

Crude Oil Fingerprinting Analysis

A thorough introduction to environmental monitoring in the oil and gas industry Analytical Techniques in the Oil and Gas Industry for Environmental Monitoring examines the analytical side of the oil and gas industry as it also provides an overall introduction to the industry. You'll discover how oil and natural gas are sourced, refined, and processed. You can learn about what's produced from oil and natural gas, and why evaluating these sourced resources is important. The book discusses the conventional analyses for oil and natural gas feeds, along with their limitations. It offers detailed descriptions of advanced analytical techniques that are commercially available, plus explanations of gas and oil industry equipment and instrumentation. You'll find technique descriptions supplemented with a list of references as well as with real-life application examples. With this book as a reference, you can prepare to apply specific analytical methods in your organization's lab environment. Analytical Techniques can also serve as your comprehensive resource on key techniques in the characterization of oil and gas samples, within both refinery and environmental contexts. Understand of the scope of oil and gas industry techniques available Consider the benefits and limitations of each available process Prepare for applying analytical techniques in your lab See real examples and a list of references for each technique Read descriptions of off-line analytics, as well as on-line and process applications As a chemist, engineer, instructor, or student, this book will also expand your awareness of the role these techniques have in environmental monitoring and environmental impact assessments.

The idea of The Fingerprint Sourcebook originated during a meeting in April 2002. Individuals representing the fingerprint, academic, and scientific communities met in Chicago, Illinois, for a day and a half to discuss the state of fingerprint identification with a view toward the challenges raised by Daubert issues. The meeting was a joint project between the International Association for Identification (IAI) and West Virginia University (WVU). One recommendation that came out of that meeting was a suggestion to create a sourcebook for friction ridge examiners, that is, a single source of researched information regarding the subject. This sourcebook would provide educational, training, and research information for the international scientific community.

Constant media attention on oil spills has created global awareness of their risks and the damage they do. Often under-reported is the average cost of the cleanup - often as high as \$200 per liter of oil spilled. Oil is a necessity in today's industrial society, and since our dependence on it is not likely to and any time soon, we will continue to

This manual, to be published in two volumes, provides a condensed overview of the analytical investigation of 80 Chinese Herbal Drugs which are most frequently in use. Thin layer chromatographic-, high pressure liquid chromatographic- and gas chromatographic-fingerprint analytical techniques allow the detection of all main low-molecular constituents of a plant drug and even single constituents can be visualized. Analytical results thereof are shown in numerous color figures. The quality proof of the investigation meets the standard of the European Drug Regulatory Authority. Furthermore, this volume gives a detailed description of the analytical methods used for several drugs. Bioactive constituents, pharmacological and biological activities of several single herbal drugs as well as their therapeutic applications are discussed.

The third edition of Introduction to Environmental Forensics is a state-of-the-art reference for the practicing environmental forensics consultant, regulator, student, academic, and scientist, with topics including compound-specific isotope analysis (CSIA), advanced multivariate statistical techniques, surrogate approaches for contaminant source identification and age dating, dendroecology, hydrofracking, releases from underground storage tanks and piping, and contaminant-transport modeling for forensic applications. Recognized international forensic scientists were selected to author chapters in their specific areas of expertise and case studies are included to illustrate the application of these methods in actual environmental forensic investigations. This edition provides updates on advances in various techniques and introduces several new topics. Provides a comprehensive review of all aspects of environmental forensics Coverage ranges from emerging statistical methods to state-of-the-art analytical techniques, such as gas chromatography-combustion-isotope ratio mass spectrometry and polytopic vector analysis Numerous examples and case studies are provided to illustrate the application of these forensic techniques in environmental investigations

'Environmental forensics' is a combination of analytical and environmental chemistry, which is useful in the court room context. It therefore involves field analytical studies and both data interpretation and modelling connected with the attribution of pollution events to their causes. Recent decades have seen a burgeoning of legislation designed to protect the environment and, as the costs of environmental damage and clean-up are considerable, not only are there prosecutions by regulatory agencies, but the courts are also used as a means of adjudication of civil damage claims relating to environmental causes or environmental degradation. As a result is the increasing number of prosecutions of companies who have breached regulations for environmental protection and in civil claims relating to harm caused by excessive pollutant releases to the environment. Such cases can become extremely protracted as expert witnesses provide their sometimes conflicting interpretations of environmental measurement data and their meaning. It is in this context that environmental forensics is developing as a specialism, leading to greater formalisation of investigative methods which should lead to more definitive findings and less scope for experts to disagree. Now a significant subject in its own right, at least one journal devoted to the field and a number of degree courses have sprung up. As a result of the topicality and rapid growth of the subject area, is the publication of this book - the 26th volume in the highly acclaimed Issues in Environmental Science and Technology Series. This volume contains authoritative articles by a number of the leading practitioners across the globe in the environmental forensics field and aims to cover some of the main techniques and areas to which environmental forensics are being applied. The content is comprehensive and describes a number of the key areas within environmental

forensics - topics covered by the authors include: - Source identification issues - Microbial techniques - Metal contamination and methods of assigning liability - The use of isotopes to determine sources and their applications - Molecular biological methods - Hydrocarbon fingerprinting techniques - Oil chemistry and key compound identification - The emerging role of environmental forensics in groundwater pollution Additionally, the volume considers specific pollutants and long-lived pollutants of groundwater such as halocarbons which have presented particular problems and which are described in some depth, as well as the way in which chemical degradation processes can lead to compositional changes which provide valuable information. The book provides a comprehensive overview of many of the key areas of environmental forensics written by some of the leading experts in the field. It will be both of specialist use to those seeking expert insights into the field and its capabilities as well as of more general interest to those involved in both environmental analytical science and environmental law.

Oil Spill Environmental Forensics provides a complete view of the various forensic techniques used to identify the source of an oil spill into the environment. The forensic procedures described within represent various methods from scientists throughout the world. The authors explore which analytical and interpretative techniques are best suited for a particular oil spill project. This handy reference also explores the use of these techniques in actual environmental oil spills. Famous incidents discussed include the Exxon Valdez incident in 1989 and the Guanabara Bay, Brazil 2000. The authors chronicle both the successes and failures of the techniques used for each of these events. Dr. Zhendi Wang is a senior research scientist and Head of Oil Spill Research of Environment Canada, working in the oil and toxic chemical spill research field. He has authored over 270 academic publications and won a number of national and international scientific honors and awards. Dr. Wang is a member of American Chemical Society (ACS), the Canadian Society for Chemistry (CSC), and the International Society of Environmental Forensics (ISEF). International experts show readers the forensic techniques used in oil spill investigations Provides the theoretical basis and practical applications for investigative techniques Contains numerous case studies demonstrating proven technique

International experts in the field of oil spill response, including representatives from 26 NATO countries, participated in a workshop in Canada to discuss their experience in the development and application of current and emerging technologies for oil spill response in the marine environment. These presentations which form the basis of chapters in this book provide a practical viewpoint of methods used to deal with oil spills under the variety of environmental conditions found in the marine environment. In particular, focus is given to the evaluation of oil spill countermeasures for use under arctic conditions in light of anticipated regional increases in marine traffic (e.g. Northwest Passage) and industrial activities (e.g. offshore oil and gas exploration) in the future. This book provides a timely international perspective on applied research and development, technology transfer, and "lessons learned" from field trials and actual case studies associated with recent spill events. Topics include Preparedness/Contingency Planning, (Eco-terrorism); Oil Spill Fate and Transport (Environmental Persistence, Remote Sensing, modelling, Biodegradation), Biological Effects (Environmental Effects Monitoring and Environmental Risk Assessment); and Operational Response (Containment/Recovery Treating Agents, Shoreline Cleanup, In-situ Burning, Emerging Response Strategies). This book provides a synopsis as to the methods currently employed to deals with spills and an insight on future technologies under development.

This volume explores state-of-the-art mass spectrometric techniques. It focuses on liquid chromatography/mass spectrometry/mass spectrometry and time-of-flight/mass spectrometry to determine emerging contaminants, such as pharmaceuticals, hormones, pesticides, surfactants and unknown natural products.

Although a lot is known about the influence of Polycyclic Aromatic Hydrocarbons (PAHs) on the marine environment, there are still many unanswered questions. Petrogenic Polycyclic Aromatic Hydrocarbons in the Aquatic Environment is a monograph that sums up basic knowledge about this topic while highlighting current research practices useful in studying the aquatic environment. It starts with an introduction to effect of PAH in the marine environment. It then proceeds to provide information on techniques to monitor PAH levels and investigate the affected environment in order to control the subsequent negative effects. Chapters also detail the carcinogenic and endocrine effects of PAHs on fish as well as the degradation of PAHs by microorganisms. This monograph is a useful reference for environmental science students and professionals learning about the role of PAH in the marine environment.

Building on the success of the first Edition—the first pure textbook designed specifically for students on the subject—Fundamentals of Fingerprint Analysis, Second Edition provides an understanding of the historical background of fingerprint evidence, and follows it all the way through to illustrate how it is utilized in the courtroom. An essential learning tool for classes in fingerprinting and impression evidence—with each chapter building on the previous one using a pedagogical format—the book is divided into three sections. The first explains the history and theory of fingerprint analysis, fingerprint patterns and classification, and the concept of biometrics—the practice of using unique biological measurements or features to identify individuals. The second section discusses forensic light sources and physical and chemical processing methods. Section three covers fingerprint analysis with chapters on documentation, crime scene processing, fingerprint and palm print comparisons, and courtroom testimony. New coverage to this edition includes such topics as the biometrics and AFIS systems, physiology and embryology of fingerprint development in the womb, digital fingerprint record systems, new and emerging chemical reagents, varieties of fingerprint powders, and more. Fundamentals of Fingerprint Analysis, Second Edition stands as the most comprehensive introductory textbook on the market.

Risk analysis and prevention. Oil properties oil physical properties. Oil composition and properties. Oil analysis. oil behavior. Modeling. oil spill on land. Effects of oil. Natural dispersion. Cold region spills. Case studies.

Introduces the reader to the production of the products in arefinery • Introduces the reader to the types of test methodsapplied to petroleum products, including the need forspecifications • Provides detailed explanations for accuratelyanalyzing and characterizing modern petroleum products • Rewritten to include new and evolving testmethods • Updates on the evolving test methods and new testmethods as well as the various environmental regulations arepresented

Diluted bitumen has been transported by pipeline in the United States for more than 40 years, with the amount increasing recently as a result of improved extraction technologies and resulting increases in production and exportation of Canadian diluted bitumen. The increased importation of Canadian diluted bitumen to the United States has strained the existing pipeline capacity and contributed to the expansion of pipeline mileage over the past 5 years. Although rising North American crude oil production has resulted in greater transport of crude oil by rail or tanker, oil pipelines continue to deliver the vast majority of crude oil supplies to U.S. refineries. Spills of Diluted Bitumen from Pipelines examines the current state of knowledge and identifies the relevant properties and characteristics of the transport, fate, and effects of diluted bitumen and commonly transported crude oils when spilled in the environment. This report assesses whether the differences between properties of diluted bitumen and those of other commonly transported crude oils warrant modifications to the regulations governing spill response plans and cleanup. Given the nature of pipeline operations, response planning, and the oil industry, the recommendations outlined in this study are broadly applicable to other modes of transportation as well.

This book presents new insights into the development of different aspects of petroleum science and engineering. The book contains 19 chapters divided into two main sections: (i) Exploration and Production

and (ii) Environmental Solutions. There are 11 chapters in the first section, and the focus is on the topics related to exploration and production of oil and gas, such as characterization of petroleum source rocks, drilling technology, characterization of reservoir fluids, and enhanced oil recovery. In the second section, the special emphasis is on waste technologies and environmental cleanup in the downstream sector. The book written by numerous prominent scholars clearly shows the necessity of the multidisciplinary approach to sustainable development in the petroleum industry and stresses the most updated topics such as EOR and environmental cleanup of fossil fuel wastes.

Standard Handbook Oil Spill Environmental Forensics: Fingerprinting and Source Identification, Second Edition, provides users with the latest information on the tools and methods that have become popular over the past ten years. The book presents practitioners with the latest environmental forensics techniques and best practices for quickly identifying the sources of spills, how to form an effective response, and how to determine liability. This second edition represents a complete overhaul of the existing chapters, and includes 13 new chapters on methods and applications, such as emerging application of PAH isomers in oil spill forensics, development and application of computerized oil spill identification (COSI), and fingerprinting of oil in biological and passive sampling devices. Contains 13 new chapters on methods and applications, including emerging application of PAH isomers in oil drill forensics, the development and application of computerized oil spill identification (COSI), and the fingerprinting of oil in biological and passive sampling devices Presents the latest technology and methods in biodegradation of oil hydrocarbons and its implications for source identification, surface trajectory modeling of marine oil spills, and identification of hydrocarbons in biological samples for source determination Contains new case studies to illustrate key applications, methods, and techniques

Number of Exhibits: 2

An excellent introduction to the real world of environmental work, this book covers all phases of data collection, (planning, field sampling, laboratory analysis, and data quality assessment), and is a single source comprehensive reference for the resolution of the most common problems that environmental professionals face daily in their work. (Midwest).

Advances in Marine Biology, Volume 81, the latest release in this acclaimed series published since 1963, updates on many topics that appeal to postgraduates and researchers in marine biology, fisheries science, ecology, zoology and biological oceanography, with this release presenting chapters on The Impact of Hydrocarbon Contamination on the Scallop Fishery in Port au Port Bay, Newfoundland, Pharmaceutical and personal care products in marine and coastal environments: facts, challenges and opportunities, Modeling of the Marathassa Oil Spill in the Vancouver Harbour, Characterization of Nitrogen Containing Polycyclic Aromatic Hydrocarbons (PAHs) in Crude Oil and Refined Petroleum Products, and much more. Reviews articles on the latest advances in marine biology Authored by leading figures in their respective fields of study Presents materials that are widely used by managers, students and academic professionals in the marine sciences

Analyses data on the composition, structure and formation of various petroleum hydrocarbons: the alkanes, cycloalkanes and arenes. Attention is paid to biological markers, com- pounds that may have preserved the main structural features of the original biogenic molecules. Concepts of chemical classification of crude oils are reviewed with respect to the molecular mass distribution of biological markers, and the genesis and chemical evolution of petroleum hydrocarbons are discussed.

Oil spills are a serious marine disaster. Oil spill accidents usually occur in shipping, ports and offshore oil development. Although most are emergent events, once an oil spill occurs, it will cause great harm to the marine ecological environment, and bring direct harm to the economic development along the affected coast as well as to human health and public safety. Information Engineering of Emergency Treatment for Marine Oil Spill Accidents analyzes the causes of these accidents, introduces China's emergency response system, discusses technologies such as remote sensing and monitoring of oil spill on the sea surface and oil fingerprint identification, studies model prediction of marine oil spill behavior and fate and emergency treatment technologies for oil spills on the sea surface, and emphatically introduces the emergency prediction and warning system for oil spills in the Bohai Sea as well as oil spill-sensitive resources and emergency resource management systems. Features: The status quo and causes of marine oil spill pollution, as well as hazards of oil spill on the sea. The emergency response system for marine oil spills. Model-based prediction methods of marine oil spills. A series of used and developing emergency treatments of oil spill on the sea. This book serves as a reference for scientific investigators who want to understand the key technologies for emergency response to marine oil spill accidents, including the current level and future development trend of China in this field.

Within modern forensic science and criminal investigation, experts face several challenges including managing huge amounts of data, handling miniscule pieces of evidence in a chaotic and complex environment, navigating traditional laboratory structures, and, sometimes, dealing with insufficient knowledge. These challenges must be overcome to avoid failure in investigation or miscarriage of justice. Technologies to Advance Automation in Forensic Science and Criminal Investigation provides a platform for researchers to present state-of-the-art technologies within forensic science and criminal investigation. Covering topics such as financial fraud, machine learning, and source camera identification, this book is an essential reference for criminal investigators, justice departments, law enforcement, legislators, computer scientists, automation professionals, researchers, academicians, and students and educators in higher education.

Oil Spill Science and Technology, Second Edition, delivers a multi-contributed view on the entire chain of oil-spill related topics from oil properties and behaviors, to remote sensing through the management side of contingency planning and communicating oil spill risk perceptions. Completely new case studies are included with special attention to the Deepwater Horizon event, covering the impacts of wetlands and sand beaches, a mass balance approach, and the process for removing petroleum chemicals still trapped near Alabama beaches. Other new information on lingering oil left behind from the Exxon Valdez spill, the emergency system used in the Prestige incident, and coverage on the Heibei Spirit spill in Korea are also included. This updated edition combines technology with case studies to identify the current state of knowledge surrounding oil spills that will encourage additional areas of research that are left to uncover in this critical sector of the oil and gas industry. Updated with new chapters on risk analysis and communication, contingency planning, restoration, and case studies Supported with technological advances evolved from the Deepwater Horizon/BP oil tragedy and events in the Arctic/Antarctic

Multi-contributed from various industry experts to provide an extensive background in technical equipment and worldwide procedures used today Chromatographic Analysis of the Environment, Third Edition is a detailed handbook on different chromatographic analysis techniques and chromatographic data for compounds found in air, water, soil, and sludge. Taking on a new perspective from previous editions, this third edition discusses the parameters of each environmental compartment in a consistent format that highlights preparation techniques, chromatographic separation methods, and detection methods. Most of the data are compiled in tables and figures to elucidate the text as needed. Separate chapters approach specific aspects of sampling methods especially designed for environmental purposes, quantification of environmental analytes in difficult matrices, and data handling. The second part of the book focuses on the analysis of hazardous chemicals in the environment, including volatile organic carbons (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and endocrine-disrupting chemicals (EDCs). In addition, the authors feature information on compounds such as phosphates, organic acids, halogenated VOCs, amines, and n-tirosamines, isocyanates, phthalate esters, and humic substances. Presenting important theoretical and practical aspects from sample collection to laboratory analysis, Chromatographic Analysis of the Environment, Third Edition is a unique resource of chromatographic techniques, data, and references that are useful to all scientists involved in the analysis of environmental compounds.

Oil Spill Environmental Forensics Case Studies includes 34 chapters that serve to present various aspects of environmental forensics in relation to "real-world oil spill case studies from around the globe. Authors representing academic, government, and private researcher groups from 14 countries bring a diverse and global perspective to this volume. Oil Spill Environmental Forensics Case Studies addresses releases of natural gas/methane, automotive gasoline and other petroleum fuels, lubricants, vegetable oils, paraffin waxes, bitumen, manufactured gas plant residues, urban runoff, and, of course, crude oil, the latter ranging from light Bakken shale oil to heavy Canadian oil sands oil. New challenges surrounding forensic investigations of stray gas in the shallow subsurface, volatiles in air, dissolved chemicals in water (including passive samplers), and biological tissues associated with oil spills are included, as are the effects and long-term oil weathering, long-term monitoring in urbanized and non-urbanized environments, fate and transport, forensic historical research, new analytical and chemical data processing and interpretation methods. Presents cases in each chapter on the application of specific oil spill environmental forensic techniques Features chapters written by international experts from both academia and industry Includes relevant concepts and theories elucidated for each theme

Wavelet analysis and its applications have been one of the fastest-growing research areas in the past several years. Wavelet theory has been employed in numerous fields and applications, such as signal and image processing, communication systems, biomedical imaging, radar, and air acoustics. Active media technology is concerned with the development of autonomous computational or physical entities capable of perceiving, reasoning, adapting, learning, cooperating, and delegating in a dynamic environment. This book captures the essence of the state of the art in wavelet analysis and its applications and active media technology. At the Congress, invited talks were delivered by distinguished researchers, namely Prof John Daugman of Cambridge University, UK; Prof Bruno Torresani of INRIA, France; Prof Victor Wickerhauser of Washington University, USA, Prof Ning Zhong of the Maebashi Institute of Technology, Japan; Prof John Yen of Pennsylvania State University, USA; and Prof Sankar K Pal of the Indian Statistical Institute, India.

Volume V of this manual provides an overview of the analytical investigation of numerous additional Chinese herbal drugs that are commonly used in Traditional Chinese Medicine (TCM). It illustrates the detailed chromatographic analysis of the main compounds with colored TLC photographs and HPLC peak profiles, and also discusses the bioactive properties, pharmacological and biological activity as well as the therapeutic applications of all single herbal drugs. Together with Volumes I-IV this volume represents the most comprehensive overview of analytical studies of these drugs listed in the Chinese Pharmacopoeia 2010. All the experimental requirements, including the extraction procedure for the Chinese drugs and the solvent systems used for the development of the TLC and HPLC analytical monographs, were adapted according to the latest findings published in international journals and the high standards of the European Drug Regulatory Authority. Therefore Volume V is also a must-have manual for researchers and pharmaceutical laboratories dedicated to TCM.

This professionally edited and well organized book is the first in a series which will archive key presentations from the annual conferences sponsored by the Society of Environmental Forensics.

This book provides a risk-based framework for developing and implementing strategies to manage PCB-contaminated sediments at sites around the country. The framework has seven stages, beginning with problem definition, continuing through assessment of risks and management options, and ending with an evaluation of the success of the management strategy. At the center of the framework is continuous and active involvement of all affected parties--particularly communities--in the development, implementation, and evaluation of the management strategy. A Risk-Management Strategy for PCB-Contaminated Sediments emphasizes the need to consider all risks at a contaminated site, not just human health and ecological effects, but also the social, cultural, and economic impacts. Given the controversy that has arisen at many PCB-contaminated sites, this book provides a consistent, yet flexible, approach for dealing with the many issues associated with assessing and managing the risks at Superfund and other contaminated sites.

Advances in Energy Equipment Science and Engineering contains selected papers from the 2015 International Conference on Energy Equipment Science and Engineering (ICEESE 2015, Guangzhou, China, 30-31 May 2015). The topics covered include:- Advanced design technology- Energy and chemical engineering- Energy and environmental engineering- Energy scien

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