ABSTRACT

The injection of water and gas alternatively offers better mobility control and hence improves the volumetric sweep efficiency. Although the WAG process is conceptually sound, its field incremental recovery is disappointing as it rarely exceeds 5 to 10% OOIP. Apart from operational problem, the WAG processes suffer from inherent challenges such as water blocking, gravity segregation, mobility control in high viscous oils. This study seeks to address these afore mentioned problems and propose a new combination method named as ASP alternating Gas. The unique feature of this method is, it uses alkaline, surfactant, and polymer as a chemical slug that is injected during the WAG process to improve the mobility ratio and decrease the interfacial tension (IFT). Essentially this process involves a combination of chemical flooding and immiscible carbon dioxide (CO2) injection these mechanisms are IFT reduction, reducing water blocking effect, mobility control, oil viscosity reduction due to CO2 dissolution and oil swelling. The experiment was conducted at laboratory conditions to determine the effect of pH and slug ratio on alternating ASP with Gas. A sand pack model was used as a porous media together with moderately heavy oil. Immiscible flooding process was achieved by injecting carbon dioxide gas into the core at room temperature and pressure .The result show that ASP alternating Gas improves oil recovery than conventional WAG. The ultimate oil recovery for pH 11 was 15.4% OOIP higher compared to other pH while the slug ratio of ASP: GAS 1:1 is the most efficient since yield the highest recovery of 14.3% OOIP, a low water cut and a relatively low CO_2 break through was also recorded at these optimum conditions.