The EOR Alliance

Wettability Alteration

Description:

Surfactant-based wetting agents are used to modify wettability of reservoir rocks to enhance oil production. The wettability can be to enhance water imbibition and oil-counter production.

Application:

Near-wellbore treatment and water imbibition in fractured oil-wet carbonates.

Results:

A dedicated workflow including both automated product screening (high throughput contact angle and imbibition tests) and petrophysics measurements (Amott/USBM tests) have been set up. Performance of selected products has been demonstrated in a harsh application case of imbibition in Lavoux carbonate rendered oil-wet by an asphaltenic crude oil.

Challenges:

- Oil production can be hindered by capillary trapping effects in the near-wellbore area.
- Fractured oil-wet reservoirs have low primary and secondary recovery due to early water-breakthrough and limited water imbibition.

Solutions:

- Reverse wettability toward a favorable state for oil expulsion, either by addressing capillary trapping, or by favoring counter-current production by water-imbibition.

Objectives:

- Select a fit for purpose wettability altering agent, depending on the application (oil-wetting or water-wetting agent).
- Formulate the wetting agent to adapt it to given conditions of salinity and temperature.
- Characterize the wetting agent through petrophysics application tests.
- Deliver the agent for testing at pilot scale.

References: SPE121668, SPE129178, SPE179561.

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