

# Improved Oil Recovery by Surfactant and Polymer Flooding

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# Improved Oil Recovery By Surfactant And Polymer Flooding

**RJ Shavelson**



## **Improved Oil Recovery By Surfactant And Polymer Flooding:**

**Improved Oil Recovery by Surfactant and Polymer Flooding** D.O. Shah, 2012-12-02 Improved Oil Recovery by Surfactant and Polymer Flooding contains papers presented at the 1976 AIChE Symposium on Improved Oil Recovery by Surfactant and Polymer Flooding held in Kansas City. Organized into 18 chapters, the book includes papers that introduce petroleum reservoirs and discuss interfacial tension, molecular forces, molecular aspects of ultralow interfacial tension, the structure formation and phase inversion of microemulsions, and thermodynamics of micellization and related phenomena. Papers on adsorption phenomena at solid-liquid interfaces and reservoir rocks, as well as on flow through porous media, studies on polymer solutions, microemulsions, and soluble oils are also provided. Significant topics on molecular, microscopic, and macroscopic aspects of oil displacement in porous media by surfactant and polymer solutions and related phenomena are also discussed. The literature cited in this book forms a comprehensive list of references in relation to improved oil recovery by surfactant and polymer flooding. This book will be useful to experts and non-experts in this field of research. **Improved Oil Recovery by Surfactant and Polymer Flooding. Papers from the AIChE Symposium, Kansas City, Kan. 1976. Shah and R.S. Schechter, 1977. Improved Oil Recovery by Surfactant and Polymer Flooding, 1977.**

**Polymer-Improved Oil Recovery** K.S. Sorbie, 2013-11-21 The importance of oil in the world economy cannot be overstated, and methods for recovering oil will be the subject of much scientific and engineering research for many years to come. Even after the application of primary depletion and secondary recovery processes, usually waterflooding, much oil usually remains in a reservoir, and indeed in some heterogeneous reservoir systems as much as 70% of the original oil may remain. Thus there is an enormous incentive for the development of improved or enhanced methods of oil recovery aimed at recovering some portion of this remaining oil. The techniques used range from improved secondary flooding methods including polymer and certain gas injection processes through to enhanced or tertiary methods such as chemical surfactant, caustic foam, gas miscible, carbon dioxide gas reinjection, and thermal steam soak and drive-in-situ combustion. The distinction between the classification of the methods usually refers to the target oil that the process seeks to recover. That is, in improved recovery, we are usually aiming to increase the oil sweep efficiency, whereas in tertiary recovery, we aim to mobilise and recover residual or capillary-trapped oil. There are a few books and collections of articles which give general overviews of improved and enhanced oil recovery methods. However, for each recovery method, there is such a wide range of interconnected issues concerning the chemistry, physics, and fluid mechanics of flow in porous media that rarely are these adequately reviewed.

**Chemical Enhanced Oil Recovery** Patrizio Raffa, Pablo Druetta, 2019-07-22 This book aims at presenting, describing, and summarizing the latest advances in polymer flooding regarding the chemical synthesis of the EOR agents and the numerical simulation of compositional models in porous media, including a description of the possible applications of nanotechnology acting as a booster of traditional chemical EOR processes. A large part of the world economy depends nowadays on non

renewable energy sources most of them of fossil origin Though the search for and the development of newer greener and more sustainable sources have been going on for the last decades humanity is still fossil fuel dependent Primary and secondary oil recovery techniques merely produce up to a half of the Original Oil In Place Enhanced Oil Recovery EOR processes are aimed at further increasing this value Among these chemical EOR techniques including polymer flooding present a great potential in low and medium viscosity oilfields Describes recent advances in chemical enhanced oil recovery Contains detailed description of polymer flooding and nanotechnology as promising boosting tools for EOR Includes both experimental and theoretical studies About the Authors Patrizio Raffa is Assistant Professor at the University of Groningen He focuses on design and synthesis of new polymeric materials optimized for industrial applications such as EOR coatings and smart materials He co authored about 40 articles in peer reviewed journals Pablo Druetta works as lecturer at the University of Groningen RUG and as engineering consultant He received his Ph D from RUG in 2018 and has been teaching at a graduate level for 15 years His research focus lies on computational fluid dynamics CFD

**Modern Chemical Enhanced Oil Recovery** James J.Sheng,2010-11-25 Crude oil development and production in U S oil reservoirs can include up to three distinct phases primary secondary and tertiary or enhanced recovery During primary recovery the natural pressure of the reservoir or gravity drive oil into the wellbore combined with artificial lift techniques such as pumps which bring the oil to the surface But only about 10 percent of a reservoir s original oil in place is typically produced during primary recovery Secondary recovery techniques to the field s productive life generally by injecting water or gas to displace oil and drive it to a production wellbore resulting in the recovery of 20 to 40 percent of the original oil in place In the past two decades major oil companies and research organizations have conducted extensive theoretical and laboratory EOR enhanced oil recovery researches to include validating pilot and field trials relevant to much needed domestic commercial application while western countries had terminated such endeavours almost completely due to low oil prices In recent years oil demand has soared and now these operations have become more desirable This book is about the recent developments in the area as well as the technology for enhancing oil recovery The book provides important case studies related to over one hundred EOR pilot and field applications in a variety of oil fields These case studies focus on practical problems underlying theoretical and modelling methods operational parameters e g injected chemical concentration slug sizes flooding schemes and well spacing solutions and sensitivity studies and performance optimization strategies The book strikes an ideal balance between theory and practice and would be invaluable to academicians and oil company practitioners alike Updated chemical EOR fundamentals providing clear picture of fundamental concepts Practical cases with problems and solutions providing practical analogues and experiences Actual data regarding ranges of operation parameters providing initial design parameters Step by step calculation examples providing practical engineers with convenient procedures

Advancements in Chemical Enhanced Oil Recovery Tushar Sharma,Krishna Raghav Chaturvedi,Tarek Ganat,Imtiaz Ali,2024-09-06 This

comprehensive book presents the latest advances in chemical EOR considered to be an efficient technique to recover bypassed oil and residual oil trapped in reservoirs. The volume first provides an introduction to chemical EOR and discusses its viability. From there it delves in the various EOR methods including low salinity water flooding, polymer and surfactant flooding, foam flooding, nanofluid flooding, hybrid methods, ionic liquid applications and others. The book covers chemical synthesis of EOR agents and numerical simulation of compositional models in porous media including a description of possible application of nanotechnology acting as a booster of traditional chemical EOR processes.

Surfactants for Enhanced Oil Recovery Applications Muhammad Sagir, Muhammad Mushtaq, M. Suleman Tahir, Muhammad Bilal Tahir, Abdul Ravoof Shaik, 2020-01-29. This book provides a concise treatise on the use of surfactants in enhanced oil recovery EOR including information on key types of surfactants and their respective applications in the wider petroleum industry. The authors discuss carbon dioxide EOR, alkaline surfactant polymer flooding strategies and the use of surfactants as a means of reducing interfacial tension while also paying special attention to the challenges involved in using surfactants for enhanced oil recovery such as the difficult issue of surfactant adsorption on reservoir rock. All chapters highlight and are based on the authors' own laboratory scale case studies. Given its content, the book offers a valuable asset for graduate students of petroleum and chemical engineering as well as researchers in the field of chemical enhanced oil recovery. It will also be of interest to professionals involved in enhanced industrial oil recovery.

Enhanced Oil Recovery Field Case Studies James J. Sheng, 2013-04-10. Enhanced Oil Recovery Field Case Studies bridges the gap between theory and practice in a range of real world EOR settings. Areas covered include steam and polymer flooding, use of foam, in situ combustion, microorganisms, smart water based EOR in carbonates and sandstones and many more. Oil industry professionals know that the key to a successful enhanced oil recovery project lies in anticipating the differences between plans and the realities found in the field. This book aids that effort providing valuable case studies from more than 250 EOR pilot and field applications in a variety of oil fields. The case studies cover practical problems underlying theoretical and modeling methods, operational parameters, solutions and sensitivity studies and performance optimization strategies benefitting academicians and oil company practitioners alike. Strikes an ideal balance between theory and practice. Focuses on practical problems underlying theoretical and modeling methods and operational parameters. Designed for technical professionals covering the fundamental as well as the advanced aspects of EOR.

**Improved Oil Recovery by Surfactant and Polymer Flooding. AIChE ( American Institute of Chemical Engineers ) Symposium, Kansas City, Kansas, 1976** Dinech Ochhavlad Shah (1938- ( editor )), Robert Samuel ( editor ) Schechter, 1977.

*Polymer Flooding* W. Littmann, 1988-09-01. This book covers all aspects of polymer flooding, an enhanced oil recovery method using water soluble polymers to increase the viscosity of flood water for the displacement of crude oil from porous reservoir rocks. Although this method is becoming increasingly important, there is very little literature available for the engineer wishing to embark on such a project. In the past, polymer flooding was mainly

the subject of research The results of this research are spread over a vast number of single publications making it difficult for someone who has not kept up to date with developments during the last 10 to 15 years to judge the suitability of polymer flooding to a particular field case This book tries to fill that gap The basic mechanisms of the process are described and criteria given where it may be employed Basic elements of the chemistry of EOR polymers are provided The fundamentals of polymer physics such as rheology flow in porous media and adsorption are derived Practical hints on mixing and testing of polymers in the laboratory are given as well as instructions for their application in the oil field Polymer flooding is illustrated by some case histories and the economics of the methods are examined For the essential subjects example calculations are added An indispensable book for reservoir engineers production engineers and laboratory technicians within the petroleum industry

**Enhanced Oil Recovery Field Case Studies** James J. Sheng, 2013-04-10 In this chapter the fundamentals of surfactant flooding are covered which include microemulsion properties phase behavior interfacial tension capillary desaturation surfactant adsorption and retention and relative permeabilities The surfactant polymer interactions are discussed The mechanisms and screening criteria are briefly discussed The field cases presented include low tension waterflooding Loma Novia Wichita County Regular field sequential micellar polymer flooding El Dorado Sloss micellar polymer flooding Torchlight and Delaware Childers and Minas SP project preparation and SP flooding Gudong

**Enhanced Oil Recovery** Association de recherche sur les techniques d'exploitation du pétrole, 1982 **Chemical Enhanced Oil Recovery (cEOR)** Laura Romero-Zerón, 2016-10-19 Commercial application of chemical enhanced oil recovery cEOR processes is expected to grow significantly over the next decade Thus Chemical Enhanced Oil Recovery cEOR A Practical Overview offers key knowledge and understanding of cEOR processes using an evidence based approach intended for a broad audience ranging from field operators researchers to reservoir engineers dealing with the development and planning of cEOR field applications This book is structured into three sections the first section surveys overall EOR processes The second section focuses on cEOR processes while the final section describes the electrorheology technology These sections are presented using a practical and realistic approach tailored for readers looking to improve their knowledge and understanding of cEOR processes in a nutshell

*Enhanced Oil Recovery* Ajay Mandal, Keka Ojha, 2023-11-29 Oil recovery efficiency can be increased by applying the enhanced oil recovery EOR processes which are based on the improvement of mobility ratio reduction of interfacial tension between oil and water wettability alteration reduction of oil viscosity formation of oil banks and so forth This book describes the different EOR methods and their mechanisms which are traditionally used after conventional primary and secondary processes The present scenario of different EOR processes at both the field application stage and research stage is also covered Further it discusses some of the recent advances in EOR processes such as low salinity water flooding the application of nanotechnology in EOR microbial EOR carbonated water injection etc Features Comprehensive coverage of all enhanced oil recovery EOR methods Discussion of reservoir rock and fluid

characteristics Illustration of steps in design and field implementation as well as the screening criteria for process selection Coverage of novel topics of nanotechnology in EOR and hybrid EOR method and low salinity waterfloods Emphasis on recent technologies feasibility and implementation of hybrid technologies This book is aimed at graduate students professionals researchers chemists and personnel involved in petroleum engineering chemical engineering surfactant manufacturing polymer manufacturing oil gas service companies and carbon capture and utilization Proceedings of the International Field Exploration and Development Conference 2017 Zhan Qu,Jia'en Lin,2018-07-11 This book presents selected papers from the 7th International Field Exploration and Development Conference IFEDC 2017 which focus on upstream technologies used in oil gas development the principles of the process and various design technologies The conference not only provides a platform for exchanging lessons learned but also promotes the development of scientific research in oil gas exploration and production The book will benefit a broad readership including industry experts researchers educators senior engineers and managers

**Microbial Enhanced Oil Recovery** Lalit Pandey,Pankaj Tiwari,2021-10-21 This book presents the fundamentals of the reservoir and interfacial engineering The book systematically starts with the basics of primary secondary and tertiary enhanced oil recovery and emphasizes on the theory of microbial enhanced oil recovery MEOR and its potential toward recovery of oil in place Different approaches of MEOR such as in situ ex situ and integration of chemical and microbial enhanced oil recovery EOR are discussed in detail This book highlights the link between the effectiveness of MEOR and the local reservoir conditions crude oil characteristics and indigenous microbial community The latest implementations of MEOR across the globe are highlighted as case studies to outline the potential as well as the scope of MEOR Given the topics covered this book will be useful for professionals and researchers working in the areas of petroleum science and engineering chemical engineering biotechnology bioengineering and other related fields

**Exotic Surfactant Blends** Pasquale De Marco,2025-07-23 Exotic Surfactant Blends is a comprehensive guide to the fascinating world of surfactants providing an in depth exploration of their properties behaviors and diverse applications Surfactants also known as surface active agents are ubiquitous in our daily lives playing crucial roles in everything from detergents and personal care products to food processing and industrial manufacturing This book delves into the fundamental principles of surfactant chemistry examining their molecular structures classification and properties It explores the formation and stability of mixed surfactant systems providing insights into their phase behavior and unique characteristics The interactions between surfactants and polymers inorganic compounds biological systems and the environment are thoroughly discussed highlighting their impact on both surfactant behavior and the properties of the interacting substances Beyond the theoretical foundations Exotic Surfactant Blends covers a wide range of practical applications of surfactants From their essential role in detergency and emulsification to their use in drug delivery and tissue engineering the book showcases the versatility and importance of these remarkable molecules It also examines emerging trends and future directions in surfactant research exploring novel

applications and sustainable surfactant technologies Written by leading experts in the field Exotic Surfactant Blends is an invaluable resource for researchers scientists and industry professionals involved in the development characterization and application of surfactants Its comprehensive coverage and accessible style make it an essential reference for anyone seeking to deepen their understanding of these multifaceted compounds Throughout this book readers will gain a profound understanding of the intricate world of surfactants their interactions with various substances and their diverse applications across multiple disciplines It is an indispensable guide for anyone seeking to harness the power of surfactants for innovation and problem solving in various fields If you like this book write a review

**Enhanced Oil Recovery Processes** Ariffin Samsuri, 2019-12-18 Concerned with production decline shortages of new oil reserves and increasing world energy demand the oil sector continues to search for economic and efficient techniques to enhance their oil recovery from the existing oil field using several enhanced oil recovery techniques EOR methods Despite its highefficiency widely acclaimed potentials and limitations the Low Salinity Water Flooding LSWF hybrid and nanotechnology applications have gained vast interest with promising future to increase ultimate oil recovery tackle operational challenges reduce environmental damage and allow the highest feasible recoveries with lower production costs This synergistic combination has opened new routes for novel materials with fascinating properties This book aims to provide an overview of EOR technology such as LSWF hybrid and nanotechnology applications in EOR processes

**Energy Research Abstracts** ,1985



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