INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Optimum Formulation of Chemical Slug for Enhanced Oil Recovery of Assam Crude oil

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SHORT ABSTRACT

The potential of chemical EOR to enhance oil recovery for Assam crude oil has been investigated in this thesis. A systematic method has been adapted to carry out the overall chemical EOR process. An efficient oil recovery can be obtained from chemical EOR by activating different mechanisms such as interfacial tension, emulsification, wettability alteration and sweep efficiency. In the current project, alkali flooding was first conducted to estimate the increase in oil recovery for light category Assam crude oil. The success of alkali flooding depends greatly on the acid value and saponification of crude oil which significantly controls the mechanism responsible for higher oil recovery. Hence the properties of crude oil play an important role for effective alkali flooding. After the success of alkali flooding, alkali-surfactant flooding was performed to enhance oil recovery for both light and heavy crude oils. The process was found dependent on the interfacial tension and emulsification extent which control the sweep efficiency for oil recovery. The stability of surfactant is one of the important parameter which has to be taken in account for field application. The surfactant has adsorption characteristics, hence the role of rock minerology on adsorption characteristics were evaluated. Finally, nanoparticle particles were introduced which showed improvement in different mechanisms responsible for higher oil recovery. The success of chemical-nanoparticles flooding depends on the stability of the particles on the aqueous phase at different reservoir conditions and its interaction with the crude oil.