Petrochemistry-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Petrochemistry and Chemical Engineering

November 18-20, 2013 Hilton San Antonio Airport, USA

Quantitative model for evaluating the impact of volatile oil non-equilibrium phase transition on degassing

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Abstract

On the basis of Henry Law, considering volatile oil non-equilibrium phase transition, and establishing the calculation model that considers the influence of pressure drop on gas solubility. Use the gas-liquid system composed of transformer oil and carbon dioxide gas, do experiments under different rate of pressure drop, measure the volumes of degassing during non-equilibrium and equilibrium phase-change, calculate and fit a weight function to characterize the imbalance of gas-liquid systems. Finally, calculate the volume of degassing and bubble point pressure under different pressure drop rate, and quantitatively evaluate the effect of non-equilibrium phase-change on degassing and the degree of bubble point pressure deviation. The accuracy of established model is higher than Henry Law which does not consider non-equilibrium phase-change. Results show that while the development process of volatile oil reservoirs, non-equilibrium phase transition lower bubble point pressure and slow down degassing. The pressure drop rate and pressure drop degree determine the effect degree of non-equilibrium phase transition on degassing: the larger the pressure drop degree, the greater the pressure drop rate, non-equilibrium phase transition is more obvious influence on degassing, which is lower bubble point pressure and smaller degassing rate.

Biography

Keliu Wu was an doctoral student at China University of Petroleum (Beijing). I have worked on fluid flow in porous media and phase behavior of condensate gas reservoir and volatile reservoir. My current research interests are the adsorption mechanism of shale gas, water flooding mechanism of condensate gas reservoir, and gas injection mechanism of volatile oil reservoir. I hold a BS degree in petroleum engineering from China University of Geosciences (Wuhan).