SPE Nigeria Annual International Conference and Exhibition
August 11–13, 2020
Virtual
Day 1 Tue, August 11, 2020
ISBN:

978-1-61399-785-7

Experimental Studies on the Performance of Bio Based and Industrial Surfactants in Enhanced Oil Recovery

Damilola Abraham ;

Oyinkepreye Orodu ;

Vincent Efeovbokhan ;

Emmanuel Okoro ;

Temiloluwa Ojo ;

Lekan Keshinro

Paper presented at the SPE Nigeria Annual International Conference and Exhibition, Virtual, August 2020.
Paper Number: SPE-203759-MS
https://doi.org/10.2118/203759-MS
Published: August 11 2020

Abstract

Surfactants are known for their unique property in lowering the interfacial tension (IFT) amid fluids injected and heavy crude oil of 22.3°API. In this present work, an original surfactant was formulated from natural oil (Castor oil) to see its use in enhanced oil recovery. The results from interfacial tension reduction by the castor oil-based surfactant were compared to that of the industrial surfactant (Methyl ester sulfonate). The IFT between the aqueous phases was measured then the effect of the surfactants was studied in core flooding experiments. The IFT was found to be reduced to as low as 12.1 mN/m using the castor-based surfactant and 12.3 mN/m using the industrial surfactant. The influence of brine concentration on IFT was also investigated. Results from core floods showed that the range of oil recovery after waterflood is in the range of 30-40% and the additional recovery from surfactant flooding in the range of 35-46%.

Keywords:
enhanced recovery, ift, brine concentration, crude oil, waterflooding, concentration, surfactant flooding, chemical flooding methods, industrial surfactant, methyl ester sulfonate

Subjects:
Improved and Enhanced Recovery, Waterflooding, Chemical flooding methods