

## **Solubility of Gases in Viscous Fluids and Density and Viscosity of Resulting Mixture**

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The reserves of low viscosity conventional hydrocarbons are rapidly being depleted. There remains considerable reserves of unconventional hydrocarbons such as heavy oils, bitumen, shale and gas hydrates. The extraction of heavy (viscous) oils can be enhanced by dissolving a gas, which will reduce its viscosity and consequently increase the production rate. An apparatus capable of simultaneously measuring the solubility of a gas in a liquid along with the viscosity and the density of the resulting mixture over a wide temperature (0 to 200) °C and pressure range (to 40 MPa) has been constructed and tested. Solubility was measured by the decrease in pressure from a known initial volume and pressure of the gas, viscosity was measured with a vibrating wire viscometer capable of measurements to 1 Pa·s and density was measured with a vibrating tube densimeter. A unique feature of the design is that it requires oil samples of the order of 50 cm<sup>3</sup>. Preliminary results on the solubility of carbon dioxide in squalane will be reported.