

A Short Talk On

Surface and Interfacial Aspects of Oil Recovery from Underground Hydrocarbon Reservoirs

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Abstract:

In a hydrocarbon reservoir there are places where different phases of oil, gas, water, and solid rock meet mutually. The meeting two-dimensional phase between the two bulk phases is known as interface and any property related to the interface is called interfacial property. Wettability, for instance, is an interfacial property which is governed by rock-fluid and fluid-fluid interfacial energies. Interfacial tension (IFT) between water-oil, gas-oil, or gas-water also is an important interfacial property. Wettability and IFT significantly affect important features of petroleum reservoir processes, such as water-oil contact movement, water alternative gas derive, trapping of hydrocarbon by injected fluid, and the recovery factor in all the Enhanced Oil Recovery (EOR) techniques. In addition to wettability and IFT, there are many other cases in a petroleum reservoir so that interfacial properties are governing factors. Formation damage, asphaltene precipitation and agglomeration, scale formation, fine migration, condensate blockage, foam formation, formation of microemulsion, and also oil migration are some examples of the kind. This short lecture is designed to familiarize audience with the application of colloid and interfacial science in oil recovery processes. The talk will be focused particularly on the challenges of oil recovery from fractured carbonate rocks. The items to be discussed during the seminar will be:

- Hydrocarbon Reservoirs: What Makes Them So Especial?
- Surface Forces Role: Friend or Foe?
- EOR Challenges
- The Use of Surfactants
- The Use of Nanofluids
- The Impact of Ions (Smart Water)
- Marangoni Flood in Reservoirs
- Thermodynamic Modeling: Applications and Challenges