

Society of Petroleum Engineers

**16th SPE/DOE Improved Oil
Recovery Symposium
2008**

“IOR: Now More Than Ever...”

**April 19-23, 2008
Tulsa, Oklahoma, USA**

Volume 1 of 3

Printed from e-media with permission by:

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

ISBN: 978-1-60560-165-6

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

Copyright and Use Restrictions

Copyright 2008, Society of Petroleum Engineers

Material included in this *Proceedings* is copyright protected. Electronic reproduction, distribution, or storage of any part of an SPE-copyrighted paper for commercial purposes without the written consent of the Society of Petroleum Engineers is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of where and by whom the paper was presented. For photocopying beyond the above permissions, libraries and other users dealing with the Copyright Clearance Center (CCC) Transactional Reporting Service must pay a base fee of \$3 per copyrighted article plus \$0.25 per page to CCC, 222 Rosewood Drive, Danvers, Massachusetts 01923 U.S.A. For other permissions, contact Librarian, SPE, 222 Palisades Creek Drive, Richardson, Texas 75080-2040 U.S.A.

Use of SPE member or author contact information included on this CD for commercial purposes or reproduction of that information in whole or in part, in any form or medium, is strictly prohibited and subject to legal action. Contact SPE to inquire about rental of mailing lists.

This CD of the Sixteenth SPE/DOE Improved Oil Recovery Symposium was produced by SPE. Permission to print and distribute content from this product must be obtained from SPE. Duplication of replication products is absolutely prohibited without written permission from SPE and Adobe. Adobe, the Adobe logo, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Material on the CD was reproduced from original papers and/or electronic files provided by the authors. Some discrepancies are inevitable. Please advise SPE of errors so corrections can be made to the electronic versions of the article. Send corrections by e-mail to pdf@spe.org or mail to the SPE Americas Office, attention Technical Paper Administrator.

ISBN: 978-1-60560-165-6



Society of Petroleum Engineers

16th SPE/DOE Improved Oil Recovery Symposium 2008

TABLE OF CONTENTS

VOLUME 1

Development of an Ultra-Low Interfacial Tension Surfactant in a System with No-Alkali for Chemical Flooding	1
<i>D. M. Wang, C.D. Liu, W. X. Wu, G. Wang</i>	
Study of Polymer Flooding in Class ??? Reservoir and Pilot Test	10
<i>H. Pu, D. Yin</i>	
A Pore Level Study of MIOR Displacement Mechanisms in Glass Micromodels Using Rhodococcus sp. 094	26
<i>C. Crescente, A. Rekdal, A. Abraiz, O. Torsaeter, E. Kowalewski</i>	
Mechanisms of Oil Recovery via Multi-Contact Miscible Gas Injection Process within Lensed Systems	46
<i>Y.M. Al-Wahaibi, O. Abdullah, K. Al-Hadrami</i>	
Mechanistic Modeling of Alkaline/Surfactant/Polymer Floods	69
<i>H. Mohammadi, M. Delshad, G. A. Pope</i>	
Waterflooding Under Dynamic Induced Fractures: Reservoir Management and Optimization of Fractured Waterfloods	82
<i>P.J. van den Hoek, R. Al-Masfry, D. Zwarts, J. D. Jansen, B. Hustedt</i>	
Labyrinth Packer Lowers the Costs for Steam Injection Wells: Theoretical and Experimental Results e,.....	96
<i>C. Teodoriu, G. Falcon</i>	
Comparison Study of Capillary Pressure Curves Obtained Using Traditional Centrifuge and Magnetic Resonance Imaging Techniques.....	100
<i>D. P. Green, J. Gardner, B. J. Balcom, M. J. McAloon, P. F. de J. Cano-Barrita</i>	
Effect of Miscible and Immiscible CO₂ Flooding on Gravity Drainage: Experimental and Simulation Results.....	111
<i>K. Asghari, F. Torabi</i>	
A Methodology to Design Exploitation Plans through the Application of Thermal Process, Orocual Field, Venezuela	120
<i>I. Anaya, M. M. Hernandez, A. Luces, A. J. Serna</i>	
Hysteresis and Field-Scale Optimization of WAG Injection for Coupled CO₂-EOR and Sequestration.....	131
<i>Y. Ghomian, G. A. Pope, K. Sepehrnoori</i>	
Injectivity Changes and CO₂ Retention for EOR and Sequestration Projects	152
<i>R. B. Grigg, R. K. Svec</i>	
From Intelligent Injectors to Smart Flood Management: Realizing the Value of Intelligent Completion Technology in the Moderate Production Rate Industry Segment	165
<i>W. F. MacPhail, M. Konopczynski</i>	

Production Enhancement in Gas-Condensate Reservoirs by Altering Wettability to Gas Wetness: Field Application.....	175
<i>Y. Liu, H. Zheng, G. Huang, G. Li, K. Li</i>	
Developing a Chemical EOR Pilot Strategy for a Complex, Low Permeability Water Flood	182
<i>A. J. P. Fletcher, G. R. Morrison</i>	
Efficient Ensemble-Based Closed-Loop Production Optimization.....	205
<i>Y. Chen, D. S. Oliver, D. Zhang</i>	
Using a Discretized Well Model to Simulate Production Behavior in Horizontal or Multi-Lateral Wells	224
<i>Y. Wang, D. Shan, R. N. Heim</i>	
Identification of Wells with High CO₂-Leakage Potential in Mature Oil Fields Developed for CO₂-Enhanced Oil Recovery.....	234
<i>T. L. Watson, S. Bachu</i>	
Understanding the Rate of Clean Up for Oil Zones after a Gel Treatment.....	244
<i>R. S. Seright, W. B. Lindquist, R. Cai</i>	
Time-Lapse Seismic Used to Qualify the Drainage and IOR Strategies on the Snorre Field	258
<i>F. Aanvik, R. K. Tønnesen, R. Aurvåg, G. V. Brustad, O. Lyse, L. Kollbotn</i>	
Pore Scale Estimation, Up Scaling and Uncertainty Modeling for Multiphase Properties	274
<i>A. B. Rustad, T. G. Theting, R. J. Held</i>	
Utilizing Acidized NH₂ for Mitigating Formation Damage and Improving Oil Recovery: Case Study of Penara Field, Malaysia	286
<i>N. A. M Agil, I. M. Saaid, J. Ibrahim, M. F. Harun</i>	
A New Method for Vertical Leak Detection in Low to Moderate Permeability Flooded Reservoirs.....	293
<i>D. W. Walser, D. K. Astakhov, G. R. Stanley</i>	
Economics of Field Proven Chemical Flooding Technologies	300
<i>K. Wyatt, M. Pitts, H. Surkalo</i>	
Advanced Wells: How are they Being Used and are they Creating Value?	307
<i>A. F. Mitchell, L. T. Skarsholt</i>	
A Mathematical Model for Emulsion Mobilization and Its Effect on EOR During ASP Flooding.....	315
<i>Z. Lei, S. Yuan, J. Song, J. Yuan, Y. S. Wu</i>	
Laboratory Evaluation of Water-Swellable Materials for Fracture Shutoff	324
<i>I. Abbasy, J. Vasquez, L. Eoff, D. Dalrymple</i>	
Application of a New Fully-Coupled Thermal Multiphase Wellbore Flow Model.....	338
<i>S. Livescu, L. J. Durlofsky, K. Aziz, J. C. Ginestra</i>	
Performance Analysis of SAGD Wind-Down Process with CO₂ Injection	349
<i>A. S. Bagci, S. Olushola, E. Mackay</i>	
Buffalo Field High-Pressure Air Injection Projects: Technical Performance and Operational Challenges	363
<i>D. Gutiérrez, R. J. Miller, A. R. Taylor, B. P. Thies, V. K. Kumar</i>	
Retention of CO₂-foaming Agents onto Chalk: Effects of Surfactant Structure, Temperature and Residual Oil Saturation	374
<i>I. Fjelde, J. Zuta, I. Hauge</i>	

Viscous Oil Displacement with Aqueous Associative Polymers	384
<i>F. Aktas, T. Clemens, L. M. Castanier, A. R. Kovscek</i>	
Effective EOR Decision Strategies with Limited Data: Field Cases Demonstration.....	395
<i>E. Manrique, M. Izadi, C. Kitchen, V. Alvarado</i>	
CO₂ IOR Evaluation for the U.S. Rocky Mountain Assets.....	411
<i>M. M. Kulkarni, H. L. Chen, A. C. Brummert</i>	
Analysis of the Wettability Alteration Process during Seawater Imbibition into Preferentially Oil-Wet Chalk Cores.....	424
<i>L. Yu, S. Evje, H. Kleppe, T. Kårstad, I. Fjelde, S. M. Skjaeveland</i>	
Development of Surfactants for Chemical Flooding at Difficult Reservoir.....	435
<i>J. R. Barnes, J. P. Smit, J. R. Smit, P. G. Shpakoff, K. H. Raney, M. C. Puerto</i>	
Phase Behaviour Methods for the Evaluation of Surfactants for Chemical Flooding at Higher Temperature Reservoir Conditions.....	453
<i>J. R. Barnes, J. P. Smit, J. R. Smit, P. G. Shpakoff, K. H. Raney, M. C. Puerto</i>	
Colloidal Dispersion Gels Improve Oil Recovery in a Heterogeneous Argentina Waterflood	462
<i>D. Diaz, C. Somaruga, C. Norman, J. Romero</i>	
Line Tension-Based Modification of Young's Equation for Rock-Oil-Brine Systems	472
<i>D. Saini, Y. Zheng, D. N. Rao</i>	
Reservoir Condition Measurements of Compositional Effects on Gas-Oil Interfacial Tension and Miscibility	491
<i>D. S. Sequeira, S. C. Ayirala, D. N. Rao</i>	
Combining Bulk Gels and Colloidal Dispersion Gels for Improved Volumetric Sweep Efficiency in a Mature Waterflood.....	515
<i>E. Muruaga, M. Flores, C. Norman, J. Romero</i>	

VOLUME 2

Statistical Model of Dispersion in a 2-D Glass Micromodel	527
<i>M. H. Ghazanfari, R. Kharrat, D. Rashtchian, S. Vossoughi</i>	
Chemical Flood Simulation of Laboratory Corefloods for the Mangala Field: Generating Parameters for Field-Scale Simulation	540
<i>A. Pandey, M. S. Kumar, D. Beliveau, D. W. Corbishley</i>	
Calculation of a Critical Steam Injection Rate for Thermally-Assisted Gas-Oil Gravity Drainage	551
<i>A. S. Al-Rabaani, M. J. Blunt, A. H. Muggeridge</i>	
Capillary Alteration of Caprocks by Acid Gases	567
<i>V. Shah, D. Broseta, G. Mouronval</i>	
Foam Modeling in Heterogeneous Reservoirs Using Stochastic Bubble Population Approach.....	578
<i>F. F. Zinati, R. Farajzadeh, P. L. J. Zitha</i>	
Summary of Gulf Coast Sandstone CO₂ EOR Flooding Application and Response	597
<i>M. H. Holtz</i>	
Chemical Flooding of Fractured Carbonates Using Wettability Modifiers	609
<i>N. F. Najafabadi, M. Delshad, K. Sepehrnoori, Q. P. Nguyen, J. Zhang</i>	
A Novel Foam Concept with CO₂ Dissolved Surfactants.....	628
<i>V. Q. Le, Q. P. Nguyen, A. W. Sanders</i>	

Cement Core Experiments With A Conductive Leakage Pathway, Under Confining Stress And Alteration Of Cement's Mechanical Properties Via A Reactive Fluid, As An Analog For CO₂ Leakage Scenario	643
<i>N. J. Huerta, S. L. Bryant, L. Conrad</i>	
Pore Network Modeling of Multiphase Flow in Fissured and Vuggy Carbonates.....	656
<i>S. Erzeybek, S. Akin</i>	
Capillary Pressure and Relative Permeability of Small Cores	669
<i>O. A. Olafuyi, Y. Cinar, M. A. Knackstedt, W. V. Pinczewski</i>	
Effect of Depressurization on Trapped Saturation and Fluid Flow Functions	679
<i>A. N. Nyre, S. R. McDougall, A. Skauge</i>	
Polymer Flooding in Saline Heavy Oil Environments	691
<i>S. Ayirala, P. Doe, M. Curiale, R. Chin</i>	
Application of Bayesian Networks for Predicting the Performance of Gel-Treated Wells in the Arbuckle Formation, Kansas	702
<i>S. M. Ghoraihy, J. T. Liang, D. W. Green, H. C. Liang</i>	
Wettability Alteration of Fractured Carbonate Reservoirs	709
<i>R. Gupta, K. K. Mohanty</i>	
Anisotropic Relative Permeabilities for Characterising Heavy-Oil Depletion Experiment.....	722
<i>C. C. Ezeuko, S. R. McDougall, I. Bondino, G. Hamon</i>	
Application of Coalbed Methane Water to Oil Recovery by Low Salinity Waterflooding	733
<i>H. Pu, X. Xie, P. Yin, N. R. Morrow</i>	
Residual Oil Saturation from Polymer Floods: Laboratory Measurements and Theoretical Interpretation.....	744
<i>C. Huh, G. A. Pope</i>	
Overview of the Illinois Basin's Sequestration Pilots Scott	765
<i>M. Frailey, R. J. Finley</i>	
Scaled Physical Model Experiments to Characterize the Gas-Assisted Gravity Drainage EOR Process	773
<i>A. P. Sharma, D. N. Rao</i>	
Full Field Streamline Tracing in Complex Faulted Systems with Non-Neighbor Connections	796
<i>E. A. Jimenez, A. Datta-Gupta, M. J. King</i>	
Investigation of Field Scale Dispersion	809
<i>A. K. John, L. W. Lake, S. L. Bryant, J. W. Jennings</i>	
Development of High-Performance Surfactants for Difficult Oils.....	828
<i>P. Zhao, A. C. Jackson, C. Britton, D. H. Kim, L. N. Britton, D. B. Levitt, G. A. Pope</i>	
Modelling CO₂ Injection: IOR Potential after Waterflooding.....	839
<i>R. Berenblyum, G. Calderon, L. Kollbotn, L. M. Surguchev</i>	
The Effect of Including Tracer Data in the EnKF Approach	847
<i>R. Valestrand, J. Sagen, G. Naevdal, O. Huseby, S. Forghany</i>	
Mechanisms of Enhanced Natural Imbibition with Novel Chemicals	865
<i>J. Zhang, Q. P. Nguyen, A. K. Flaaten, G. A. Pope</i>	
A New Polymer Application for North Sea Reservoirs.....	877
<i>K. Spildo, A. Skauge, M. G. Aarra, M. T. Tweheyo</i>	

Mechanistic Models of Microbe Growth in Heterogeneous Porous Media.....	886
<i>H. A. Khan, A. Gbosi, L. N. Britton, S. L. Bryant</i>	
Experiments to Investigate Steam Injection in Light Oil Fractured Carbonates	895
<i>M. Verlaan, P. Boerrigter, S. Oedai, J. van Dorp</i>	
Enhanced Gas Recovery and CO₂ Sequestration by Injection of Exhaust Gases from Combustion of Bitumen	905
<i>S. S. K. Sim, P. Brunelle, A. T. Turta, A. K. Singhal</i>	
A Systematic Laboratory Approach to Low-Cost, High-Performance Chemical Flooding	915
<i>A. K. Flaaten, Q. P. Nguyen, G. A. Pope, J. Zhang</i>	
Range of Operability of Gas-Assisted Gravity Drainage Process	935
<i>T. N. Mahmoud, D. N. Rao</i>	
Improving Waterflood Recovery: LoSal(TM) EOR Field Evaluation.....	947
<i>J. C. Seccombe, A. Lager, K. Webb, G. Jerauld, E. Fueg</i>	
Simulation Evaluation of Gravity Stable CO₂ Flooding in the Muddy Reservoir at Grieve Field, Wyoming	966
<i>S. Wo, P. Yin, B. Blakeney-DeJarnett, C. E. Mullen</i>	
A Globally-Convergent Flash Calculation for Constant K-Values Based on a Parameterization of the Tie-Line Field.....	981
<i>R. Juanes</i>	
New Generation Silicate Gel System for Casing Repairs and Water Shutoff	997
<i>L. D. Burns, M. Burns, P. Wilhite, S. McCool, K. Oglesby, J. Glass</i>	
Compositional Parametrization for Multi-phase Flowin Porous Media.....	1009
<i>D. V. Voskov, H. A. Tchelepi</i>	
Upscaling of Capillary Trapping Under Gravity Override: Application to CO₂ Sequestration in Aquifers	1025
<i>R. Juanes, C. W. MacMinn</i>	
In Situ Phase Pressures and Fluid Saturation Dynamics Measured in Waterfloods at Various Wettability Conditions.....	1041
<i>A. Brautaset, G. Ersland, A. Graue</i>	
Mechanistic Interpretation and Utilization of Viscoelastic Behavior of Polymer Solutions for Improved Polymer-Flood Efficiency	1051
<i>M. Delshad, D. H. Kim, O. A. Magbagbeola, C. Huh, G. A. Pope, F. Tarahhom</i>	

VOLUME 3

Optimal Rate Control Under Geologic Uncertainty	1066
<i>A. H. Alhuthali, A. Datta-Gupta, B. Yuen, J. P. Fontanilla</i>	
A Combinatorial Approach for Identification of Performance EOR Surfactants.....	1091
<i>M. Morvan, R. Koetitz, P. Moreau, B. Pavageau, P. Rivoal, B. Roux</i>	
Application of pH-Triggered Polymers in Fractured Reservoirs to Increase Sweep Efficiency	1100
<i>F. Lalehrokh, S. L. Bryant, C. Huh, M. M. Sharma</i>	
An Innovative Approach to Evaluate Residual Oil Saturation in Insitu Condition.....	1113
<i>S. Hazra, S. Bhattacharya</i>	
EOR Potential of the Michigan Silurian Reefs Using CO₂.....	1118
<i>B. Toelle, Larry Pekot, D. Barnes, M. Grammer, W. Harrison</i>	

Selection and Screening of Polymers for Enhanced-Oil Recovery	1125
<i>D. B. Levitt, G. A. Pope</i>	
Designing for Mixed Wettability	1143
<i>M. Kumar, T. J. Senden, S. Latham, A. P. Sheppard, M. A. Knackstedt, Y. Cinar, W. V. Pinczewski</i>	
Pore-Scale Simulation of WAG Floods in Mixed-Wet Micromodels	1152
<i>M. I. J. van Dijke, M. Lorentzen, M. Sohrabi, K. S. Sorbie</i>	
Evaluation of Behind-Pipe Saturation in a Miscible CO₂ Flood	1166
<i>S. Amadi, R. G. Hughes</i>	
Foam Mobility Control for Surfactant EOR.....	1178
<i>R. F. Li, W. Yan, S. Liu, G. J. Hirasaki, C. A. Miller</i>	
Air Foam Injection for IOR: from Laboratory to Field Implementation in ZhongYuan Oilfield China	1194
<i>H. Yu, B. Yang, G. Xu, J. Wang, S. R. Ren, W. Lin, L. Xiao, H. Gao</i>	
The Modeling Challenge of High Pressure Air Injection.....	1204
<i>A. H. de Zwart, D. W. van Batenburg, C. P. A. Blom, A. Tsolakidis, C. A. Glandt, P. Boerrigter</i>	
Insurance Value of Intelligent Well Technology against Reservoir Uncertainty	1217
<i>E. A. Addiego-Guevara, M. D. Jackson, M. A. Giddins</i>	
Kuparuk MWAG Project after 20 Years.....	1233
<i>W. Shi, J. Corwith, A. Bouchard, R. Bone, E. Reinbold</i>	
ASP Processes: Wide Range of Conditions for Good Recovery.....	1242
<i>S. Liu, R. F. Li, C. A. Miller, G. J. Hirasaki</i>	
Time-Dependent Injectivity During CO₂ Storage in Aquifers	1260
<i>M. Burton, N. Kumar, S. L. Bryant</i>	
Impact of Phase Behavior Modeling on In-Situ Combustion Process Performance	1275
<i>M. R. Kristensen, M. G. Gerritsen, P. G. Thomsen, M. L. Michelsen, E. H. Stenby</i>	
Using Co-Solvents to Provide Gradients and Improve Oil Recovery during Chemical Flooding in a Light Oil Reservoir	1292
<i>V. Dwarakanath, T. Chaturvedi, A. C. Jackson, T. Malik, A. Siregar, P. Zhao</i>	
The Potential for Additional Carbon Dioxide Flooding Projects in the United States.....	1304
<i>H. Mohan, M. Carolus, K. Biglarbigi</i>	
LoSal(TM) Enhanced Oil Recovery: Evidence of Enhanced Oil Recovery at the Reservoir Scale	1313
<i>A. Lager, K. J. Webb, I. R. Collins, D. M. Richmond</i>	
Effective Use of Heterogeneity Measures in the Evaluation of a Mature CO₂ Flood	1325
<i>D. Senocak, S. P. Pennell, C. E. Gibson, R. G. Hughes</i>	
Integrated Clustering/Geostatistical/Evolutionary Strategies Approach for 3D Reservoir Characterization and Assisted History-Matching in a Complex Carbonate Reservoir, SACROC Unit, Permian Basin.....	1334
<i>R. Gonzalez, K. Schepers, S. R. Reeves, E. Eslinger, T. Back</i>	
Effect of Heterogeneous Capillary Pressure on Buoyancy-Driven CO₂ Migration	1359
<i>E. Saadatpoor, S. L. Bryant, K. Sepehrnoori</i>	
Evaluation of Manson Lease Oil Field for Improved Oil Recovery Process	1376
<i>J. S. Tsau, V. V. Bustamante, D. W. Green, B. Barnett, J. L. Dale</i>	

Generating Facies Maps by Assimilating Production Data and Seismic Data With the Ensemble Kalman Filter	1386
<i>Y. Zhao, A. C. Reynolds, G. Li</i>	
Investigation into the Processes Responsible for Heavy Oil Recovery by Alkali-Surfactant Flooding	1416
<i>J. Bryan, A. Mai, A. Kantzas</i>	
Investigation of Diffusion Coefficients of Heavy Oil and Hydrocarbon Solvent Systems in Porous Media	1429
<i>H. Luo, A. Kantzas</i>	
Case Study on Preformed Particle Gel for In-depth Fluid Diversion.....	1438
<i>B. Bai, F. Huang, Y. Liu, R. S. Seright, Y. Wang</i>	
A Successful Gas Injection Pilot Test in a Mature and Complex Fractured Carbonate Reservoir, Oxiacaque Field, Southern Mexico.....	1456
<i>M. Arteaga, J. Molina, R. Hernández, F. Flamenco</i>	
Possible Mechanisms and Case Studies for Enhancement of Oil Recovery and Production Using In-Situ Seismic Stimulation	1467
<i>S. Kostrov, W. Wooden</i>	
CO₂ Storage in Low Permeability Formations	1475
<i>Y. Cinar, O. Bukhteeva, P. R. Neal, W. G. Allinson, L. Paterson</i>	
Flood Front Tracking and Pulse Test Time Lags.....	1488
<i>A. Orangi, I. Ershaghi</i>	
Mechanism of the Effect of Micro-Forces on Residual Oil in Chemical Flooding.....	1502
<i>H. F. Xia, D. M. Wang, G. Wang, W. G. Ma, J. Liu</i>	
New Developments in Production Technology for Polymer Flooding	1512
<i>W. Yan, W. Demin, W. Jun, L. Jiangtao, Y. Runtao, D. Zengyou</i>	
Review of Practical Experience & Management by Polymer Flooding at Daqing.....	1520
<i>H. Z. Dong, S. F. Fang, D. M. Wang, J. Y. Wang, Z. Liu, W. H. Hong</i>	
Current Status and Prospects of ASP Flooding in Daqing Oil Fields	1538
<i>W. Fenglan, Y. Zhenyu, W. Junzheng, L. Yang, C. Guangyu, P. Shukai, W. Ying</i>	
The Application of Hydrocarbon-Degrading Bacteria in Daqing's Low Permeability, High Paraffin Content Oilfields	1544
<i>H. ZhaoWei, H. Peihui , L. Jianjun, C. Jianfei, D. Xumou, G. Menghua, C. Xinghong</i>	
Application of Surfactants with Narrow Equivalent Weight Distribution and Desirable Structure to Daqing ASP Flooding.....	1554
<i>X. Wu, L. Zong, J. Chen, H. Wang, Y. Yang, C. Shan, J. Geng</i>	
An Applied Chemical Flooding Simulator and Its Application in Daqing Oilfield	1563
<i>G. Chen, Y. Li, J. Wang, M. Ma, K. Lu, G. Jin, H. Sun</i>	
The Methods of Improving Polymer Flooding Performance at Northwest Area of Lamadian	1576
<i>Z. B. Shao, S. L. Gao, F. S. Huang, G. B. Hu, W. Yan</i>	
Performance and Effect Analysis of ASP Commercial Flooding in Central Xing 2 Area of Daqing Oil Field	1583
<i>H. F. Li, D. P. Xu, J. Jiang, X. W. Du, J. C. Hong, Y. Jiang, Y. S. Xu</i>	
Author Index	