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CO_2 miscible and immiscible displacement in the United States: The promise, the problems, and the lessons for others

An overview of the status of CO_2 miscible and immiscible enhanced oil recovery in the United States will be provided. The natural and anthropogenic sources of the CO_2 will be detailed and its mode of distribution to the oilfield will be outlined. The formations which are most suitable for CO_2 EOR will be reviewed. The most important solvent properties of CO_2 will be explained along with the mechanisms responsible for the excellent displacement efficiency associated with CO_2 EOR. The foremost technical challenges with CO_2 EOR will also be discussed, especially the problems caused by the low CO_2 viscosity. Chemical and mechanical strategies that are being developed to address these conformance and mobility control issues will be summarized. Promising new applications for CO_2 EOR, such as the recovery of highly viscous oils, oils found in tight shale formations, and oil in the residual oil zone will be reviewed. Finally, the outlook for continued CO_2 EOR will be presented.

Biography

Robert Enick is the Professor of the Department of Chemical and Petroleum Engineering at the University of Pittsburgh. He is an ORISE Faculty Fellow at the National Energy Technology Laboratory, where he teams with NETL scientists to study high pressure phase behavior and viscometry related to primary and tertiary oil recovery processes. He also has expertise in improving the performance of CO_2 enhanced oil recovery by decreasing its mobility with CO_2-soluble thickeners, CO_2-soluble foaming agents and brine-soluble surfactants. He also studies the thickening of natural gas liquids for improved hydrocarbon miscible displacement.

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