Contribution ID: **415** Type: **Poster Presentation**

The Influence of Imaging Contrast Agents on Emulsification under Flow Conditions

Wednesday, 1 June 2022 14:50 (1h 10m)

X-ray and optical contrast agents are widely used in porous media research in order to image fluid displacement processes. The field of application is wide and reaches from microfluidics (optical and fluorescence microscopy) to core floods and in the latter form the continuum (medical CT) to the pore scale (micro CT). In all these applications, the contrast is increasing with the increasing concentration of the contrast agent, and some applications require relatively high agent concentrations for the required sensitivity. However, contrast agents are chemicals that may influence fluid properties, fluid-fluid and rock fluid interactions.
The present study deals with surfactant and alkaline flooding on the pore scale. In this frame, we are concerned about the influence of x-ray, optical and fluorescence contrast agents on the fluid-phase behavior, respectively, on the formation of emulsion phases. For this, we test common contrast agents at different concentrations for both crude oil and synthetic oil systems. For x-ray contrast, compounds with heavy elements are required, such as CsCl (Cesium chloride), KI (potassium iodide) for water doping, or Iododecane, Bromoheptane for oil phase doping. In the present study, we focus on CsCL and Iododecan. On the other hand, optical contrast between transparent oil and water phase can be reached by Sudan and Eosin or by fluorescent salt under fluorescence light.
For minimizing the influence of doping agents on the phase behavior of the intended fluid systems, we perfumed a series of classical phase behavior experiments and experiments under porous-media-flow conditions. As porous media, 2D microfluidics as well as 3D porous glass was used. The resulting emulsion phases were detected by optical (optical and fluorescence microscopy) and x-ray (medical and micro CT) means. In the presentation, we discuss the results of the study in terms of agent concentrations and the resulting emulsion phases, respectively, the reliability of experimental results.

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References

Time Block Preference

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

Participation

Unsure

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Session Classification: Poster

Track Classification: (MS06-B) Interfacial phenomena in multiphase systems