The EOR Alliance

Advanced EOR Foams for Oil-Wet Fractured Reservoirs

Description:

Injection of foam exhibiting low interfacial tension with oil and/or wettability alteration of the rock.
Foam generates an important pressure gradient in the fractures to promote flow of the formulation into the matrix and then enhance oil mobilization by a favorable change of capillary pressure.

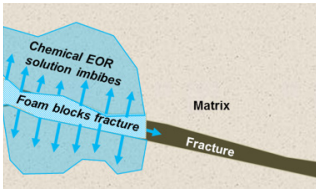


Fig 1. Schematic view of phenomena in the process

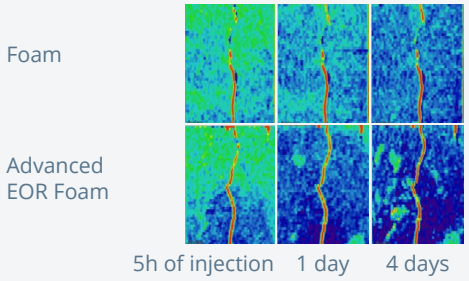
Application:

Increase recovery factor of the matrix in highly fractured reservoirs with unfavorable wettability.

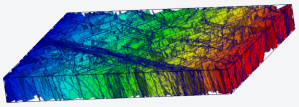
Results:

The Alliance has developed a unique formulation solution combining foam properties and low interfacial tension and/or wettability alteration, even in high temperature and harsh conditions of injection brine. Coreflood experiments show that foam exists and propagates in fractures and aqueous formulation enters the matrix so that the wettability alteration and/or low interfacial tension can boost the recovery factor of the matrix. These conclusions are supported by laboratory work and simulation models.

Lab Results
Ex: Oil recovery in fractured core (CT-scan images)



Your Reservoir
Thorough characterization of fracture network



1. Simulation
Continuous modeling of the process

2. Design of pilot

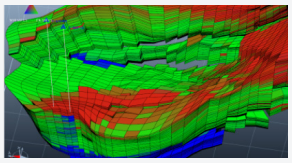


Fig 2. Simplified workflow: formulation evaluation in representative corefloods tests, fracture network characterization, simulation of process, and pilot design.

Challenges & Solutions:

- Increase viscous forces driving oil out of the matrix blocks: Foam generates a pressure gradient in fractures
- Take full benefit of *gravity* forces: Very low IFT foam formulation annihilates capillary pressure
- Take full benefit of spontaneous imbibition: formulation change rock wettability into water-wet
- Design an economical solution fitted to your reservoir: our simulation models help the decision process for pilots

Objectives:

- Lab design and characterization of the most adapted formulation with industrially available surfactants
- Design of a pilot, reservoir engineering for pilot zone selection, simulation for the process and on site assistance for pilot deployment

References: SPE169140-PA, SPE179811-PA, SPE174658-MS, SPE190363-MS

An Alliance between: IFP Energies nouvelles, BeicipFranlab, SOLVAY asking more from chemistry®

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