

**VALIDATION AND STANDARDIZATION OF ASPHALTENE
DEPOSITION BY CAPILLARY EXPERIMENTS**



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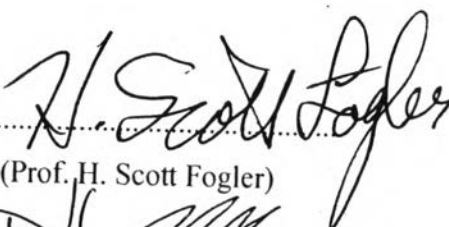
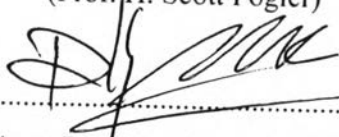
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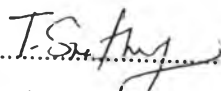
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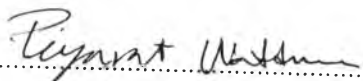
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ABSTRACT

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Asphaltene deposition can occur during processing and production of crude oil and can cause severe problems for the oil industry. In this experiment, n-heptane was used as a precipitant to destabilize asphaltenes to force deposition inside a capillary. From previous studies, the asphaltene deposition mechanism is still unknown and reproducibility has not been thoroughly investigated. The deposition apparatus has been developed to improve good mixing by adding a connecting line and mixing frit before the solution flows into the capillary. A pre-filter was also added to prevent asphaltenes formed in the mixing section from travelling into the capillary. The modified apparatus shows more consistent results. Initial results have shown that asphaltenes will deposit well *below* the onset point. These experiments were performed with an oil that had a relatively high asphaltene content. In the field, asphaltene deposition problems can occur with a variety of asphaltene contents. We have expanded our investigation to study an additional crude oil. We also investigated the properties affecting the asphaltene deposition for each oil studied.

บทคัดย่อ

วรัณ ชื่นมีเชาว์ : การพิสูจน์และหามาตรฐานของการเกาะตัวของแอสฟัลทีนโดยการทดลองด้วยท่อแคปิลลารี (Validation and Standardization of Asphaltene Deposition by Capillary Experiments) อ. ที่ปรึกษา : ศ. ดร. เอช สก๊อตต ฟอกเลอร์ และ ผศ. ดร. ปมทอง มาลากุล ณ อุรุยา 37 หน้า

การเกาะตัวของแอสฟัลทีนสามารถเกิดขึ้นในขบวนการผลิตและแปรรูปน้ำมันดิบเป็นปัญหาที่รุนแรงสำหรับอุตสาหกรรมน้ำมัน ในการศึกษานี้ นอมัลเฮปเทน ได้ถูกนำมาใช้เป็นสารเร่งการตกตะกอนเพื่อทำให้แอสฟัลทีนเกิดความไม่เสถียรและก่อให้เกิดการเกาะตัวภายในท่อแคปิลลารี จากการศึกษาที่ผ่านมาพบว่า ยังไม่ทราบกลไกการเกาะตัวที่แน่ชัด และไม่สามารถยืนยันผลการทดลองได้ ด้วยเหตุนี้ เครื่องมือที่ใช้ศึกษาการเกาะตัวจึงได้ถูกพัฒนาขึ้นเพื่อปรับปรุงการผสมของสาร โดยการต่อท่อเชื่อมและพริกก่อนที่สารละลายไหลเข้าสู่ท่อแคปิลลารี รวมถึงการใส่ตัวช่วยกรองเพื่อป้องกันไม่ให้แอสฟัลทีนที่เกิดขึ้นในช่วงที่สารกำลังผสมกันนั้นหลุดเข้าไปในท่อแคปิลลารี ซึ่งเครื่องมือที่ผ่านการปรับปรุงนั้นแสดงให้เห็นถึงผลที่มีความสอดคล้องกันมากกว่าเดิม จากผลการทดลองขั้นต้นแสดงให้เห็นว่า แอสฟัลทีนสามารถเกิดการเกาะตัวได้แม้จะอยู่ในสถานะที่ต่ำกว่าจุดที่สามารถสังเกตเห็นแอสฟัลทีนได้ (Onset point) โดยการทดลองขั้นต้นนี้ได้ทำการศึกษากับน้ำมันที่มีแอสฟัลทีนอยู่เป็นจำนวนมาก ซึ่งในความเป็นจริงนั้น ปัญหาการเกาะตัวของแอสฟัลทีนสามารถเกิดขึ้นได้กับน้ำมันที่มีปริมาณแอสฟัลทีนหลากหลาย ดังนั้นการศึกษานี้จึงขยายขอบเขตการศึกษาไปถึงน้ำมันดิบที่แตกต่างกันออกไป และยังสามารถศึกษาคุณสมบัติที่มีผลกระทบต่อ การเกาะตัวของแอสฟัลทีนในแต่ละน้ำมันที่ทำการศึกษา

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