A study on the viscosity of carbon dioxide foam in heterogeneous reservoir for Enhanced Oil Recovery (EOR)

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With increasing crude oil prices and global warming, CO_2-flooding has become the most promising technology for enhanced oil recovery (EOR). The CO_2-EOR performance may be improved by Water-Alternating-Gas (WAG) method. However, injected gas of WAG tends to rise upward in reservoir due to gravity settling leading to a decrease in oil recovery efficiency. Foam-Assisted-WAG (FAWAG) creates a foam barrier between water and gas interface which impedes CO_2 channeling and improves the sweep efficiency. In this study, capillary tubes with various inner diameters were used to delineate the rheology of carbon dioxide foam in heterogeneous oil reservoir. CO_2 foam was generated by shear stress in the variable volume view cell and made flow through a capillary tube. Differential pressure transducer was used to measure the pressure drop (ΔP) across the capillary. Hagen-Poiseuille equation was used to calculate the apparent viscosity of foam. The apparent viscosity of foam exhibited shear-thinning behavior.