

Gold Recovery From Electronics

E-Waste in Transition
 The Chemistry of Gold Extraction
 Almost Free Money
 Chemistry of Gold Extraction
 The Recovery Of Gold From Secondary Sources
 Elements of Bioeconomy
 Innovations and Breakthroughs in the Gold and Silver Industries
 Energy Technology 2017
 Critical metals in discarded electronics
 Metal Recovery from Electronic Waste: Biological Versus Chemical Leaching for Recovery of Copper and Gold
 Recovery of Precious Metals from Electronic Scrap
 Silver Recovery From Assorted Spent Sources: Toxicology Of Silver Ions
 The Extractive Metallurgy of Gold
 Waste Recycling Technologies for Nanomaterials Manufacturing
 Electrochemistry for Chemists
 Electronic Waste and Printed Circuit Board Recycling Technologies
 Gold Warriors
 Nanoporous Gold
 1746-1756
 Linkages of Sustainability
 Illustrated Guide to Home Chemistry Experiments
 Hydrometallurgy '94
 Hydrometallurgical Treatment of Electronic Scrap to Recover Gold and Silver
 Digital Rubbish
 Recovering Precious Metals
 Lost Gold of the Republic
 Gold Recovery from Scrap Electronic Solders by Fused-salt Electrolysis
 Fiberglass Reinforced Plastics
 Sustainable Inorganic Chemistry
 Cross-Coupling Reactions
 Refining Precious Metal Wastes, Gold--silver--platinum Metals
 Recovery and Refining of Precious Metals
 11th International Symposium on High-Temperature Metallurgical Processing
 WEEE Recycling
 Gold Mining in the Nineteen Nineties
 Advanced and Emerging Technologies for Resource Recovery from Wastes
 Element Recovery and Sustainability
 Electronic Waste
 Gold Ore Processing
 Gold Refining for the Amateur Chemist

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TESSA NATHAN

E-Waste in Transition Springer Nature

New discoveries of the properties of gold at a nanoscale, and its effective use in modern technologies, have been driving a virtual 'gold rush'. Depleting natural resources has meant that the recovery of gold continues to grow in importance and relevance. The Recovery of Gold from Secondary Sources analyses the most advanced technology in gold recovery and recycling from spent sources of mobile phones, unwanted electronic equipment and waste materials. State-of-the-art techniques of hydrometallurgical and bio-metallurgical processing, leaching, cementing, adsorbing and separation through bio-sorbents are all described in detail, providing a guide for students and researchers. Discussion of environmentally friendly methods of recovery are presented, in order to provide modern-day alternatives to previous techniques. For those interested in the study of gold recovery this book gives a comprehensive overview of current recovery, making it the ultimate source of information for students, researchers, chemists, metallurgists, environmental scientists and electronic waste recovery experts.

The Chemistry of Gold Extraction Royal Society of Chemistry

Waste electrical and electronic equipment (WEEE) generation is a global problem. Despite the growing awareness and deterring legislation, most of the WEEE is disposed improperly, i.e. landfilled or otherwise shipped overseas, and treated in sub-standard conditions. Informal recycling of WEEE has catastrophic effects on humans and the environment. WEEE contains considerable quantities of valuable metals such as base metals, precious metals and rare earth elements (REE). Metal recovery from WEEE is conventionally carried out by pyrometallurgical and hydrometallurgical methods. In this PhD research, novel metal recovery technologies from WEEE are investigated. Using acidophilic and cyanide-generating bacteria, copper and gold were removed from crushed electronic waste with removal efficiencies of 98.4 and 44.0%, respectively. The leached metals in solution were recovered using sulfidic precipitation and electrowinning separation techniques. Finally, a techno-economic assessment of the technology was studied. This research addresses the knowledge gap on two metal extraction approaches, namely chemical and biological, from a secondary source of metals. The essential parameters of the selective metal recovery processes, scale-up potential, techno-economic and sustainability assessment have been studied.

Almost Free Money World Scientific

This is a study of the material life of information and its devices; of electronic waste in its physical and electronic incarnations; a cultural and material mapping of the spaces where electronics in the form of both hardware and information accumulate, break down, or are stowed away. Where other studies have addressed "digital" technology through a focus on its immateriality or virtual qualities, Gabrys traces the material, spatial, cultural and political infrastructures that enable the emergence and dissolution of these technologies. In the course of her book, she explores five interrelated "spaces" where electronics fall apart: from Silicon Valley to Nasdaq, from containers bound for China to museums and archives that preserve obsolete electronics as cultural artifacts, to the landfill as material repository. Digital Rubbish: A Natural History of Electronics describes the materiality of electronics from a unique perspective, examining the multiple forms of waste that electronics create as evidence of the resources, labor, and imaginaries that are bundled into these machines. Ranging across studies of media and technology, as well as environments, geography, and design, Jennifer Gabrys draws together the far-reaching material and cultural processes that enable the making and breaking of these technologies.

Chemistry of Gold Extraction New Era Publications International Aps

Gold extraction or recovery from its ores may require a combination of comminution, mineral

processing, hydrometallurgical, and pyrometallurgical processes to be performed on the ore. Gold mining from alluvium ores was once achieved by techniques associated with placer mining such as simple gold panning and sluicing, resulting in direct recovery of small gold nuggets and flakes. Placer mining techniques since the mid to late 20th century have generally only been the practice of artisan miners. Hydraulic mining was used widely in the Californian gold rush, and involved breaking down alluvial deposits with high-pressure jets of water. Hard rock ores have formed the basis of the majority of commercial gold recovery operations since the middle of the 20th century where open pit and or sub-surface mining techniques are used.

The Recovery Of Gold From Secondary Sources Springer

Silver holds three world records; it has the lowest contact resistance, highest electrical conductivity and the best thermal conductivity of all metals. The element's physical strength, brilliance and malleability leads to its many uses from electronics to optical applications. A new 'silver rush' has occurred following the recent discovery that silver, when divided to form particles at the nano scale, can take on new properties. Meanwhile, there has been an increase in regulations against environmental pollution of silver ions toxicity, which have caused numerous diseases and disorders in the marine, microbial, invertebrate and vertebrate community (including humans). Both of which have led to a great interest in silver recovery for both environmental toxicity and an economic point of view. Comprised of ten chapters, this book draws attention to the most advance technologies in silver recovery and recycling from various spent sources, which will appeal to research scientists and metallurgists. The state of the art in recovery of silver from different sources by hydrometallurgical and bio-metallurgical processing and varieties of leaching, cementing, reducing agents, adsorbents, and bio-sorbents are highlighted in this book.

Elements of Bioeconomy BoD – Books on Demand

Come along on the search for the greatest shipwreck treasure of the Civil War era.

Innovations and Breakthroughs in the Gold and Silver Industries Springer Science & Business Media
 Gold Ore Processing: Project Development and Operations, Second Edition, brings together all the technical aspects relevant to modern gold ore processing, offering a practical perspective that is vital to the successful and responsible development, operation, and closure of any gold ore processing operation. This completely updated edition features coverage of established, newly implemented, and emerging technologies; updated case studies; and additional topics, including automated mineralogy and geometallurgy, cyanide code compliance, recovery of gold from e-waste, handling of gaseous emissions, mercury and arsenic, emerging non-cyanide leaching systems, hydro re-mining, water management, solid-liquid separation, and treatment of challenging ores such as double refractory carbonaceous sulfides. Outlining best practices in gold processing from a variety of perspectives, Gold Ore Processing: Project Development and Operations is a must-have reference for anyone working in the gold industry, including metallurgists, geologists, chemists, mining engineers, and many others. - Includes several new chapters presenting established, newly implemented, and emerging technologies in gold ore processing - Covers all aspects of gold ore processing, from feasibility and development stages through environmentally responsible operations, to the rehabilitation stage - Offers a mineralogy-based approach to gold ore process flowsheet development that has application to multiple ore types

Energy Technology 2017 Watchmaker Publishing

The book describes all aspects of technical innovation related to the gold and silver industries, from ore identification through to processing. It includes details of comminution, pre-concentration and beneficiation, commercially available and recently developed innovative pyro and hydrometallurgical processes, including leaching processes, separation and purification, and recovery and refining. The book focuses on capital and operating cost estimation, process simulation, waste remediation and minimization. Sustainable gold and silver processes are

examined with the use of clean technologies and efficient use of energy and water. Topics such as supply and demand of gold and silver, their exchange in major global markets, and the factors that influence gold and silver prices and major economic indices are discussed. Presents emerging trends and innovations in the areas of ore body knowledge, mining, processing, waste management, economics, finance and automation; Describes emerging enablers for the gold and silver industries such as digitization, automation and remote operations; Promotes breakthroughs in mining, processing, waste management, energy and water from an integrated operations perspective.

Critical metals in discarded electronics William Andrew

This book discusses the recent advances in the wastes recycling technologies to provide low-cost and alternative ways for nanomaterials production. It shows how carbon nanomaterials can be synthesized from different waste sources such as banana fibers, argan (*Argania spinosa*) seed shells, corn grains, camellia oleifera shell, sugar cane bagasse, oil palm (empty fruit bunches and leaves) and palm kernel shells. Several nanostructured metal oxides (MnO₂, Co₃O₄,...) can be synthesized via recycling of spent batteries. The recovered nanomaterials can be applied in many applications including: Energy (supercapacitors, solar cells, etc.) water treatments (heavy metal ions and dyes removal) and other applications. Spent battery and agriculture waste are rich precursors for metals and carbon, respectively. The book also explores the various recycling techniques, agriculture waste recycling, batteries recycling, and different applications of the recycled materials.

Metal Recovery from Electronic Waste: Biological Versus Chemical Leaching for Recovery of Copper and Gold Springer

In this book, experts engage in an extended dialogue arguing for a comprehensive view of sustainability. They emphasize the constraints imposed by the relationships among the components, for example, how the need for clean, easily accessible water intersects with the need for the energy required to provide it. This book urges a transformation in the way we view sustainability, a transformation that is necessary if we are to plan responsibly for a more sustainable world.--[book jacket].

Recovery of Precious Metals from Electronic Scrap University of Michigan Press

GOLD MINING IN THE 1990's--This one book outlines EVERYTHING a beginner will need & want to know about getting started at gold mining today, either as a hobby or as a small-scale commercial activity. In easy to understand language, supported by clear photographs & graphic demonstrations, this book covers all of the important subjects--including what gold is & looks like, where it comes from & where to find it, how gold deposits & how to find & recover it, & also touches on the legal aspects of how to claim the gold for yourself. The book covers the up-to-date mining procedures of panning gold, sluicing, dredging, high-banking, drywashing, electronic probing, hardrock mining, basic refining techniques, cleaning procedures, selling gold, & much, much more. Herein lies the most comprehensive & thorough work on electronic prospecting techniques (locating gold with metal detectors) available in any publication on the market today. Virtually an encyclopedia of modern gold mining techniques, there is no other book available more up to date, more simple to understand, or which covers the entire subject as thoroughly as this manual.

Silver Recovery From Assorted Spent Sources: Toxicology Of Silver Ions Royal Society of Chemistry

In 1945, US intelligence officers in Manila discovered that the Japanese had hidden large quantities of gold bullion and other looted treasure in the Philippines. President Truman decided to recover the gold but to keep its riches secret. These, combined with Japanese treasure recovered during the US occupation, and with recovered Nazi loot, would create a worldwide American political action fund to fight communism. This 'Black Gold' gave Washington virtually limitless, unaccountable funds, providing an asset base to reinforce the treasuries of America's allies, to bribe political and military leaders, and to manipulate elections in foreign countries for more than fifty years.

The Extractive Metallurgy of Gold CreateSpace

The Earth's natural resources are finite and easily compromised by contamination from industrial chemicals and byproducts from the degradation of consumer products. The growing field of green and sustainable chemistry seeks to address this through the development of products and processes that are environmentally benign while remaining economically viable. Inorganic chemistry plays a critical role in this endeavor in areas such as resource extraction and isolation, renewable energy, catalytic processes, waste minimization and avoidance, and renewable industrial feedstocks.

Sustainable Inorganic Chemistry presents a comprehensive overview of the many new developments taking place in this rapidly expanding field, in articles that discuss fundamental concepts alongside cutting-edge developments and applications. The volume includes educational reviews from leading scientists on a broad range of topics including: inorganic resources, sustainable synthetic methods, alternative reaction conditions, heterogeneous catalysis, photocatalysis, sustainable nanomaterials, renewable and clean fuels, water treatment and remediation, waste valorization and life cycle sustainability assessment. The content from this book will be added online to the Encyclopedia of Inorganic and Bioinorganic Chemistry.

Waste Recycling Technologies for Nanomaterials Manufacturing Nordic Council of Ministers

Recycling of waste from electrical and electronic equipment (WEEE) traditionally focuses on large quantities of waste materials such as plastics. However, some product groups in the WEEE contain hidden treasures in the form of critical metals. This project assesses the critical metals' waste handling as part of five selected product groups, in the Nordic region. The environmental and economic benefits from the recycling of these metals currently and in the near future is quite substantial, mainly due to the presence of significant quantities of gold in the selected products. In order to contribute further to the circular economy concept, the Nordic countries should pay attention not only to quantitative but also to qualitative aspects of recycling, in order to capture recyclable materials that, although in small quantities, their recycling brings a high economic and environmental value.

Electrochemistry for Chemists Springer Nature

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

Electronic Waste and Printed Circuit Board Recycling Technologies Springer

Almost Free Money Where do I sign up?! Are you looking for a fun way to make some extra cash and

make ends meet? Would you like to launch your own home business with very little start-up costs? Are you a stay-at-home parent or retired senior looking for financial freedom? Are you already an internet seller who is bored with the selling the same old crap or tired of competing with other sellers for inventory? Looking to increase your profit margins on selling used items on the internet? Would you like to know how to save your family money by learning about many items that you can sell that most people throw right into their trash cans? Almost Free Money provides solutions to all of these problems facing many people in our current economic condition. This 119-page document (which is all information content, and no extraneous illustrations) is a compilation of ten years of research into materials that can easily be found in any location around the world for free or under \$1. The book teaches readers methods for effectively reselling items online on eBay and at the Amazon marketplace with extremely high profit rates. The author has successfully used the research relayed in this book to locate and sell over 12,000 items at an average profit of over 500%. Here are the Top Ten Benefits from reading Almost Free Money: 1. Learn how to get your hands on tons of free items and materials that can be sold on the internet from home, or at physical locations if you prefer. Readers are provided with appendices containing over 520 such items, and the eBay categories where the items may be listed for maximum profit. Identify items that already exist in your home that can be sold for great money. 2. We will take a tour through your home and property and discuss items that can make you money instantly! 3. Find gold, silver and platinum for free in a variety of sources. Gold currently has a spot price of about \$1700 a troy ounce. 4. If you are an internet seller, and only selling on eBay, you are missing the boat! You will learn where to effectively sell your treasure. 5. Learn what to look for while you are at garage sales, thrift stores, and flea markets. 6. You will learn how to sell scrap metal - the ultimate free money. You will take a virtual trip to a scrap metal dealer. Selling scrap is easy and fun. 7. Launch your home business for peanuts, and organize your business effectively, including record keeping and income tax issues. 8. Learn how to research on the internet, the most important skill for an entrepreneur. 9. Make money from home at any time of the day or night. You will build an inventory and make money while you sleep. 10. Find inventory anywhere in the world. Anybody can do this! We are confident that you will enjoy the accounts of finding treasure for free, and benefit from the information provided in this book. Come on and in and join several thousand fellow savers, garage sale shoppers and scrappers who have ordered Almost Free Money. Glad I came across this book! By Scott C. (Cedar Falls, Iowa USA) "I have been searching for ways to start "down-sizing" our home... get rid of stuff that we no longer need or use. Rather than box it all up and give it away, I have learned several options of how we can profit off of our unused and unwanted things by reading this book. And if I want to i could pursue a way to earn a 2nd income through the author's very detailed and useful suggestions! You never know what treasures you have or can find and he helps you look for them and find them!!! I will never look at my junk the same way!"

Gold Warriors John Wiley & Sons

In 1972, a very powerful catalytic cycle for carbon-carbon bond formation was first discovered by the coupling reaction of Grignard reagents at the sp²-carbon. Over the past 30 years, the protocol has been substantially improved and expanded to other coupling reactions of Li, B, N, O, Al, Si, P, S, Cu, Mn, Zn, In, Sn, and Hg compounds. These reactions provided an indispensable and simple methodology for preparative organic chemists. Due to the simplicity and reliability in the carbon-carbon, carbon-heteroatom, and carbon-metalloid bond formations, as well as high efficiency of the catalytic process, the reactions have been widely employed by organic chemists in various fields. Application of the protocol ranges from various syntheses of complex natural products to the preparation of biologically relevant molecules including drugs, and of supramolecular and functional materials. The reactions on solid surfaces allow robot synthesis and combinatorial synthesis. Now, many organic chemists do not hesitate to use transition metal complexes for the transformation of organic molecules. Indeed, innumerable organic syntheses have been realized by the catalyzed reactions of transition metal complexes that are not achievable by traditional synthetic methods. Among these, the metal-catalyzed cross-coupling reactions have undoubtedly contributed greatly to the development of such a new area of "metal-catalyzed organic syntheses". An excellent monograph for the cross-coupling reactions and other metal-catalyzed C-C bond-forming reactions recently appeared in *Metal-catalyzed Cross-coupling Reactions* (Wiley-VCH, 1998).

Nanoporous Gold Elsevier

Extensively revised and updated, this edition provides the broad base of knowledge required by all working in the gold extraction and gold processing industries. It bridges the gap between research and industry by emphasizing practical applications of chemical principles and techniques.

1746-1756 Springer Science & Business Media

This book introduces advanced or emerging technologies for conversion of wastes into a variety of high-value chemicals and materials. Energy and resources can be recovered from various residential, industrial and commercial wastes, such as municipal wastewater and sludge, e-waste, waste plastics and resins, crop residues, forestry residues and lignin. Advanced waste-to-resource and energy technologies like pyrolysis, hydrothermal liquefaction, fractionation, de-polymerization, gasification and carbonization are also introduced. The book serves as an essential guide to dealing with various types of wastes and the methods of disposal, recovery, recycling and re-use. As such it is a valuable resource for a wide readership, including graduate students, academic researchers, industrial researchers and practitioners in chemical engineering, waste management, waste to energy and resources conversion and biorefinery.

Linkages of Sustainability CRC Press

High-surface-area materials have recently attracted significant interest due to potential applications in various fields such as electrochemistry and catalysis, gas-phase catalysis, optics, sensors and actuators, energy harvesting and storage. In contrast to classical materials the properties of high-surface-area materials are no longer determined by their bulk, but by their nanoscale architecture. Nanoporous gold (np-Au) represents the fascinating class of mesoporous metals that have been intensively investigated in recent years. The current interest and the increasing number of scientific publications show that np-Au by itself is an outstanding nano-material that justifies a book devoted to all aspects of its properties and applications. The resulting publication is a discussion of this unique nano-material and is an accessible and comprehensive introduction to the field. The book provides a broad, multi-disciplinary platform to learn more about the properties of nanoporous gold from an inter-disciplinary perspective. It starts with an introduction and overview of state-of-the-art applications and techniques characterizing this material and its applications. It then covers the progress in research within the last years. The chapters are in-depth overviews written by the world's leading scientists in the particular field. Each chapter covers one technique or application so that the reader can easily target their favoured topic and will get the latest and state-of-the-art information in the field.