

CO₂ Gas Solubility and Foam Generation

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Abstract : Cold drainage mechanism of oil production is a complicated process which involves with solubility and foaming processes. Laboratory experiments were carried out to investigate the CO₂ gas solubility in hexadecane (as light oil) and the effect of depressurization processes on microbubble generation. The experimental study of sensitivity parameters of temperature and pressure on CO₂ gas solubility in hexadecane was conducted at temperature of 20 °C and 50 °C and pressure ranged 2.0-7.0 MPa by using PVT (RUSKA Model 2370) apparatus. The experiments of foamy hexadecane were also prepared by depressurizing from saturated pressure of 6.4 MPa and temperature of 50 °C. The experimental results show the CO₂ gas solubility in hexadecane linearly increases with increasing pressure. At pressure 4.5 MPa, CO₂ gas dissolved in hexadecane 2.5 mmol.g⁻¹ for temperature of 50 °C and 3.5 mmol.g⁻¹ for temperature of 20 °C. The bubbles of foamy hexadecane were observed that most of large bubbles were coalesced shortly whereas the small one keeps presence. The experimental result of foamy hexadecane indicated large depressurization step (ΔP) produces high quality of foam with high microbubble distribution.

Keywords : CO₂ gas solubility, depressurization process, foamy hexadecane, microbubble distribution

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