



Contribution ID: 556

Type: **Poster Presentation**

Pore-scale imaging of asphaltene deposition with permeability reduction and wettability alteration

Tuesday, 31 May 2022 09:20 (1h 10m)

To better understand asphaltene deposition mechanisms and their influence on rock permeability and wettability, we have developed an in situ micro-CT imaging capability to observe asphaltene precipitation during multiphase flow at high resolution in three dimensions. Pure heptane and crude oil were simultaneously injected to induce asphaltene precipitation in the pore space of a sandstone rock sample. The heptane permeability across the sample was nine times lower after the first asphaltene precipitation, while it was reduced by a factor of ninety due to asphaltene migration and growth after subsequent brine injection. Furthermore, through quantifying the curvatures and contact angles on the images before and after asphaltene precipitation, we observed that the wettability of the porous medium changed from water-wet to mixed-wet. Overall, we demonstrate a micro-CT imaging and analysis workflow to quantify asphaltene deposition, permeability reduction and wettability change which can be used for reservoir characterisation and remediation.

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Country

United Kingdom

References

Time Block Preference

Time Block B (14:00-17:00 CET)

Participation

In person

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Session Classification: Poster

Track Classification: (MS10) Advances in imaging porous media: techniques, software and case studies