

to discover groupings, similarities and differences among the data. Each chapter will be written by an acknowledged international expert in that area. Each author will be given detailed instructions as to the intended audience, as well as expected breadth and depth of coverage of the material in the hopes that this will minimize the problem of uneven coverage of topics and chapters that often occurs in edited books. Although each of the types of evidence covered in the book use methods of analysis that lie outside chemistry, these will be mentioned only for completeness in passing. The emphasis will be on the use of chemical tools in evidence analysis. This book is designed to be either a text book for an advanced forensic chemistry course, or a treatise in forensic chemistry for the scientist who wants to learn the subject in some depth. It is not designed to be a survey of the current literature in the field or a reference manual.

This book offers a comprehensive account of energetic materials, including their synthesis, computational modeling, applications, associated degradation mechanisms, environmental consequences and fate and transport. This multi-author contributed volume describes how armed forces around the world are moving their attention from legacy explosive compounds, which are heat and shock sensitive (thus posing greater challenges in terms of handling and storage), to the insensitive munitions compounds/formulations such as insensitive munitions explosive (IMX) and the Picatinny Arsenal Explosive (PAX) series of compounds. The description of energetic materials focuses on explosives, pyrotechnic compositions, and propellants. The contributors go on to explain how modern generation energetic compounds must be insensitive to shock and heat but at the same time yield more energy upon explosion. Nanoinspired and/or co-crystallized energetic materials offer another route to generate next-generation energetic materials, and this authoritative book bridges a large gap in the literature by providing a comprehensive analysis of these compounds. Additionally, it includes a valuable overview of energetic materials, a detailed discussion of recent advances on future energetic compounds, nanotechnology in energetic materials, environmental contamination and toxicity, assessment of munitions lethality, the application quantitative structure–activity relationship (QSAR) in design of energetics and the fate and transport of munition compounds in the environment.

This book presents the latest research on the area of nano-energetic materials, their synthesis, fabrication, patterning, application and integration with various MEMS systems and platforms. Keeping in mind the applications for this field in aerospace and defense sectors, the articles in this volume contain contributions by leading researchers in the field, who discuss the current challenges and future perspectives. This volume will be of use to researchers working on various applications of high-energy research.

Primarily driven by advancing technology and concerns for safety, advancement in the world of pyrotechnics and high-energy materials has exploded in the past 25 years. The promulgation of new government regulations places new and more stringent restrictions on the materials that may be used in energetic mixtures. These regulations now mandate numerous training programs, and initiate other actions, such as OSHA's Process Safety Management standard, intended to eliminate accidents and incidents. Unfortunately, the US lacks an organized, broad-range academic program to cover the science and use of energetic materials and educate the next generation of pyrotechnicians. Designed as a bridge to allow a smooth and confident transition for personnel coming from a chemistry background into the practical world of explosives, Chemistry of Pyrotechnics: Basic Principles and Theory, Second Edition emphasizes basic chemical principles alongside practical, hands-on knowledge in the preparation of energetic mixtures. It examines the interactions between and adaptations of pyrotechnics to changing technology in areas such as obscuration science and low-signature flame emission. Much more than a simple how-to guide, the book discusses chemical and pyrotechnic principles, components of high-energy mixtures, and elements of ignition, propagation, and sensitivity. It offers heat compositions, including ignition mixes, delays, thermites, and propellants and investigates the production of smoke and sound as well as light and color. Promoting the growth and expansion of pyrotechnics as a science, Chemistry of Pyrotechnics: Basic Principles and Theory, Second Edition provides practitioners with the ability to apply chemical principles and logic to energetic materials and thereby make the field as productive, useful, and safe as possible.

This world-famous work has been enlarged and updated without tampering with its tried and tested format. Around 500 alphabetically ordered, monographic entries consider the physicochemical properties, production methods and safe applications of over 120 explosive chemicals, while discussing 70 fuels, additives and oxidizing agents and describing the relevant test methods. The extensive thermodynamic data has been thoroughly updated and now also provided on a CD-ROM compiled by the Fraunhofer Institute of Chemical Technology. This excerpt from the ICT Thermodynamical Database not only includes additional thermodynamic data, and references to further reading, but also features enhanced search facilities. Other key features include a 1,500-entry combined index and glossary with terms and abbreviations in English, French and German, conversion tables and numerous literature references. A handy reference for explosive experts and also for translators, public authorities and patent lawyers. From reviews of previous editions: '... This wealth of information and an index that comprises some 1500 keywords and several conversion tables make this a unique source of knowledge for anybody working with explosives.' (Propellants, Explosives, Pyrotechnics)

What causes our breathtaking excitement when fireworks burst above us? Why do we "see fireworks" when we fall deeply in romantic love? Why are fireworks and explosions the most apt metaphor for passion of any kind? Lynn McLain, a daughter of Dr. Joseph H. McLain, who designed and manufactured fireworks and worked on safety standards for decades, poses those questions -- and answers many others in this compact book that celebrates all that fireworks have to offer. The book includes colorful reproductions of rare images alongside intriguing historical and cultural fireworks trivia questions and answers. All royalties from its sale will be donated to the installation of an unprecedented, fireworks-inspired, computer-programmable, permanent light sculpture at Washington College in Chestertown, Maryland in honor of Dr. John A. Conkling and in memory of the author's father, both of whom made great contributions to the science and safety of fireworks.

Provides a detailed description of perchlorate chemistry and recent advances in innovative remediation technologies for perchlorate contamination and their pros and cons. Additionally, the first book to describe the natural occurrence of perchlorate and its unique isotopic signatures for environmental forensics and its detection in the environment, particularly the real-time analysis using surface enhanced Raman spectroscopy.

Volume is indexed by Thomson Reuters CPCI-S (WoS). Explosion, shock wave, high-energy reaction and other high-rate phenomena of various materials are the main topic of this collection. The book includes papers related to explosion and shock wave phenomena driven by explosives and other impulsive phenomena including their applications. The use of such intense dynamic loading has been employed for materials processing technology and the field is currently spreading to food processing

and others. The volume will bring to readers new idea for the progress in science and technology.

????:Rock mechanics for underground mining

Safety and Health for Engineers, 3rd Edition, addresses the fundamentals of safety, legal aspects, hazard recognition and control, and techniques for managing safety decisions, as well as: Completely revises and updates all 38 chapters in the book New edition adds more than 110 stories and cases from practice to illustrate various topics or issues New topics on adapting to new safety concerns that arise from technology innovations; convergence of safety, health and environmental departments in many organizations; the concept of prevention through design; and emphasis on safety management systems and risk management and analysis Includes learning exercises and computational examples based on real world situations along with in-depth references for each chapter Includes a detailed solutions manual for academic adopters Covers the primary topics included in certification exams for professional safety, such as CSP/ASP

This exciting new book details all aspects of a major class of pyrolants and elucidates the progress that has been made in the field, covering both the chemistry and applications of these compounds. Written by a pre-eminent authority on the subject from the NATO Munitions Safety Information Analysis Center (MSIAC), it begins with a historical overview of the development of these materials, followed by a thorough discussion of their ignition, combustion and radiative properties. The next section explores the multiple facets of their military and civilian applications, as well as industrial synthetic techniques. The critical importance of the associated hazards, namely sensitivity, stability and aging, are discussed in detail, and the book is rounded off by an examination of the future of this vital and expanding field. The result is a complete guide to the chemistry, manufacture, applications and required safety precautions of pyrolants for both the military and chemical industries. From the preface: "... This book fills a void in the collection of pyrotechnic literature... it will make an excellent reference book that all researchers of pyrolants and energetics must have..." Dr. Bernard E. Douda, Dr. Sara Pliskin, NAVSEA Crane, IN, USA

Explores combustion and the role of fire in everyday life, its impact on all aspects of human endeavor, and its role in mythology and other realms of human thought and action.

A perennial bestseller, Chemistry of Pyrotechnics and Explosives: Basic Principles and Theory, is simply the most definitive reference in this field. Author J.A. Conkling first covers the requisite background in chemistry, thermodynamics, and light emission, introduces oxidizing agents, fuels, binders, and retardants, then explores virtually every aspect of formulating pyrotechnics. Topics include the requirements for and preparation of high-energy mixtures, ignition and propagation, heat and delay compositions, and color and light production, including sparks, flitter, and glitter. The journal Pyrotechnica said this book "...belongs on every pyrotechnist's bookshelf."

All the chapters from the previous edition have been revised and enlarged to include in most cases new fireworks formats. Four new chapters have been added to this 3rd Edition: In a new chapter Chemistry of Fireworks Compositions; Dr. Takeo Shimizu examines the use of materials and binders in the manufacturing process and how to control reactions. The chapter on Fireworks Displays, examines the evolution of displays and modern uses throughout the world. The new chapter on Gunpowder deals with its uses since ancient times to date. The legislative framework for fireworks control in Great Britain, United States, Canada and the European Union are discussed in the new Legislation chapter. In addition, this 3rd Edition includes a glossary with more than three hundred fireworks terms and numerous photographs, some from the historical archives of the Brocks Fireworks.

This new dictionary covers a wide range of terms used in the field of forensic science, touching on related disciplines such as chemistry, biology, and anthropology. Case examples, figures, and photographs make it the ideal reference for students and practitioners of forensic science, as well as those with an interest in forensic science.

This world-famous reference work has been enlarged and updated without tampering with its tried and tested format. Around 500 alphabetically ordered, monographic entries consider the physicochemical properties, production methods and safe applications of over 120 explosive chemicals; discuss 70 fuels, additives and oxidizing agents; and describe test methods. The extensive thermodynamic data have been thoroughly updated and for the first time are also provided in electronic format. The included CD-ROM was compiled by the Fraunhofer Institute of Chemical Technology (Pfinzthal, Germany) and represents an excerpt from the ICT Thermodynamical Database. Not only additional thermodynamic data, and references to further reading, but also enhanced search facilities are provided. Other key features include: the 1500-entry combined index and glossary (comprising terms and abbreviations in English, French and German), conversion tables and many literature references. This book is suitable for explosive experts and also for translators, public authorities and patent lawyers. From reviews of previous editions: '... This wealth of information and an index that comprises some 1500 keywords and several conversion tables make this a unique source of knowledge for anybody working with explosives.' (Propellants, Explosives, Pyrotechnics)

In the late 1970s and early 1980s, our nation began to grapple with the legacy of past disposal practices for toxic chemicals. With the passage in 1980 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, it became the law of the land to remediate these sites. The U. S. Department of Defense (DoD), the nation's largest industrial organization, also recognized that it too had a legacy of contaminated sites. Historic operations at Army, Navy, Air Force, and Marine Corps facilities, ranges, manufacturing sites, shipyards, and depots had resulted in widespread contamination of soil, groundwater, and sediment. While Superfund began in 1980 to focus on remediation of heavily contaminated sites largely abandoned or neglected by the private sector, the DoD had already initiated its Installation Restoration Program in the mid 1970s. In 1984, the DoD began the Defense Environmental Restoration Program (DERP) for contaminated site assessment and remediation. Two years later, the U. S. Congress codified the DERP and directed the Secretary of Defense to carry out a concurrent program of research, development, and demonstration of innovative remediation technologies. As chronicled in the 1994 National Research Council report, "Ranking Hazardous-Waste Sites for Remedial Action", our early estimates on the cost and suitability of existing technologies for cleaning up contaminated sites were wildly optimistic. Original estimates, in 1980, projected an average Superfund cleanup cost of a mere \$3.

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