

SPE Improved Oil Recovery Conference 2022

Online
25 - 29 April 2022

Volume 1 of 2

ISBN: 978-1-7138-5277-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2022) by Society of Petroleum Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact Society of Petroleum Engineers
at the address below.

Society of Petroleum Engineers
P. O. Box 833836
Richardson, Texas 75083-3836

Phone: (800) 456-6863
Fax: (972) 952-9435

books@spe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

FIELD CASE STUDIES 1: CHEMICAL

Evaluation of Carbon Footprint for a Hydrocarbon Foam EOR Field Pilot 1
*Orlando Castellanos Diaz, Amit Katiyar, Armin Hassanzadeh, Matt Crosley, Troy Knight,
Pete Rozowski*

Review of Offshore Chemical Flooding Field Applications and Lessons Learned 12
Ming Han, Subhash Ayirala, Ali Al-Yousef

GAS INJECTION 1: ANALYTICAL AND EXPERIMENTAL METHODS

Oil and Gas Relative Permeability as a Function of Fluid Composition 22
Lauren Churchwell, David DiCarlo

Nanoparticle Stabilized Strong Foam for EOR in High Salinity Fractured Carbonate Reservoirs 40
Wang Xuezheng, Mohanty K Kishore

Analytical Method for Forecasting ROZ Production in a Commingled MOC and ROZ CO₂ Flood 53
David Wayne Hampton, Ahmed Wagia-Alla

WATERFLOODING 1: MECHANISTIC MODELING CHALLENGES ACROSS SCALES: LABORATORY AND FIELD

Fast Screening of LSW Brines Using QCM-D and Crude Oil-Brine Interface Analogs 65
*M. P. Yutkin, K. M. Kaprielova, S. Kamireddy, A. Gmira, S. C. Ayirala, C. J. Radke, T. W.
Patzek*

Upscaling Low Salinity Benefit from Lab-Scale to Field-Scale - An Ensemble of Models with a
Relative Permeability Uncertainty Range 74
Aboulghasem Kazemi Nia Korrani, Gary Russell Jerauld

Reaction Kinetics Determined from Core Flooding and Steady State Principles for Stevns Klint and
Kansas Chalk Injected with MgCl₂ Brine at Reservoir Temperature 91
Pål Østebø Andersen, Reidar Inge Korsnes, Andre Tvedt Olsen, Erik Bukkholm

NOVEL EOR 1: FIELD APPLICATIONS

CO₂ Foam Pilot in a Heterogeneous Carbonate Reservoir: Analysis and Results 116
Zachary Paul Alcorn, Arne Graue, Metin Karakas

First Thermo-Responsive Polymer Field Evaluation in a High Temperature Reservoir of Golfo San
Jorge, Argentina. Promising Results for Cost Optimization in a Polymer Project 128
*Maria Alejandra Hryc, Daniela Verónica Renta, Guillaume Dupuis, Thierry Leblanc, Maria
Eugenia Peyrebonne Bispe, Mayra Goldman, Martin Villambrosa, Gaston Fondevila Sancet*

Bioremediation by Indigenous Microbes: A Green Approach to Degrade Polymer Residue 141
Songyuan Liu, Bo Lu, Chao-yu Sie, Yifan Li

FIELD CASE STUDIES 2: UNCONVENTIONALS

Small Scale EOR Pilot in the Eastern Eagle Ford Boosts Production	150
<i>Tim Bozeman, Will Nelle, Quoc Nguyen</i>	
A Novel Gas Dispersible Foam Technology Can Improve the Efficiency of Gas Injection Processes for IOR-EOR Operations in Unconventional Reservoirs	164
<i>Kelly Díez, Alonso Ocampo, Alejandro Restrepo, Jonny Patiño, Juan Rayo, Diego Ayala, Luis Rueda</i>	
Discussion of the Effect of Shut-In After Fracturing on Oil Recovery	173
<i>James J Sheng, Fanhua Zeng</i>	

GAS INJECTION 2: FIELD, LAB BASED CASE STUDIES AND MODELING

Evaluation of Historical and Ongoing Double Displacement Process in Yates Field Unit	184
<i>Saeedeh Mohebbinia, Stephen Peter Pennell, Raul Valdez, Kiomars Eskandaridalvand</i>	
Modeling of Laboratory Gas Flooding in Tight Chalk with Different Non-Equilibrium Treatments	209
<i>Seyedamir Mirazimi, Dan Olsen, Erling Halfdan Stenby, Wei Yan</i>	
Laboratory Analyses and Compositional Simulation of the Eagle Ford and Wolfcamp Shales: A Novel Shale Oil EOR Process	227
<i>Amanda Marilyn Bustin, R. Marc Bustin, Robert Downey, Kiran Venepalli</i>	

WATERFLOODING 2: FIELD IMPLEMENTATION OF OPTIMIZED SOLUTIONS AND WATER QUALITY

Optimizing Waterflooding EOR Through Cyclic Injection: A Case Study on the Hoople Field, Midland Basin, West Texas.....	240
<i>Mario Jose Farias, Xijin CJ Liu</i>	
In-Depth Water Conformance Control: Design, Implementation and Surveillance of the First Thermally Active Polymers Treatment TAP in a Colombian Field	250
<i>Mauricio Gutierrez, Joan Sebastian García, Ruben Hernan Castro, Tatiana Yiceth Zafra, Jonattan Rojas, Rocio Macarena Ortiz, Henderson Ivan Quintero, Hugo Alejandro Garcia, Luis Niño, Jhon Amado, Diego Quintero, Mojtaba Kiani</i>	
Improved Amott Cell Procedure for Predictive Modeling of Oil Recovery Dynamics from Mixed- Wet Carbonates	264
<i>Ksenia Kaprielova, Maxim Yutkin, Ahmed Gmira, Subhash Ayirala, Clayton Radke, Tadeusz W. Patzek</i>	

NOVEL EOR 2: NANOTECHNOLOGIES IN EOR

First Nanoparticle-Based EOR Nano-EOR Project in Japan: Laboratory Experiments for a Field Pilot Test	283
<i>Yutaro Kaito, Ayae Goto, Daisuke Ito, Satoru Murakami, Hirotake Kitagawa, Takahiro Ohoi</i>	
Miniature Viscosity Sensors for EOR Polymer Fluids.....	304
<i>Miguel Gonzalez, Subhash Ayirala, Lyla Maskeen, Abdulkarim Sofi</i>	

Design of Surrogate Oils for Surfactant-Brine-Oil Phase Behavior	315
<i>Jaebum Park, Kishore Mohanty</i>	

CHEMICAL EOR 1: CONVENTIONAL AND NOVEL POLYMER TECHNOLOGY

Use of Horizontal Injectors for Improving Injectivity and Conformance in Polymer Floods	328
<i>Jongsoo Hwang, Shuang Zheng, Mukul Sharma, Maria-Magdalena Chiotoroiu, Torsten Clemens</i>	
Pressure Barrier Applicability to Polymer Flood Design	346
<i>Dongmei Wang, Shane Namie, Randall Seright</i>	
Polymer Selection for Sandstone Reservoirs Using Heterogeneous Micromodels, Field Flow Fractionation and Corefloods	364
<i>Ante Borovina, Rafael E. Hincapie Reina, Torsten Clemens, Eugen Hoffmann, Jonas Wegner, Johannes Steindl</i>	

CONFORMANCE CONTROL 1

Selective Crystallization - En Route to In-Situ Deep Conformance Control.....	382
<i>Ali Binabdi, Subash Ayirala, Ahmed Gmira, Theis Solling</i>	
Toward Deep Diversion for Waterflooding and EOR: From Representative Delayed Gelation to Practical Field-Trial Design	390
<i>Abdulkareem M. AlSofi, Waleed A. Dokhon</i>	
Comprehensive Evaluation of a Novel Recrosslinkable Hyper Branched Preformed Particle Gels for the Conformance Control of High Temperature Reservoirs	398
<i>Tao Song, Mohamed Ahdaya, Shuda Zhao, Yang Zhao, Thomas Schuman, Baojun Bai</i>	

VISCOUS HEAVY OIL 1: CHEMICAL AND THERMAL METHODS 1

Oil Recovery Prediction for Polymer Flood Field Test of Heavy Oil on Alaska North Slope Via Machine Assisted Reservoir Simulation.....	412
<i>Cody Douglas Keith, Xindan Wang, Yin Zhang, Abhijit Y Dandekar, Samson Ning, Dongmei Wang</i>	
Optimizing Production Performance, Energy Efficiency and Carbon Intensity with Preformed Foams in Cyclic Steam Stimulation in a Mature Heavy Oil Field: Pilot Results and Development Plans	443
<i>Romel Antonio Pérez, Héctor Arnoldo Rodríguez, Gabriel Julian Rendón, Brayan Guillermo Plata, Lina Marcela Salinas, Carolina Barbosa, Luis Eduardo García, Fernando Andrés Rojas, Jorge Armando Orrego, Lucy Johanna León, José Gabriel St. Bernard, Eduardo Jose Manrique</i>	
Polymer Injectivity Enhancement Using Chemical Stimulation: A Multi-Dimensional Study	456
<i>Sriram Chandrasekhar, Dennis Arun Alexis, Julia Jin, Taimur Malik, Varadarajan Dwarakanath</i>	
Energy Efficient Steam-Based Hybrid Technologies: Modeling Approach of Laboratory Experiments	472
<i>Romel Antonio Pérez, Hugo Alejandro García, Dubert Gutiérrez, Hector Arnoldo Rodríguez, Sudarshan Mehta, Robert Gordon Moore, Matthew Ursenbach, Belenitza Sequera-Dalton, Eduardo Jose Manrique</i>	

CHEMICAL EOR 2: SURFACTANT STUDIES

Mobility Of Microemulsions: A New Method to Improve Understanding and Performances of Surfactant EOR.....	489
<i>David Rousseau, Clémence Le Gallo, Nicolas Wartenberg, Tiphaine Courtaud</i>	
Chemical Flood with a Single Surfactant	503
<i>Krishna Panthi, Kishore K. Mohanty</i>	
Mapping Chemical EOR Technologies to Different Reservoir Settings at Harsh Conditions in North Kuwait.....	521
<i>Abdul-Aziz Al-Dhuwaili, Sanhita Tiwari, Bodoor Baroon, Reem AlAbbas, Moudi Al-Ajmi, Gerbert De Bruijn, Randa Nabulsi, Issa Abu Shiekah, Gerard Glasbergen, Diederik van Batenburg</i>	

GAS INJECTION 3: FOAM APPLICATIONS

Potential and Challenges of Foam-Assisted CO2 Sequestration	532
<i>William R. Rossen, Rouhi Farajzadeh, George J. Hirasaki, Mohammadreza Amirmoshiri</i>	
New Mechanistic Approach to Trapped Foam in Population-Balance Model Enabling Improved Prediction of N2 and CO2 Foams Rheology in Porous Media.....	552
<i>Kun Ma, Khalid Mateen</i>	
Modeling of Foam Flow in Porous Media in the Presence of Residual Oil	568
<i>Muhammad Majid Almajid, Anthony R. Kovscek</i>	

VISCOUS HEAVY OIL 2: CHEMICAL AND THERMAL METHODS 2

New Paradigm in the Understanding of In Situ Combustion: The Nature of the Fuel and the Important Role of Vapor Phase Combustion.....	579
<i>Dubert Gutiérrez, Don Mallory, Gord Moore, Raj Mehta, Matt Ursenbach, Andrea Bernal</i>	
Comprehensive Fluid Compositional Analysis Program to Support the Interpretation of Chichimene Field In-Situ Combustion Pilot.....	604
<i>Eduardo Jose Manrique, Marta Liliana Trujillo, Juan Carlos Lizcano, Diego Alejandro Cardenas, Jose Walter Vanegas, Fredy De Jesus Portillo, Helmut Salazar, Nicolas Caicedo</i>	
A Study of the Impact of Permeability Barriers on Steam-Solvent Coinjection Using a Large-Scale Physical Model.....	620
<i>Kai Sheng, Ryosuke Okuno, Abdullah Al-Gawfi, Petro Nakutnyy</i>	

CHEMICAL EOR 3: POLYMER AND SURFACTANT MODELING

An Unconventional Approach to Model a Polymer Flood in the Kalamkas Oilfield.....	647
<i>Marat Sagyndikov, Randall Seright, Nauryzbek Tuyakov</i>	
Towards More Representative Workflows for Designing Robust Surfactant EOR Formulations	665
<i>Nicolas Wartenberg, Dylan Blaizot, Matthieu Mascle, Aurélie Mouret, David Rousseau</i>	
Fundamental Improvements in Modeling Surfactant Behavior in Reservoir Simulators	679
<i>Leonard Yujya Chang, Zhitao Li, Haishan Luo, Gary Arnold Pope</i>	

RESERVOIR CHARACTERIZATION 2: TRACERS VISUALIZATION AND CROSSFLOW

Hydrothermal Stability and Transport Properties of Optically Detectable Advanced Barcoded Tracers with Carbonate Rocks in the Presence of Oil	704
<i>Hooisweng Ow, Sehoon Chang, Gawain Thomas, Hsieh Chen, Salah H. Saleh, Mohammad B. Otaibi, Subhash Ayirala</i>	
Modeling of Chemical Tracers to Estimate Oil Volume Contacted and Sweep Efficiency in Porous Media Under Countercurrent Spontaneous Imbibition.....	716
<i>Moises Velasco-Lozano, Matthew Thomas Balhoff</i>	
A Visualization Study of Low-Tension Polymer Flood for Viscous Oil Reservoirs.....	734
<i>Yujia Guo, Haofeng Song, Kishore K. Mohanty</i>	

RESERVOIR AND FIELD MANAGEMENT 1: UNCERTAINTY AND RISK MANAGEMENT OF EOR/IOR

Re-Injection of Produced Polymer in EOR Projects to Improve Economics and Reduce Carbon Footprint	753
<i>Pinaki Ghosh, Ryan R Wilton, Annalise Bowers, Thomas O'Brien, Yu Cao, Clayton Wilson, Mahmoud Ould Metidji, Guillaume Dupuis, Ravi Ravikiran</i>	
Dynamic Changes of Pore Structure During CO ₂ Mineral Sequestration in Shale.....	774
<i>Yang Ming Yang, Hao Chen</i>	
Enabling Increased Oil Recovery from Deep-Water Viscous Oil Reservoirs by Improved Performance Prediction of Multiphase Viscous Pumps	782
<i>Karel De Raeve, Xavier Gaillard, Pierre-Jean Bibet</i>	

NOVEL EOR 4: ADVANCES IN WATERFLOODING

Interference Analysis in Reservoirs with Bottom-Water Drive During Water Injection Processes Through Subsurface Connectivity	798
<i>Vladimir Martinez, Erdal Ozkan, Heber Cinco Ley</i>	
Impact of Brine Chemistry on Waterflood Oil Recovery: Experimental Evaluation and Recovery Mechanisms	813
<i>Behdad Aminzadeh, Sriram Chandrasekhar, Mayank Srivastava, Tom Tang, Art Inouye, Mauricio Villegas, Monika Valjak, Varadarajan Dwarakanath</i>	

VOLUME 2

SmartWater Based Synergistic Technologies: A Next Recovery Frontier for Enhanced Oil Recovery.....	828
<i>Subhash C. Ayirala, Abdulkareem M. AlSofi, Zuhair A. AlYousef, Jinxun Wang, Moataz O. Abu Alsaoud, Ali A. AlYousef</i>	

CHEMICAL EOR 4: WETTABILITY ALTERATION

Physics-Based and Data-Driven Wettability Alteration Model.....	843
<i>Fabio Bordeaux-Rego, Mehran Mehrabi, Esmail Eltahan, Kamy Sepehrnoori</i>	

Surfactant Enhanced Oil Recovery from Tight Carbonates: Core-Scale Experiments to Reservoir-Scale Modeling..... 868
Yue Shi, Kishore Mohanty

Modelling the Impact of Surface Charge on Wettability Alteration in Low Salinity Waterflooding 889
Yogarajah Elakneswaran

IOR/EOR IN UNCONVENTIONAL RESERVOIRS 1: GAS INJECTION IN UNCONVENTIONAL RESERVOIRS

Impact of Stimulated Reservoir Volume in the Efficacy of Miscible Gas Injection EOR in Shale Reservoirs..... 901
Raki Sahai, Rouzbeh G. Moghanloo

Gas Injection Pilot Design Simulation Model in Eagle Ford 935
Basar Basbug, Hulya Sarak, Tuba Firincioglu, Chet Ozgen, Claudia Parada Machado, Chengwu Yuan, Philip Chapman

A Pore-Scale Study on the Shale-Gas Transport with CO₂ Injection Applying the Lattice Boltzmann Method 957
Zhuoran Li, Jiahui You, Guan Qin

CONCEPTUAL MODELING 1: MODELING NEW CONCEPTS

Revised Correlation for Accurate Estimation of CO₂-Brine Interfacial Tension at Reservoir Conditions 968
Gary Russell Jerauld, Aboulghasem Kazemi Nia Korrani

Predictive Model for Relative Permeability Using Physics-Based Artificial Neural Networks..... 989
Hanif Farrastama Yoga, Prakash Purswani, Russell Taylor Johns

State-of-the-Art Laboratory Methods for Chemical EOR 1005
Robert Matthew Dean, Chris James Britton, Jonathan William Driver, Gary Arnold Pope

A Molecular Level Study of Water-Oil Interface in the CO₂ EOR Under Low Pressure Condition 1032
Qiu hao Chang, Liangliang Huang, Xingru Wu

NOVEL EOR 5: NOVEL EOR LABORATORY

An Investigation of In-Situ Upgrading the Shale Oil By Air Injection 1043
Jianhua Qin, Tao Wan, Jing Zhang, Sheng James

Experimental and Simulation Based Interpretation of Characteristic Behavior During Forced and Spontaneous Imbibition in Strongly Water-Wet Sandstones..... 1052
Pål Østebø Andersen, Liva Salomonsen, Dagfinn Sleveland

Screening of Topside Challenges Related to Polymer Presence in the Back Produced Fluids – Casabe Case Study 1077
Aurélié Mouret, Christian Blazquez-Egea, Isabelle Hénaut, Cyril Jermann, Mathieu Salaiin, Henderson Quintero, Mauricio Gutierrez, Tito Acosta, Robinson Jimenez, Nadine Vargas

CHEMICAL EOR 5: FOAM AND SOLVENTS

- Experimental Investigation of Transient Foam Flow in a Long Heterogeneous Consolidated Sandstone 1098
Muhammad Majid Almajid, Anthony R. Kavscek
- Evaluation of Environmentally Friendly Green Solvents for the Recovery of Heavy Oils 1117
Tanya Ann Mathews, Jairo Cortes, Berna Hascakir
- Polymer Stabilized Foam Rheology and Stability for Unconventional EOR Application 1126
Christopher Griffith, Julia Jin, Harry Linnemeyer, Gayani Pinnawala, Behdad Aminzadeh, Samuel Lau, Do Hoon Kim, Dennis Alexis, Taimur Malik, Varadarajan Dwarakanath
- Understanding Foam Flow in Rough Carbonate Fractures..... 1137
Anuradha Radhakrishnan, Alex Gigliotti, Keith P. Johnston, David DiCarlo, Maša Prodanovic

IOR/EOR IN UNCONVENTIONAL RESERVOIRS 2: THE ROLE OF CHEMICALS IN UNCONVENTIONAL RESERVOIRS

- Lab and Pilot-Scale Evaluation of Stable Foam for Drilling in High Temperature Environment 1149
Christopher Griffith, Harry Linnemeyer, Do Hoon Kim, Ruth Hahn, Jimin Zhou, Eric Upchurch, Taimur Malik, Angel Wileman, Griffin Beck, Swanand Bhagwat, Luis Gutierrez
- Slickwater Friction Reducer Performance Evaluation and Application 1166
Gojko Matovic, Timothy Theriot, Harold Linnemeyer, Marlon Solano, Michael Fuller, Seung Han, Amos Kim, Nabijan Nizamidin, Do Hoon Kim, Taimur Malik, Varadarajan Dwarakanath
- Conformance Improvement in Fractured Tight Reservoirs Using a Mechanically Robust and Eco-Friendly Particle Gel PG 1178
Bing Wei, Runxue Mao, Qingtao Tian, Xingguang Xu, Lele Wang, Jinyu Tang, Jun Lu

CCUS 1: CCUS IN EOR AND SEQUESTRATION

- Rapid Estimation of Carbon Dioxide Stored in CO₂ EOR Operations for Screening Purposes 1191
Andrea Carlino, Ann Helen Muggeridge, Philip Craig Smalley
- Development of Site Characterization and Numerical Modeling Workflow of Acid Gas Injection for MRV-45Q Application 1210
Samuel Acheampong, William Ampomah, Jiawei Tu, Robert Balch, Matt Eales, Robert Trentham, Richard Esser, Candace Cady, Martha Cather, El-Kaseeh George
- Towards Quantitative Approach to Evaluating Greenhouse Gas Leakage from CO₂ Enhanced Oil Recovery Fields 1227
Bailian Chen, Mohamed Z. Mehana, Rajesh J. Pawar

NOVEL EOR 3: TOWARDS NET ZERO CARBON

- A Comparative Study of the Impact of the CO₂ Properties on the Thermal Output of a Geothermal Well 1238
Ram Ratnakar, Birol Dindoruk, Silviu Livescu, Sandarbh Gautam

Coupled Well-Reservoir Heat Modelling for Closed-Loop Geothermal Wells - A Feasibility Study	1257
<i>Silviu Livescu, Birol Dindoruk</i>	
Direct Contact Steam Generation Reduces Carbon Intensity	1269
<i>Brian Kay</i>	
Recent Advances of Alkali-Surfactant-Polymer ASP Flooding in China	1278
<i>Hu Guo, Xiuqin Lyu, Menghao Zhang, Yang Xu, En Meng, Huifeng Liu, Zhengbo Wang, Hongtao Fu, Yuxuan Zhang, Kaoping Song</i>	

CONCEPTUAL MODELING 2: MODELING RECOVERY MECHANISMS

Assisted 3D Model Construction and Facies Propagation in Golfo San Jorge Basin Reservoirs for Modelling EOR	1311
<i>Jose Damian Llanes, Alejo Viñales, Juan Juri</i>	
Fluid – Fluid Interfacial Area and Its Impact on Relative Permeability - A Pore Network Modeling Study.....	1328
<i>Sanchay Mukherjee, Russell T. Johns, Sajjad Foroughi, Martin J. Blunt</i>	
Aquifer Influx Versus Water Injection in GoM.....	1342
<i>Mohammad Reza Fassih, J. P. Blangy</i>	
Microscale Dynamics of Oil Connectivity and Mobilization by Controlled-Ionic-Composition Waterflooding at Elevated Temperature Using Synchrotron 3D X-Ray Microscopy	1352
<i>Tianzhu Qin, Paul Fenter, Mohammed AlOtaibi, Subhash Ayirala</i>	

CHEMICAL EOR 6: POLYMER FIELD CASE STUDIES AND TREATMENT TECHNOLOGY

Viscous Oil Polymer Flood Milne Point Field Case History Concept to Full Field Implementation.....	1362
<i>Reid Edwards, Almas Aitkulov, Connor Redwine, Katherine Cunha</i>	
Polymer Containing Produced Fluid Treatment for Re-Injection: Lab Development to Field Deployment	1400
<i>Gayani Wasana Pinnawala, Sumitra Subrahmanyam, Dennis Arun Alexis, Sujeewa Senarath Palayangoda, Harold Linnemeyer, Gojko Matovic, Do Hoon Kim, Timothy Theriot, Taimur Malik, Varadarajan Dwarakanath</i>	
Confirmation of Polymer Viscosity Retention at the Captain Field Through Wellhead Sampling	1422
<i>Geoffrey Johnson, Mehrdad Hesampour, Susanna Toivonen, Sirkku Hanski, Stina Sihvonen, Nancy Lugo, Jennifer McCallum, Michael Pope</i>	

IOR/EOR IN UNCONVENTIONAL RESERVOIRS 3: NOVEL PRODUCTION CONCEPTS IN UNCONVENTIONAL RESERVOIRS

Full Cycle of Unconventional EOR with Microbial Technology – From Lab to Field	1434
<i>Bo Lu, Songyuan Liu, Yifan Li, Brian Price</i>	
Gas-Oil Ratio GOR Characterization of Unconventional Wells in Eagle Ford.....	1442
<i>Yajie Zhao, Jack Nohavitz, Ryan Williams, Wei Yu, Mauricio Xavier Fiallos-Torres, Reza Ganjdanesh, Kamy Sepehrnoori</i>	

Enhanced Oil Recovery Experiments in Wolfcamp Outcrop Cores and Synthetic Cores to Assess Contribution of Pore-Scale Processes.....	1455
<i>Asm Kamruzzaman, Hossein Kazemi, Timothy J Kneafsey, Matthew T Reagan</i>	

CCUS 2: CCUS LAB RESEARCH, POLICY AND CHALLENGES

Carbon Capture, Utilization, and Storage in the Context of Petroleum Industry: A State-of-the-art Review.....	1477
<i>Daulet Magzymov, Birol Dindoruk, Russell T. Johns</i>	

CCUS in China: Challenges and Opportunities.....	1490
<i>Hu Guo, Xiuqin Lyu, En Meng, Yang Xu, Menghao Zhang, Hongtao Fu, Yuxuan Zhang, Kaoping Song</i>	

Improved Oil Recovery Techniques and Their Role in Energy Efficiency and Reducing CO2 Footprint of Oil Production	1512
<i>R. Farajzadeh, G. Glasbergen, V. Karpan, R. Mjeni, D. Boersma, A. A. Eftekhari, A. Casquera García, J. Bruining</i>	

CHEMICAL EOR 7: FIELD APPLICATIONS AND CASE STUDIES

Successful Implementation of an EOR Field-Trial Using Surfactant Induced Wettability: Formulation Design, Implementation & Interpretation and Key Lessons Learned	1527
<i>Neeraj Rohilla, Amit Katiyar, Amit Kumar, Peter Hutson, Pete M. Rozowski, Adriano Gentilucci</i>	

Modeling of High Pressure and Temperature Microemulsion Experiments using HLD-NAC Based Equation of State	1540
<i>Daulet Magzymov, Russell T. Johns, Hafsa Hashim, Birol Dindoruk</i>	

Evaluating the Effect of Carbonate Impurities on Wettability Alteration Using a Geochemical Model	1561
<i>Xingjuan Hao, Moataz Abu-Al-Saud, Subhash Ayirala, Yogarajah Elakneswaran</i>	

GAS INJECTION 3: FIELD, LAB BASED CASE STUDIES AND MODELING

Water Alternating Alkane Injection: A Molecular Dynamics Simulation Study	1572
<i>Yakup Berk Coskuner, Elio Dean, Xiaolong Yin, Erdal Ozkan</i>	

Residual Oil Zone Recovery Evaluation and Forecast Methodology: A Wason Field Case Study	1584
<i>Neha Gupta, Sameer Parakh, Tao Gang, Nicholas Cestari, Parag Bandyopadhyay</i>	

Development of Bio-Based Surfactant Foams for Hydrocarbon Gas Disposal Applications.....	1602
<i>Julia Jin, Lin Zuo, Gayani Pinnawala, Harold Linnemeyer, Christopher Griffith, Jimin Zhou, Taimur Malik</i>	

CHEMICAL EOR 8: FIELD APPLICATIONS AND CASE STUDIES

Novel Application of Polyethylene Oxide Polymer for EOR from Oil-Wet Carbonates	1619
<i>Eric Brandon Trine, Gary Arnold Pope, Chris James Britton, Robert Matthew Dean, Jonathan William Driver</i>	

A New Logistically Simple Solution for Implementing ASP/ACP in Difficult Environments –
Evaluation of Concept with High TAN Viscous Crude Oil 1631
*Jeffrey George Southwick, Karasinghe Nadeeka Upamali, Mina Fazelalavi, Upali Peter
Weerasooriya, Chris James Britton, Robert Matthew Dean*

Methods to Improve Accuracy and Performance in a Fully Implicit Surfactant Flood Simulator 1644
Xundan Shi, Choongyong Han, Christian Wolfsteiner, Yih-Bor Chang, Baris Güyagüler

Author Index