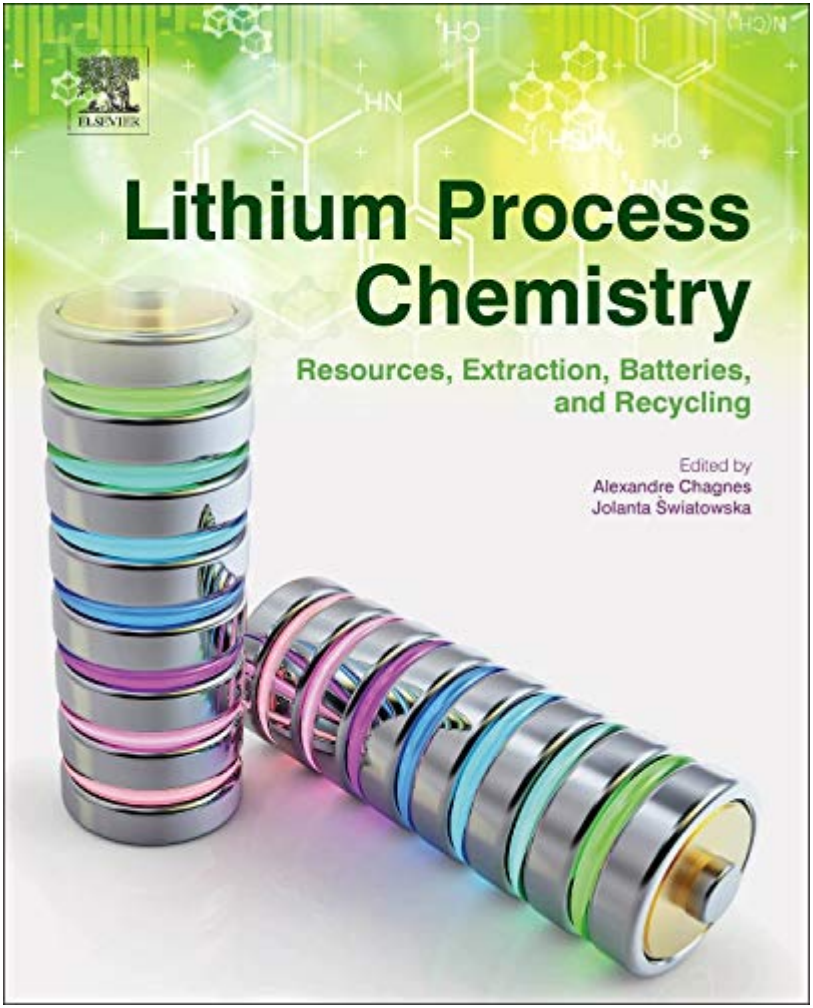

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Lithium Process Chemistry- Alexandre Chagnes 2015-06-14 Lithium Process Chemistry: Resources, Extraction, Batteries and Recycling presents, for the first time, the most recent developments and state-of-the-art of lithium production, lithium-ion batteries, and their recycling. The book

provides fundamental and theoretical knowledge on hydrometallurgy and electrochemistry in lithium-ion batteries, including terminology related to these two fields. It is of particular interest to electrochemists who usually have no knowledge in hydrometallurgy and hydrometallurgists not familiar with electrochemistry applied to Li-ion batteries. It is also useful for both teachers and students, presenting an overview on Li production, Li-ion battery technologies, and lithium battery recycling processes that is accompanied by numerous graphical presentations of different battery systems and their electrochemical performances. The book represents the first time that hydrometallurgy and electrochemistry on lithium-ion batteries are assembled in one unique source. Provides fundamental and theoretical knowledge on hydrometallurgy and electrochemistry in lithium-ion batteries Represents the first time that hydrometallurgy and electrochemistry on lithium-ion batteries are assembled in one unique source. Ideal for both electrochemists who usually have no knowledge in hydrometallurgy and hydrometallurgists not familiar with electrochemistry applied to Li-ion batteries Presents recent developments, as well as challenges in lithium production and lithium-ion battery technologies and their recycling Covers examples of Li processes production with schematics, also including numerous graphical presentations of different battery systems and their electrochemical performances

Lithium Process Chemistry: Resources, Extraction, Batteries, and Recycling-

Recycling of Spent Lithium-Ion Batteries-Liang An 2019-10-15 This book presents a state-of-the-art review of recent advances in the recycling of spent lithium-ion batteries. The topics covered include: introduction to the structure of lithium-ion batteries; development of

battery-powered electric vehicles; potential environmental impact of spent lithium-ion batteries; pretreatment of spent lithium-ion batteries for recycling processing; pyrometallurgical processing for recycling spent lithium-ion batteries; hydrometallurgical processing for recycling spent lithium-ion batteries; direct processing for recycling spent lithium-ion batteries; high value-added products from recycling of spent lithium-ion batteries; and effects of recycling of spent lithium-ion batteries on environmental burdens. The book provides an essential reference resource for professors, researchers, and policymakers in academia, industry, and government around the globe.

Recycling of Lithium-Ion Batteries-Arno Kwade 2017-12-12 This book addresses recycling technologies for many of the valuable and scarce materials from spent lithium-ion batteries. A successful transition to electric mobility will result in large volumes of these. The book discusses engineering issues in the entire process chain from disassembly over mechanical conditioning to chemical treatment. A framework for environmental and economic evaluation is presented and recommendations for researchers as well as for potential operators are derived.

Lithium-Ion Batteries: Basics and Applications-Reiner Korthauer 2018-08-07 The handbook focuses on a complete outline of lithium-ion batteries. Just before starting with an exposition of the fundamentals of this system, the book gives a short explanation of the newest cell generation. The most important elements are described as negative / positive electrode materials, electrolytes, seals and separators. The battery disconnect unit and the battery management system are important parts of modern lithium-ion batteries. An economical, faultless and efficient battery production is a must today and is represented with one chapter in the handbook. Cross-

cutting issues like electrical, chemical, functional safety are further topics. Last but not least standards and transportation themes are the final chapters of the handbook. The different topics of the handbook provide a good knowledge base not only for those working daily on electrochemical energy storage, but also to scientists, engineers and students concerned in modern battery systems.

Extraction 2018-Boyd R. Davis 2018-08-18 This three volume set presents papers from the first collaborative global metallurgy conference focused exclusively on extractive topics, including business and economic issues. Contributions examine new developments in foundational extractive metallurgy topics and techniques, and present the latest research and insights on emerging technologies and issues that are shaping the global extractive metallurgy industry. The book is organized around the following main themes: hydrometallurgy, pyrometallurgy, sulfide flotation, and extractive metallurgy markets and economics.

Handbook of Lithium and Natural Calcium Chloride-Donald E. Garrett 2004-04-05 Handbook of Lithium and Natural Calcium Chloride is concerned with two major industrial minerals: Lithium and Calcium Chloride. The geology of their deposits is first reviewed, along with discussions of most of the major deposits and theories of their origin. The commercial mining and processing plants are next described, followed by a review of the rather extensive literature on other proposed processing methods. The more important uses for lithium and calcium chloride are next covered, along with their environmental considerations. This is followed by a brief review of the production statistics for each industry, and some of their compounds' phase data and physical properties. Describes the chemistry, chemical engineering, geology and mineral processing

aspects of lithium and calcium chloride Collects in one source the most important information concerning these two industrial minerals Presents new concepts and more comprehensive theories on their origin

WEEE Recycling-Alexandre Chagnes 2016-07-26 WEEE Recycling: Research, Development, and Policies covers policies, research, development, and challenges in recycling of waste electrical and electronic equipment (WEEE). The book introduces WEEE management and then covers the environmental, economic, and societal applications of e-waste recycling, focusing on the technical challenges to designing efficient and sustainable recycling processes—including physical separation, pyrometallurgical, and hydrometallurgical processes. The development of processes for recovering strategic and critical metals from urban mining is a priority for many countries, especially those having few available ores mining. Describes the two metallurgical processes—hydro- and pyro-metallurgy—and their application in recycling of metals Provides a life cycle analysis in the WEEE recycling of metals Outlines how to determine economic parameters in the recycling of waste metals Discusses the socio economic and environmental implication of metal recycling

Lithium-Ion Batteries-Yuping Wu 2015-04-24 Lithium-Ion Batteries: Fundamentals and Applications offers a comprehensive treatment of the principles, background, design, production, and use of lithium-ion batteries. Based on a solid foundation of long-term research work, this authoritative monograph: Introduces the underlying theory and history of lithium-ion batteries Describes the key components of lithium-ion batteries, including negative and positive electrode materials, electrolytes, and separators Discusses electronic conductive agents, binders, solvents for slurry preparation, positive thermal

coefficient (PTC) materials, current collectors, and cases Examines the assembly processes and electrochemical performance of lithium-ion batteries Explores applications in power tools, electric vehicles, aerospace, and more Lithium-Ion Batteries: Fundamentals and Applications delivers a systematic overview of lithium-ion batteries, from physical properties to manufacturing technologies. The book also supplies valuable insight into potential growth opportunities in this exciting market.

Extractive Metallurgy of Lithium - Lithium-ion Cells Recycling-Roger Rumbu

Sustainability in the Mineral and Energy Sectors-Sheila Devasahayam 2016-09-15 Sustainable practices within the mining and energy sectors are assuming greater significance due to uncertainty and change within the global economy and safety, security, and health concerns. This book examines sustainability issues facing the mining and energy sectors by addressing six major themes: Mining and Mineral Processing; Metallurgy and Recycling; Environment; Energy; Socioeconomic and Regulatory; and Sustainable Materials and Fleets. Emphasizing an integrated transdisciplinary approach, it deliberates on optimizing mining productivity and energy efficiency and discusses integrated waste management practices. It discusses risk management, cost cutting, and integration of sustainable practices for long-term business value. It gives a comprehensive outlook for sustainable mineral futures from academic and industry perspectives covering mine to mill optimization, waste, risk and water management, improved efficiencies in mining tools and equipment, and performance indicators for sustainable developments. It covers how innovation and research underpin management of natural resources including sustainable carbon management. •Focuses on

mining and mineral processing, metallurgy and recycling, the environment, energy, socioeconomic and regulatory issues, and sustainable materials and fleets. •Describes metallurgy and recycling and uses economic, environmental and social parameter analyses to identify areas for improvement in iron, steel, aluminium, lead, zinc, copper, and gold production. •Discusses current research on mining, performance indicators for sustainable development, sustainability in mining equipment, risk and safety management, and renewable energy resources •Covers alternative and conventional energy sources for the mineral sector as well water treatment and remediation and energy sustainability in mining. •Provides an overview of sustainable carbon management. •Offers an interdisciplinary approach with international focus.

Evolutionary and Revolutionary Technologies for Mining-

National Research Council 2002-03-14 The Office of Industrial Technologies (OIT) of the U. S. Department of Energy commissioned the National Research Council (NRC) to undertake a study on required technologies for the Mining Industries of the Future Program to complement information provided to the program by the National Mining Association. Subsequently, the National Institute for Occupational Safety and Health also became a sponsor of this study, and the Statement of Task was expanded to include health and safety. The overall objectives of this study are: (a) to review available information on the U.S. mining industry; (b) to identify critical research and development needs related to the exploration, mining, and processing of coal, minerals, and metals; and (c) to examine the federal contribution to research and development in mining processes.

Lithium-Ion Batteries-

Gianfranco Pistoia 2013-12-16

Lithium-Ion Batteries features an in-depth description of different lithium-ion applications, including important features such as safety and reliability. This title acquaints readers with the numerous and often consumer-oriented applications of this widespread battery type. Lithium-Ion Batteries also explores the concepts of nanostructured materials, as well as the importance of battery management systems. This handbook is an invaluable resource for electrochemical engineers and battery and fuel cell experts everywhere, from research institutions and universities to a worldwide array of professional industries. Contains all applications of consumer and industrial lithium-ion batteries, including reviews, in a single volume Features contributions from the world's leading industry and research experts Presents executive summaries of specific case studies Covers information on basic research and application approaches

E-Mobility and Circular Economy-Urs A. Peuker 2019-06-21 The International Workshop E-Mobility and Circular Economy, which has been jointly organized by TU Bergakademie Freiberg, Helmholtz Institute Freiberg for Resource Technology and TU Clausthal, was held in 2018. The conference was dedicated to key technological and economical questions which arise in the recycling of materials commonly used in e-mobility and electronics. It was aimed both at presenting new solutions for mechanical and metallurgic recycling and the substitution of conventional engineering materials. As there is an increasing need for rare chemical species in the generation of certain electronic, electrical, and mechanical properties in e-mobility and electronics, there was an additional focus on trace elements.

Handbook on Battery Energy Storage System-Asian Development Bank 2018-12-01 This handbook serves as a guide to deploying

battery energy storage technologies, specifically for distributed energy resources and flexibility resources. Battery energy storage technology is the most promising, rapidly developed technology as it provides higher efficiency and ease of control. With energy transition through decarbonization and decentralization, energy storage plays a significant role to enhance grid efficiency by alleviating volatility from demand and supply. Energy storage also contributes to the grid integration of renewable energy and promotion of microgrid.

Giant Metallic Deposits-
Peter Laznicka 2010-09-02
Metals in the earth's crust are very unevenly distributed and, traditionally, a small number of ore deposits, districts or countries have dominated the world supply and have influenced commodity prices. The importance of exceptionally large, or rich, deposits has greatly increased in the age of globalization when a small number of international corporations dominate the metals market, based on few very large ore deposits, practically anywhere in the world. Search for giant orebodies thus drives the exploration industry: not only the in-house teams of large internationals, but also hundreds of junior companies hoping to sell their significant discoveries to the "big boys". Geological characteristics of giant metallic deposits and their setting and the politico-economic constraints of access to and exploitation in prospective areas have been a "hot topic" in the past fifteen years, but the knowledge generated and published has been one-sided, scattered and fragmented. This is the first comprehensive book on the subject that provides body of solid facts rather than rapidly changing theories, written by author of the Empirical Metallogeny book series and founder of the Data Metallogenica visual knowledge system on mineral deposits of the world, who has had an almost 40 years long international academic and industrial experience. The book will provide abundant material for comparative research in metallogeny,

practical information for the explorationists as to where to look for the "elephants", and some inspiration for commodity investors.

Achieving the Paris Climate Agreement Goals-Sven Teske 2019-02-01 This open access book presents detailed pathways to achieve 100% renewable energy by 2050, globally and across ten geographical regions. Based on state-of-the-art scenario modelling, it provides the vital missing link between renewable energy targets and the measures needed to achieve them. Bringing together the latest research in climate science, renewable energy technology, employment and resource impacts, the book breaks new ground by covering all the elements essential to achieving the ambitious climate mitigation targets set out in the Paris Climate Agreement. For example, sectoral implementation pathways, with special emphasis on differences between developed and developing countries and regional conditions, provide tools to implement the scenarios globally and domestically. Non-energy greenhouse gas mitigation scenarios define a sustainable pathway for land-use change and the agricultural sector. Furthermore, results of the impact of the scenarios on employment and mineral and resource requirements provide vital insight on economic and resource management implications. The book clearly demonstrates that the goals of the Paris Agreement are achievable and feasible with current technology and are beneficial in economic and employment terms. It is essential reading for anyone with responsibility for implementing renewable energy or climate targets internationally or domestically, including climate policy negotiators, policy-makers at all levels of government, businesses with renewable energy commitments, researchers and the renewable energy industry.

Frontiers in Chemical Engineering-National

Research Council 1988-02-01 In the next 10 to 15 years, chemical engineers have the potential to affect every aspect of American life and promote the scientific and industrial leadership of the United States. Frontiers in Chemical Engineering explores the opportunities available and gives a blueprint for turning a multitude of promising visions into realities. It also examines the likely changes in how chemical engineers will be educated and take their place in the profession, and presents new research opportunities.

Electrolytes for Lithium and Lithium-Ion Batteries-T. Richard Jow 2014-05-06 Electrolytes for Lithium and Lithium-ion Batteries provides a comprehensive overview of the scientific understanding and technological development of electrolyte materials in the last several years. This book covers key electrolytes such as LiPF6 salt in mixed-carbonate solvents with additives for the state-of-the-art Li-ion batteries as well as new electrolyte materials developed recently that lay the foundation for future advances. This book also reviews the characterization of electrolyte materials for their transport properties, structures, phase relationships, stabilities, and impurities. The book discusses in-depth the electrode-electrolyte interactions and interphasial chemistries that are key for the successful use of the electrolyte in practical devices. The Quantum Mechanical and Molecular Dynamical calculations that has proved to be so powerful in understanding and predicating behavior and properties of materials is also reviewed in this book. Electrolytes for Lithium and Lithium-ion Batteries is ideal for electrochemists, engineers, researchers interested in energy science and technology, material scientists, and physicists working on energy.

Lithium Needs and Resources-S. S. Penner 2016-01-11 Lithium: Needs and Resources focuses on the applications, reactions, and

increasing demand for lithium, as well as the exploration methods used in the extraction of this element. The selection first offers information on the lithium industry, including markets for lithium metal and lithium compounds and lithium reserves. The text then surveys past and future development of the market for lithium in the global aluminum industry. Topics include effects of lithium carbonate, demand for aluminum, development of US demand, and survey of aluminum plants. The compilation takes a look at lithium ore in Brazil and lithium-bearing rocks in Clark County, Nevada, USA, including geology of lithium districts, future perspectives, and mineralogy and distribution of lithium. The text also discusses hydrogen-mineral reactions and their application to the removal of iron from spodumene. Considerations include iron removal process, crystal chemistry of spodumene, and hydrogen-mineral reactions. The publication surveys the deposits of lithium in the United Kingdom; exploration methods in the Tanco mine area in Manitoba, Canada; and the role of the U.S. Geological Survey in the lithium industry. The selection is a vital source of information for readers interested in studying the sources and applications of lithium.

Future Lithium-ion Batteries-Ali Eftekhari 2019-03-14 Lithium-ion batteries are an established technology with recent large-scale batteries finding emerging markets for electric vehicles and household energy storage. Battery research during the past two decades has focussed on practical improvements to available batteries, such as cell design to enhance energy density, which are currently nearing their maximum potential. We must now consider alternative avenues of research in pursuit of a new breakthrough in this technology. This book collects authoritative perspectives from leading researchers to project the emerging opportunities in the field of lithium-ion batteries. Covering topics including

anode and cathode materials, electrolytes, emerging markets and the challenges and opportunities of lithium-ion battery supply, it will provide researchers with cutting-edge leads to advance the next generation of materials. Edited by a pioneer in the field, and with contributions from experts from across the globe, this book will be of use to graduate students and researchers in academia and industry interested in lithium-ion batteries and energy storage.

New Trends in Intercalation Compounds for Energy Storage-Christian Julien 2012-12-06
Recent advances in electrochemistry and materials science have opened the way to the evolution of entirely new types of energy storage systems: rechargeable lithium-ion batteries, electrochroms, hydrogen containers, etc., all of which have greatly improved electrical performance and other desirable characteristics. This book encompasses all the disciplines linked in the progress from fundamentals to applications, from description and modelling of different materials to technological use, from general diagnostics to methods related to technological control and operation of intercalation compounds. Designing devices with higher specific energy and power will require a more profound understanding of material properties and performance. This book covers the status of materials and advanced activities based on the development of new substances for energy storage.

Calceocrinids from the Bromide Formation (Middle Ordovician) of Southern Oklahoma-James C. Brower 1977

Alkali-ion Batteries-Dongfang Yang 2016-06-01
This book covers selected topics in different aspects of

science and technology of alkali-ion batteries written by experts from international scientific community. Through the 9 chapters, the reader will have access to the most recent research and development findings on alkali-ion batteries through original research studies and literature reviews. This book covers inter-disciplinary aspects of alkali-ion batteries including new progress on material chemistry, micro/nano structural designs, computational and theoretical models and understanding of structural changes during electrochemical processes of alkali-ion batteries.

Hydrometallurgy-T Havlik 2014-01-23 This book is concerned with the theoretical principles of hydrometallurgical processes and engineering aspects. The hydrometallurgical processes of production of copper are discussed and leaching of chalcopyrite as the main sulphide mineral of copper processed in industry is used as an example. The book is suitable as a university textbook for students of metallurgy. Examines the different techniques involved Discusses the production of specific metals using hydrometalluric processes Looks at the future of hydrometallurgy

Lithium Ion Rechargeable Batteries-Kazunori Ozawa 2012-01-09 Starting out with an introduction to the fundamentals of lithium ion batteries, this book begins by describing in detail the new materials for all four major uses as cathodes, anodes, separators, and electrolytes. It then goes on to address such critical issues as self-discharge and passivation effects, highlighting lithium ion diffusion and its profound effect on a battery's power density, life cycle and safety issues. The monograph concludes with a detailed chapter on lithium ion battery use in hybrid electric vehicles. Invaluable reading for materials scientists, electrochemists, physicists, and those working in the automobile and electrotechnical industries, as well as those working in

computer hardware and the semiconductor industry.

The Handbook of Lithium-Ion Battery Pack Design- John T Warner 2015-05-23 The Handbook of Lithium-Ion Battery Pack Design: Chemistry, Components, Types and Terminology offers to the reader a clear and concise explanation of how Li-ion batteries are designed from the perspective of a manager, sales person, product manager or entry level engineer who is not already an expert in Li-ion battery design. It will offer a layman's explanation of the history of vehicle electrification, what the various terminology means, and how to do some simple calculations that can be used in determining basic battery sizing, capacity, voltage and energy. By the end of this book the reader has a solid understanding of all of the terminology around Li-ion batteries and is able to do some simple battery calculations. The book is immensely useful to beginning and experienced engineer alike who are moving into the battery field. Li-ion batteries are one of the most unique systems in automobiles today in that they combine multiple engineering disciplines, yet most engineering programs focus on only a single engineering field. This book provides you with a reference to the history, terminology and design criteria needed to understand the Li-ion battery and to successfully lay out a new battery concept. Whether you are an electrical engineer, a mechanical engineer or a chemist this book helps you better appreciate the inter-relationships between the various battery engineering fields that are required to understand the battery as an Energy Storage System. Offers an easy explanation of battery terminology and enables better understanding of batteries, their components and the market place. Demonstrates simple battery scaling calculations in an easy to understand description of the formulas Describes clearly the various components of a Li-ion battery and their importance Explains the differences between various Li-ion cell types and chemistries and enables the

determination which chemistry and cell type is appropriate for which application Outlines the differences between battery types, e.g., power vs energy battery Presents graphically different vehicle configurations: BEV, PHEV, HEV Includes brief history of vehicle electrification and its future

Encyclopedia of Chemical Technology- 1991

Uranium-Nasser Awwad 2018-05-09 This edited volume Uranium: Safety, Resources, Separation, and Thermodynamic Calculation is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the study of uranium. This publication aims at providing a thorough overview of the latest research efforts by international authors on uranium studies and opens new possible research paths for further novel developments.

Kirk-Othmer Encyclopedia of Chemical Technology, Volume 15-Kirk-Othmer 2005-10-06 The fifth edition of the Kirk-Othmer Encyclopedia of Chemical Technology builds upon the solid foundation of the previous editions, which have proven to be a mainstay for chemists, biochemists, and engineers at academic, industrial, and government institutions since publication of the first edition in 1949. The new edition includes necessary adjustments and modernisation of the content to reflect changes and developments in chemical technology. Presenting a wide scope of articles on chemical substances, properties, manufacturing, and uses; on industrial processes, unit operations in chemical engineering; and on fundamentals and scientific subjects related to the field. The Encyclopedia describes established technology along with cutting edge topics of interest in the wide field of chemical technology, whilst uniquely providing the

necessary perspective and insight into pertinent aspects, rather than merely presenting information. * Set began publication in January 2004 * Over 1,000 articles * More than 600 new or updated articles * 27 volumes

The Utilization of Slag in Civil Infrastructure Construction-George C. Wang 2016-06-24 The Utilization of Slag in Civil Infrastructure Construction strives to integrate the theory, research, and practice of slag utilization, including the production and processing of slags. The topics covered include: production and smelting processes for metals; chemical and physical properties of slags; pretreatment and post-treatment technology to enhance slag properties; potential environmental impact; mechanisms of potential expansion; special testing methods and characteristics; slag processing for aggregate and cementitious applications; suitability of slags for use in specific applications; overall properties of materials containing slags; and commercialization and economics. The focus of the book is on slag utilization technology, with a review of the basic properties and an exploration of how its use in the end product will be technically sound, environment-friendly, and economic. Covers the production, processing, and utilization of a broad range of ferrous, non-ferrous, and non-metallurgical slags Provides information on applicable methods for a particular slag and its utilization to reduce potential environmental impacts and promote natural resource sustainability Presents the overall technology of transferring a slag from the waste stream into a useful materials resource Provides a detailed review of the appropriate utilization of each slag from processing right through to aggregate and cementitious use requirements

Behaviour of Lithium-Ion Batteries in Electric Vehicles-Gianfranco Pistoia

2018-03-11 This book surveys state-of-the-art research on and developments in lithium-ion batteries for hybrid and electric vehicles. It summarizes their features in terms of performance, cost, service life, management, charging facilities, and safety. Vehicle electrification is now commonly accepted as a means of reducing fossil-fuels consumption and air pollution. At present, every electric vehicle on the road is powered by a lithium-ion battery. Currently, batteries based on lithium-ion technology are ranked first in terms of performance, reliability and safety. Though other systems, e.g., metal-air, lithium-sulphur, solid state, and aluminium-ion, are now being investigated, the lithium-ion system is likely to dominate for at least the next decade – which is why several manufacturers, e.g., Toyota, Nissan and Tesla, are chiefly focusing on this technology. Providing comprehensive information on lithium-ion batteries, the book includes contributions by the world's leading experts on Li-ion batteries and vehicles.

Critical Mineral Resources of the United States-K. J. Schulz 2018-07-27 As the importance and dependence of specific mineral commodities increase, so does concern about their supply. The United States is currently 100 percent reliant on foreign sources for 20 mineral commodities and imports the majority of its supply of more than 50 mineral commodities. Mineral commodities that have important uses and face potential supply disruption are critical to American economic and national security. However, a mineral commodity's importance and the nature of its supply chain can change with time; a mineral commodity that may not have been considered critical 25 years ago may be critical today, and one considered critical today may not be so in the future. The U.S. Geological Survey has produced this volume to describe a select group of mineral commodities currently critical to our economy and security. For each mineral commodity covered, the authors provide a comprehensive look at (1) the

commodity's use; (2) the geology and global distribution of the mineral deposit types that account for the present and possible future supply of the commodity; (3) the current status of production, reserves, and resources in the United States and globally; and (4) environmental considerations related to the commodity's production from different types of mineral deposits. The volume describes U.S. critical mineral resources in a global context, for no country can be self-sufficient for all its mineral commodity needs, and the United States will always rely on global mineral commodity supply chains. This volume provides the scientific understanding of critical mineral resources required for informed decisionmaking by those responsible for ensuring that the United States has a secure and sustainable supply of mineral commodities.

Desalination-Taner Yonar 2017-08-30 Increasing population and environmental pollution are the main stress on freshwater sources. On the other hand, freshwater needs of human being increase dramatically every day. From agriculture to industry and from household to recreation, we need freshwater. In the near future, saltwater and brackish water bodies may be the main source of freshwater for our planet. Desalination phenomena are now being implemented with increasing interest. The book on desalination provides a valuable scientific contribution on freshwater production from saltwater sources. In this book, necessary theoretical knowledge and experimental results of different desalination processes are presented.

Chemical Poems - One on Each Element-Mario Markus 2013 Poetry. "How many gorillas must disappear, so that we can talk comfortably on our cell phones? Tantalum, the chemical element number 73, abundant in African ores, gives us the answer. It makes its confession, along with other ingredients of the world, under the researching pen of Mario Markus. This

work removes the threshold between the visible and the invisible, indifference and surprise, science and poetry. The chemical elements are more than gadgets of the universe: they are some of the wonderful responses that shape our bodies and fill our spirits with a lasting plenitude. Markus' frank and rich poetry shows this to us as he relates the elements to wine and pencils, music and lamps, mirrors and the courtship of butterflies. From verse to verse, the periodic table becomes no longer a rigid information scheme, but a window into creation and its most precious truth, which is life."—Fl via Alvares Ganem, Brazilian poet

Electrochemical Power Sources: Fundamentals, Systems, and Applications- Jürgen Garche 2018-09-28 Safety of Lithium Batteries describes how best to assure safety during all phases of the life of Lithium ion batteries (production, transport, use, and disposal). About 5 billion Li-ion cells are produced each year, predominantly for use in consumer electronics. This book describes how the high-energy density and outstanding performance of Li-ion batteries will result in a large increase in the production of Li-ion cells for electric drive train vehicle (xEV) and battery energy storage (BES or EES) purposes. The high-energy density of Li battery systems comes with special hazards related to the materials employed in these systems. The manufacturers of cells and batteries have strongly reduced the hazard probability by a number of measures. However, absolute safety of the Li system is not given as multiple incidents in consumer electronics have shown. Presents the relationship between chemical and structure material properties and cell safety Relates cell and battery design to safety as well as system operation parameters to safety Outlines the influences of abuses on safety and the relationship to battery testing Explores the limitations for transport and storage of cells and batteries Includes recycling, disposal and second use of lithium ion

batteries

Nuclear Wastes-National Research Council 1996-02-23 Disposal of radioactive waste from nuclear weapons production and power generation has caused public outcry and political consternation. Nuclear Wastes presents a critical review of some waste management and disposal alternatives to the current national policy of direct disposal of light water reactor spent fuel. The book offers clearcut conclusions for what the nation should do today and what solutions should be explored for tomorrow. The committee examines the currently used "once-through" fuel cycle versus different alternatives of separations and transmutation technology systems, by which hazardous radionuclides are converted to nuclides that are either stable or radioactive with short half-lives. The volume provides detailed findings and conclusions about the status and feasibility of plutonium extraction and more advanced separations technologies, as well as three principal transmutation concepts for commercial reactor spent fuel. The book discusses nuclear proliferation; the U.S. nuclear regulatory structure; issues of health, safety and transportation; the proposed sale of electrical energy as a means of paying for the transmutation system; and other key issues.

Uranium Mining in Virginia-National Research Council 2012-09-03 Uranium mining in the Commonwealth of Virginia has been prohibited since 1982 by a state moratorium, although approval for restricted uranium exploration in the state was granted in 2007. Uranium Mining in Virginia examines the scientific, technical, environmental, human health and safety, and regulatory aspects of uranium mining, milling, and processing as they relate to the Commonwealth of Virginia for the purpose of assisting the Commonwealth to determine whether uranium mining, milling, and processing can be undertaken in a manner that safeguards the environment, natural and

historic resources, agricultural lands, and the health and well-being of its citizens. According to this report, if Virginia lifts its moratorium, there are "steep hurdles to be surmounted" before mining and processing could take place within a regulatory setting that appropriately protects workers, the public, and the environment, especially given that the state has no experience regulating mining and processing of the radioactive element. The authoring committee was not asked to recommend whether uranium mining should be permitted, or to consider the potential benefits to the state were uranium mining to be pursued. It also was not asked to compare the relative risks of uranium mining to the mining of other fuels such as coal. This book will be of interest to decision makers at the state and local level, the energy industry, and concerned citizens.

Management, Recycling and Reuse of Waste Composites-Vannessa Goodship 2009-12-18 This authoritative reference work provides a comprehensive review of the management, recycling and reuse of waste composites. These are issues which are of increasing importance due to the growing use of composites in many industries, increasingly strict legislation and concerns about disposal of composites by landfill or incineration. Part one discusses the management of waste composites and includes an introduction to composites recycling and a chapter on EU legislation for recycling waste composites. Part two reviews thermal technologies for recycling waste composites with chapters on pyrolysis, catalytic transformation, thermal treatments for energy recovery and fluidized bed pyrolysis. Part three covers mechanical methods of recycling waste composites. This section includes chapters on additives for recycled plastic composites, improving mechanical recycling and the quality and durability of mechanically recycled composites. Parts four discusses improving sustainable manufacture of

composites, with chapters on environmentally-friendly filament winding of FRP composites, process monitoring and new developments in producing more functional and sustainable composites. Part five gives a review of case studies including end-of-life wind turbine blades, aerospace composites, marine composites, composites in construction and the recycling of concrete. With its distinguished editor and international team of contributors, Management, recycling and reuse of waste composites is a standard reference for anyone involved in the disposal or recycling of waste composites. Reviews the increasingly important issues of recycling and reuse as a result of the increased use of composites Discusses the management of waste composites and EU legislation with regards to recycling Examines methods for recycling, including thermal technologies and mechanical methods

Spoiling Tibet-Gabriel Lafitte 2013-09-12 The mineral-rich mountains of Tibet so far have been largely untouched by China’s growing economy. Nor has Beijing been able to settle Tibet with politically reliable peasant Chinese. That is all about to change as China’s 12th Five-Year Plan, from 2011 to 2015, calls for massive investment in copper, gold, silver, chromium and lithium mining in the region, with devastating environmental and social outcomes. Despite great interest in Tibet worldwide, Spoiling Tibet is the first book that investigates mining at the roof of the world. A unique, authoritative guide through the torrent of online posts, official propaganda and exile speculation.