



Effect Oil-Gas-Water-Saturation of Rocks of Different Lithology and Geodynamics of Rocks

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Introduction

Initial water saturation of oil recovery for rocks is investigated using spontaneous imbibition experiments. Experiments are done by using diluted sea water as imbibing fluid and ocean water as initial water. The impact of pH and Ca²⁺, Mg²⁺, Na⁺, and K⁺ cations concentration change in fluid are investigated. Results are went to spot the active cations present in carbonate rocks during the low-salinity water injection. Effect of initial water saturation on the oil recovery by low-salinity water injection. The impact might be positive or negative relying on its value and thus the rock permeability. Comparison of divalent cations concentrations shows that the minimum adsorption of Ca²⁺ and maximum desorption of Mg²⁺ cause maximum oil recovery of spontaneous imbibition. The results show three cations of Ca²⁺, Mg²⁺, and Na⁺ are present in rocks within the presence of sea water as initial water and diluted sea as imbibing fluid, because the amounts of potassium remain constant.

Description

The oil companies have an interest to take a position for the technologies that enhance the oil recovery (EOR technology). Performance of the EOR techniques significantly depends on the reservoir rock and fluids properties. a number of the reservoir rocks are naturally fractured and, therefore, the flow mechanisms in these reservoirs are different from non-fractured reservoirs. The rock sort of the fractured reservoirs is especially carbonate, whereas the non-fractured reservoirs are generally sandstone. The fractured carbonate reservoirs contain two media including fracture and matrix. The reside within the fractured reservoirs is especially trapped within the matrix region thanks to low permeability and high capillarity effect and consequently, the capillary forces are dominant within the matrix region of carbonate rocks, in order that the oil recovery from these rocks is less than the sandstone reservoirs. Changing the rock and fluid properties (i.e., viscosity, interfacial surface tension, relative permeability, wettability, and capillary forces) to the favourable conditions are the most ideas behind the EOR methods to displace the trapped oil toward production wells within the reservoir.

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Among the varied mechanisms, the wettability alteration of the rock from the oil-wet to the water-wet is one among the foremost favourable mechanisms within the case of carbonates. during this mechanism, the capillary pressure is modified, especially within the matrix region of the carbonate fractured reservoirs, in order that the water is imbibed into the matrix and displaces the trapped oil

Conclusion

The effects and factors of hydrogeological parameters such as irreducible water saturation, irreducible gas saturation, and gas entry pressure on gas hydrate production When the irreducible water saturation decreases from 0.10 to 0.50, the cumulative gas production decreases and therefore the total water production drops. the rise within the irreducible water saturation could occupy the pore space, so it'll reduce the relative permeability of gas and water. At an equivalent time, it'll make the effective pore throat diameter smaller and increase the capillary pressure, so it'll reduce the gas production and water production are discussed and experimental views are known

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