Faculty of Science
Chemistry Department

CO_2 Miscible Flooding of Egyptian Oil Reservoirs

A Thesis Submitted by
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Approval Sheet

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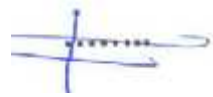

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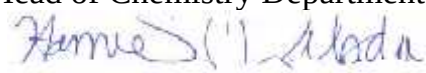

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LIST OF ABBREVIATIONS

Abbreviations

Symbols	Description
A	The cross-sectional area of the sand pack
API	American Petroleum Institute, degree.
BP	Bubble point (saturation pressure), psi
CO_2	Carbon Dioxide
CMD	Constant Mass Depletion
E_a	Average Absolute percent relative error
E_{max}	Maximum Absolute Percent Relative
E_{min}	Minimum Absolute Percent Relative
E_r	Average percent relative error%.
EOR	Enhanced Oil Recovery
Exp	Experimental
FCM	First Contact miscibility
fr	Fraction
GC	Gas Chromatography
GOR	Gas oil ratio, SCF/STB
K	Permeability
L	length of the sand pack
Ma	Average molecular weight of I component
MCM	Multiple contact miscibility
M_i	Molecular weight of I component
MMP	Minimum Miscibility Pressure
MW	Molecular weight.
MW_{C5^+}	Molecular weight of pentane plus.
nd	Number of data points

p	Reservoir pressure, psi.
p_i	Initial Reservoir pressure, psia.
PV	Pour volume
PVT	Pressure, Volume, Temperature
q	The flow rate
^oR	Rank
Res	Reservoir
S	Standard deviation.
S.ID	Sample ID
Sol	Gas Solubility, mole fraction
T	Reservoir temperature, ^oF.
y	Mole percentage
y_i	Mole fraction of I component
μ	Viscosity of fluid
DP	The pressure drop along the sand pack
γ_o	Specific gravity of the oil
ρ_o	Density of the crude oil, gm/cc
ρ_w	Density of the water, gm/cc
φ	Porosity

Subscript

a	Absolute
bbl/d	Barrel per day
bbl/STB	Barrel per stock tank barrel
cp	Centipoise
^oF	Fahrenheit
FG	Flashed Gas

gm/cc	Gram per cubic centimeter
i	Intial
inj	Injection
int	Intermediate
max	Maximum
md	Milli darcy
min	Minimum
PV	Pour volume
Psi	Pound / square inch
res	Reservoir.
vol	Volatile
r	Relative
RF	Reservoir Fluid
SCF / STB	Stander cubic foot per stock tank barrel

Abstract

Name: Eman Mohamed Ibrahim Mansour**.**

Title of thesis: **CO_2** Miscible Flooding of Egyptian Oil Reservoirs.

This study presents a new proposed empirical correlations of crude oils for the minimum miscibility pressure and **(CO_2)**-oil physical properties that include **(CO_2)**-oil density, **(CO_2)**-swelling factor, **(CO_2)**-gas solubility and **(CO_2)**-oil viscosity. Evaluation of the development was performed using data of 10 live crude oil samples representing all active oil producing areas in Egypt. The practical outcome was needed to predict of minimum miscibility pressure and **(CO_2)**-oil physical properties of crude oils by reservoir engineers in case of the absence the experimental analysis.

Calculations for sensitivity of the proposed empirical correlations were determined by testing four oil samples collected from different locations in Egypt and comparing the measured data with those calculated from the new proposed empirical correlations. These evaluations show an excellent agreement of the measured properties and calculated ones.

Keywords: Enhanced oil recovery, **(EOR)** screening criteria, Miscible flooding injection, Minimum miscibility pressure. Slim tube test and Swelling test.

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