Microemultion flooding mechanism for optimum oil recovery on chemical injection / Yani Faozani Alli; Edward ML Tobing; Usman

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Abstrak

The formation of microemultion in the injection of surfacant at chmical flooding is crucial for the effectiveness of injection. Microemultion can be obtained either by mixing the surfactant and oil at the surface or injecting surfactant into the reservoir to form in situ microemultion. Its transculent homogeneous mixtures of oil and water in the presence of surfacant is believed to displace the remaining oil in the reservoir. Preveriously, we showed the effect of microemultion-based surfactant formulation to reduce the interfacial tension (IFT) of oil and water to the ultralow level that sufficient enough to overcome the capillary pressure in the pore throat and mobilize the residual oil. However, the effectiveness of microemultion flooding to enchance the oil recovery in targeted representative core has not been investigated. In this artice, the performance of microemultion-based surfactant formulation to improve the oil recovery in the reservoir condition was investigated in the laboratory scale trought the core flooding experiment. Microemultion-based formulation consist of 2% surfactant A and 0.85% of alkaline sodium carbonate (Na2CO3) were prepared by mixing with synthetic soften brine (SSB) in the presence of various concentration of polymer for improving the mobility control. The viscocity of surfactant-polymer in the presence of alkaline (ASP) and polymer drive that used for chemical injection slug were measured. The tertiary oil recovery experiment was carried out using core flooding apparatus to study the ability of microemultion-based formulation t recover the oil production. the results showed that polymer at 2200 ppn in the ASP mixture can generate 12.16cP solution which is twice higher than the oil viscosity to prevent the fingering occurence. Whereas single polymer drive at 1300 ppm was able to produce 15.15 cP polymer solution due to the absence of alkaline. Core flooding experiment result with design of injection of 0.15 PV ASP followed by 1.5 PV polymer showed that the additional oil recover after waterflood can be obtained as high as 93.41% of remaining oil saturation after waterflood (Sor), or 57.71%of initial oil saturation (Soi). Those results conclude that the microemultion-based surfactant flooding is the most effective mechanism to achieve the optimum oil recovery in the targeted reservoir