Study of Heavy oil by Chemical Flooding

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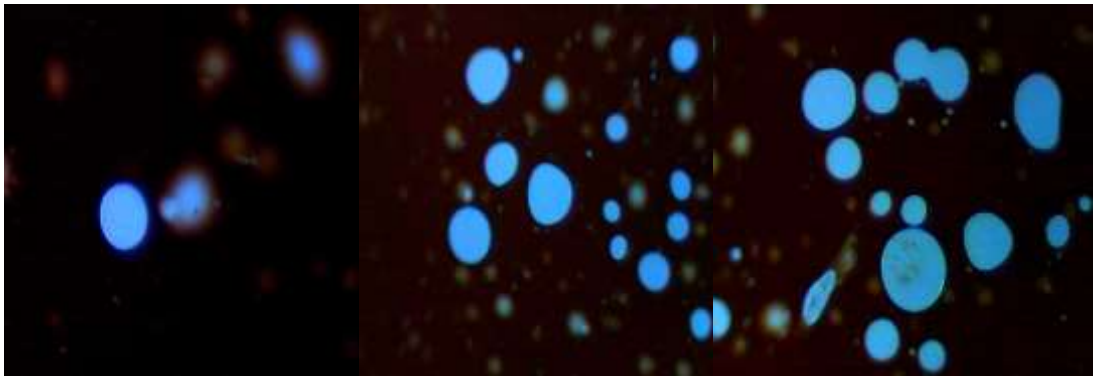
Abstract

The flow of heavy oil in reservoir formation is more complicated process than conventional oil flow. In order to understand these processes, it is necessary to carry out fundamental research on the mechanisms involved. Many researchers have found that crude oil emulsions are readily formed during the process of heavy oil recovery by chemical flooding. There are many factors that can affect the increment of recovery factor, one of them could be the formation of crude oil emulsions. So, in this work, the stability of emulsions was tested and some ASP flooding test were performed on a laboratory scale. In order to study the heavy oil recovery by chemicals, laboratory experiments were conducted using Huanxiling oilfield in Liaohe oil area. Two different oil samples of viscosities 170mPa.s and 350mP.s at 50·C, respectively were obtained. The experiment is divided into two kinds of alkali, strong alkali NaOH and weak base Na_2CO_3, surfactant used is twelve alkyl amine oxide (all the other surface-active agents are the same), and polymer HPAM is used.

As the light oil reserves in the world have almost depleted or have touched to their economic limit. So, the proportion of heavy oil production is increasing day by day. Conversely, the oil recovery factor from heavy oil reservoirs is extremely low by using both primary and secondary production, making heavy oil reservoirs best applicant for Enhanced Oil Recovery (EOR) tools.

Key Words: heavy oil, chemical flooding, sweep efficiency, emulsion, emulsion stability

Image



(a) Water to Oil ratio 1:2 (b) Water to Oil ratio 1:1 (c) Water to oil ratio 2:1

Fig: Effect of water content on the type of emulsion

Recent Publications

1. Al-Wahaibi T, Al-Wahaibi Y, Al-Hashmi A-AR, Mjalli FS, Al-Hatmi S. Experimental investigation of the effects of various parameters on viscosity reduction of heavy crude by oil–water emulsion. Petrol Sci 2015;12 (1):170–6.
2. Muraza O, Galadima A. Aquathermolysis of heavy oil: a review and perspective on catalyst development. Fuel 2015;157:219–31.

3. Speight JG. Heavy and extra-heavy oil upgrading technologies. USA: Gulf Professional Publishing; 2013.
4. Kun Guo ，Hailong Li ，Zhixin Yu. In-situ heavy and extra-heavy oil recovery: A review. Article in Fuel · August 2016.
5. Fletcher P, Cobos S, Jaska C, Forsyth JPJ, Crabtree M, Gaillard N, Favero C. Improving heavy oil recovery using an enhanced polymer system. SPE improved oil recovery symposium. Tulsa (Oklahoma, USA): Society of Petroleum Engineers; 2012.

Biography

Fatima Zahid has done her B.E. in Petroleum & Gas Engineering from BUITEMS, Pakistan. She received her master's degree in Petroleum & Natural Gas Engineering from China University of Petroleum Beijing. This research was done by her during her master's as a final year project. With the help of experiments, she provided a way to evaluate the mechanism of heavy oil by using different chemicals. This approach can be further extended for simulation studies.

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