabric. When the hardness increased, the adsorption of a mixed surfactant decreased but the interfacial tension increased. For addition of the builder under the presence of hardness, the total oil removal was improved at a certain level.

บทคัดย่อ

อัมพิกา นาครัชตะอมร : ผลกระทบของน้ำกระด้าง และสารลดความกระด้างของน้ำที่มีต่อการทำความสะอาดคราบน้ำมันเครื่อง (Detergency of Oily Soil: Effect of Hardness and Builders) อ. ที่ปรึกษา: รศ.ดร. สุเมธ ชวเดช ศ.ดร. จอห์น เอฟ สกามีฮอร์น และ ดร. จันทรา ทองคำภา 87 หน้า

วัตถุประสงค์ของงานวิจัยนี้คือ ศึกษาผลกระทบของน้ำกระด้างและสารลดความกระด้างของน้ำ ที่มีต่อระบบการเกิดไมโครอิมัลชันกับน้ำมันเครื่องและต่อประสิทธิภาพของการทำความสะอาดคราบน้ำมันเครื่อง โดยสารลดแรงดึงผิวผสมที่ถูกเลือกใช้ในการเกิดไมโครอิมัลชันกับน้ำมันเครื่อง ประกอบด้วย อัลโฟเทอรา 145-3 โพลีเอทรีลีนออกไซด์ (Alfoterra 145-3PO) 0.1 เปอร์เซ็นต์โดยน้ำหนัก และ เทอจิทอล 15 เอส 5 (Tergitol 15-S-5) 5 เปอร์เซ็นต์โดยน้ำหนัก ภายในสภาวะที่มี และไม่มีน้ำกระด้าง และ/หรือ สารลดความกระด้างของน้ำ จากเฟสไดอะแกรมของไมโครอิมัลชัน พบว่าเมื่อความกระด้างของน้ำเพิ่มขึ้น ปริมาณเกลือที่เหมาะสมที่สุดในการเกิดไมโครอิมัลชัน วินเซอร์ชนิดที่สาม มีแนวโน้มลดลงเล็กน้อย แต่การเพิ่มความกระด้างของน้ำนี้ ไม่มีผลกระทบต่อแผนภูมิของไมโครอิมัลชัน นอกจากนี้ยังพบว่า ประสิทธิภาพในการทำความสะอาดคราบน้ำมันเครื่องชนิด และการดูดซับของสารลดแรงดึงผิวบนพื้นผิวของผ้ามีแนวโน้มลดลงอย่างมาก ในขณะที่ค่าแรงดึงผิวระหว่างคราบน้ำมันเครื่องและสารลดแรงดึงผิว มีแนวโน้มสูงขึ้น ส่วนการเติมสารลดความกระด้างของน้ำลงในสภาวะที่มีน้ำกระด้าง พบว่าประสิทธิภาพในการทำความสะอาดคราบน้ำมันเครื่องถูกพัฒนาขึ้นในระดับหนึ่งเท่านั้น

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