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The Laboratory and Analytical Method to Predict the Optimal Pressure for CO_2 Injection into the Geologic Formation

Łukasz Habera
Oil and Gas Institute, Cracow, Poland,
Doctoral student at AGH – University of Science and Technology, Cracow, Poland

In southern Poland there is an operating oil field "Borzęcin" performing pioneering project of injection sour gases containing CO2 in to geologic formation. The Optimistic results have been achieved related with good injectivity and relatively large volumes of injected gases. Those promising effects encourage investigators for further research in order to find an optimal condition to design an injection process, especially for value of pressure.

The author present an Oil displacing drives by carbon dioxide, and show the benefits from keeping miscible type of displacing process. This work concerns different definition of fluid's miscibility as well as the way to achieve the miscibility condition through condensing and vaporizing gas drive.

The presented laboratory method to estimate minimum miscibility pressure encompass following tests: Slim tube test, rising bubble test and multiple mixing cell test.

The author presents a review of empirical correlation of MMP, and brings closer the analytical model to estimate MMP based on the equation of state (EOS). This work also presents results of laboratory experiments, including isothermal injection of CO_2 into the physical reservoir model, so-called Slim Tube. CO_2 as a GHG (green house gas) was selected for injection into the reservoir because of its high EOR (enhanced oil recovery) potential. The experiments were carried out at different pressure levels, including gas chromatography analysis and visual flow observation of the supercritical CO_2. The final results show the satisfactory applicability of the CO_2 dedicated to the injection projects with high EOR yield.