

Copper Leaching Solvent Extraction And Electrowinning Technology

Alumina Recovery from Copper Leaching Liquors Using a Supported Liquid Membrane
 Metallurgical Application of Solvent Extraction (in Two Parts)
 A Study of Simultaneous Leaching and Solvent Extraction of Copper from Malachite
 Using Oxygen to Reactivate a Nearly Dormant Copper Sulfide Leach
 Extractive Metallurgy of Copper
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 Copper Leaching, Solvent Extraction, and Electrowinning Technology
 Proceedings of the First Global Conference on Extractive Metallurgy
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 Report of Investigations
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 Silver-catalyzed Oxidative Leaching of an Arsenical Copper Sulfide Concentrate
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 Alternative Methods for Copper Recovery from Dump Leach Liquors
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 Proceedings of the Sixth International Symposium
 2. Practices and Trends
 Recovery of Cobalt and Copper from Complex Sulfide Concentrates

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Alumina Recovery from Copper Leaching Liquors Using a Supported Liquid Membrane CRC Press

Copper Leaching, Solvent Extraction, and Electrowinning Technology SME

Metallurgical Application of Solvent Extraction (in Two Parts) SME

"Petrus van Staden shares his insights on minerals biotechnology. John Canterford explores plant design and operation. Gordon Bacon discusses the challenges of plant start-ups, and John Marsden offers practical solutions for reducing energy consumption in all aspects of unit operations." "Bob Shoemaker, one of the world's most respected authorities on precious metal recovery, reflects on developments and lessons learned during his half century in the business." "Hundreds of other authors provide insights on acid rock drainage, waste water and resource recovery, process development and modeling, heap leaching, the future role of hydrometallurgy, and countless other timely, important subjects."

A Study of Simultaneous Leaching and Solvent Extraction of Copper from Malachite Elsevier

The applications of solvent extraction (SX) and liquid membranes (LM) span chemistry, metallurgy, hydrometallurgy, chemical/mineral processing, and waste treatment—making it difficult to find a single resource that encompasses fundamentals as well as advanced applications. Solvent

Extraction and Liquid Membranes: Fundamentals and Applications in New Materials draws together a diverse group of internationally recognized experts to highlight key scientific and technological aspects of solvent extraction that are critical to future work in the field. The first chapters identify relevant thermodynamics, kinetics, and interfacial behavior principles and introduce methods for calculating extraction equilibria and kinetic parameters. The next chapters focus on engineering and technological aspects of various industrial processes and plant applications, including optimization and modeling tools and calculations. The final chapters examine new materials for metal extraction and separations, covering preparation and application processes for organic and inorganic sorbents, solid polymeric extractants, and solvent impregnated resins. Solvent Extraction and Liquid Membranes offers a comprehensive review of the most important principles, calculations, and procedures involved in this widely applicable separation technique. The book's pedagogical approach will benefit students and researchers in the field as well as working scientists and engineers who wish to apply solvent extraction to their own applications.

Using Oxygen to Reactivate a Nearly Dormant Copper Sulfide Leach SME

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.

Extractive Metallurgy of Copper Springer Science & Business Media

Hydroxyoximes and Copper Hydrometallurgy provides a current examination of what is known regarding hydroxyoxime extractants, the chemistry and physicochemistry of extraction, and the potential of applying hydroxyoximes for extraction of copper and other metals in industrial processes. Topics addressed include the development of the hydrometallurgical process, methods of synthesis and structural characteristics, extraction properties, losses of active substances and problems associated with environmental pollution, the potential of metal extraction and separation with hydroxyoximes, methods of extraction and stripping that can improve metal separation and recovery, the applications of hydroxyoximes in various membrane processes, and industrial processes and equipment used for processing oxide ores and tailing. The book will benefit metallurgists, hydrometallurgists, analytical and physical chemists, and researchers in mining industries and solvent extraction.

Development of a Continuous Flotation Process for Removal of Insoluble Slimes from Potash Ore Copper Leaching, Solvent Extraction, and Electrowinning Technology

Rev. ed. of: Extractive metallurgy of copper / A.K. Biswas and W.G. Davenport. 1994. 3rd ed.

Copper Leaching, Solvent Extraction, and Electrowinning Technology Elsevier

Biomining uses microorganisms to recover metals, in particular copper and gold, from ores and concentrates. This book takes a strong applied approach to the study of biomining. It describes emerging and established industrial processes, as well as the underlying theory of the process, along with the biology of the microorganisms involved. Chapters have been contributed by experts from leading biomining companies, consultants and internationally recognized researchers and academics.

Proceedings of the First Global Conference on Extractive Metallurgy LAP Lambert Academic Publishing

This new edition has been extensively revised and updated since the 3rd edition published in 1994. It contains an even greater depth of industrial information, focussing on how copper metal is extracted from ore and scrap, and how this extraction could be made more efficient. Modern high intensity smelting processes are presented in detail, specifically flash, Contop, Isasmelt, Noranda, Teniente and direct-to-blister smelting.

Considerable attention is paid to the control of SO₂ emissions and manufacture of H₂SO₄. Recent developments in electrorefining, particularly stainless steel cathode technology are examined. Leaching, solvent extraction and electrowinning are evaluated together with their impact upon optimizing mineral resource utilization. The book demonstrates how recycling of copper and copper alloy scrap is an important source of copper and copper alloys. Copper quality control is also discussed and the book incorporates an important section on extraction economics. Each chapter is followed by a summary of concepts previously described and offers suggested further reading and references.

Hydrometallurgy in Extraction Processes Chichester : E. Horwood ; New York : Halsted Press

The hydrometallurgical papers of Volume IV highlight optimization efforts in solvent extraction/electrowinning operations in North and South America. Biohydrometallurgy, for example, not only takes a key role in copper recovery in many leach operations but offers a new role in cost-effective environmental remediation. The discussions of several approaches to the treatment of copper sulfide concentrates emphasize the high level of interest in finding alternative means of recovering copper and precious metals and avoiding many of the costs and impurity issues associated with the conventional processing.

An Introduction to Copper Electrowinning Oxford ; Toronto : Pergamon

The electrowinning of copper ions derived from leaching, or solvent extraction is a significant contributor to the global copper commodity supply. The process of electrolysis for copper was first developed in the late 19th century and despite numerous advancements in technology the principles and basic equipment remain the same. The first part of this paper deals with the theoretical requirements and fundamental equations and principles that govern copper electrowinning. The second part discusses the practical requirements for designing a copper electrowinning plant. Electrowinning, also called electroextraction, is the electrodeposition of metals from their ores that have been put in solution via a process commonly referred to as leaching. In electrowinning, a current is passed from an inert anode through a liquid leach solution containing the metal so that the metal is extracted as it is deposited in an electroplating process.

Biomining Society for Mining Metallurgy & Exploration

This book recognizes the growing role of solvent extraction and electrowinning technology in the global copper business. This process is an efficient and cost-effective way to extract copper. These proceedings document the present status of the SX-EW business. It represents a substantial body of historical, scientific, engineering, and commercial information regarding the growth and application of the technology. Sections include: the Business and Technology of SX-EW, Theory and Practice of Copper Leaching, Theory and Practice of Tankhouse Operations, and Theory and Practice of Solvent Extract.

Automation in Mining, Mineral and Metal Processing 2004 Elsevier

This two-volume set provides a full account of hydrometallurgy. Filled with illustrations and tables, this work covers the flow of source material from the mined or concentrate state to the finished product. It also highlights ion exchange, carbon adsorption and solvent extraction processes for solution purification and concentration. The extensive reference list-over 850-makes this set a valuable resource for extraction and process metallurgists, researchers, and practitioners.

Improved Elution and Impurity Removal Techniques, with Revised Process Economics CRC Press

A completely revised and up-to-date edition containing comprehensive industrial data. The many significant changes which occurred during the 1980s and 1990s are chronicled. Modern high intensity smelting processes are presented in detail, specifically flash, Contop, Isasmelt, Noranda, Teniente and direct-to-blister smelting. Considerable attention is paid to the control of SO₂ emissions and manufacture of H₂SO₄. Recent developments in electrorefining, particularly stainless steel cathode technology are examined. Leaching, solvent extraction and electrowinning are evaluated together with their impact upon optimizing mineral resource utilization. The volume targets the recycling of copper and copper alloy scrap as an increasingly important source of copper and copper alloys. Copper quality control is also discussed and the book incorporates an important section on extraction economics. Each chapter is followed by a summary of concepts previously described and offers suggested further reading and references.

Solvent Extraction and Liquid Membranes Lulu.com

This volume recognizes the growing role of solvent extraction and electrowinning technology in the world copper business. This well-established, remarkable hydrometallurgical achievement fills an important role in our technical ability to extract copper in an efficient and cost-effective way. This proceedings documents the present status of the SX-EW business. It represents a substantial body of historical, scientific, engineering, and commercial information regarding the growth and application of the technology. Sections include: The Business and Technology of SX-EW, Theory and Practice of Copper Leaching, Theory and Practice of Tankhouse Operations, and Theory and Practice of Solvent Extraction.

Extraction 2018 CRC Press

This thesis considers methods which can be employed to increase the mass of copper transferred into and out of the organic phase during the load and strip stages of commercial solvent extraction processes. Conventional 5-alkylsalicylaldehyde reagents transfer 1 mol of divalent copper per 2 mol of ligand in a neutral complex of the type [Cu(L-H)₂] via a pH-swing process. New triacidic ligands have been designed which triple the molar transport of copper to form [Cu₃(L-3H)₂]. Until recently copper recovery by solvent extraction has been confined to oxidic ores which are leached with sulfuric acid. New leaching technologies generate high tenor copper sulfate feed streams from sulfidic ores. The conventional 5-alkylsalicylaldehyde reagents do not work effectively in conjunction with these leach processes as they do not consume the acid which is generated on loading the oxime. To address this problem ditopic zwitterionic ligands have been designed which can transfer both metal cation and attendant anion. These new metal salt reagents are diacidic, therefore not only transfer metal salts but also increase the molar transport relative to the conventional reagents.

Equilibrium-modifiers are often added to improve the mass transport efficiency of conventional solvent extraction processes. The nature of their interaction with the species in solution is poorly understood. This thesis investigates their interaction with the free ligands and copper complexes to gain an understanding of their mode of action in order to rationalise the design of future modifiers to optimise recovery efficiencies. Increased molar transport is addressed in Chapter 2. The diacidic ligand 5-methylsalicylaldehyde-pivaloylhydrazide (L2) and its dinuclear copper complex [Cu₂(L2-2H)₂] were synthesised and characterised to gain an understanding of their speciation in solution. X-ray structural analysis of [Cu₂(L2-2H)₂] confirmed that the phenolate oxygen atoms bridge the copper centres rather than the amidato oxygen atoms of the hydrazone. Variable temperature magnetic susceptibility data confirm that the copper centres are antiferromagnetically coupled as expected for the Cu-OCu angle (99.6(2)°). An understanding of the coordination geometry of the dinuclear systems lead to design of triacidic ligands. A series of 3-hydrazono- and 3-hydroxyanil-5-alkylsalicylic acids were synthesised. The prototype ligand 5-methyl 3-octanoylhydrazonosalicic acid (L6) was demonstrated to triple molar transport and increase mass transport by 2.5 fold. Solvent extraction results indicate that copper is sequentially loaded as pH is increased. The plateaux observed in loading curves suggest formation of stable mono-, di-, and tri-nuclear copper complexes within the pH-ranges 1.75 - 2.75, 3.25 - 4.0 and > 4.25 respectively. The triacidic ligands were also demonstrated to double the molar transport of the conventional salicylaldehydes when used in 1:1 blends by formation of a ternary complex. Chapter 3 describes the incorporation of two tertiary amine groups into diacidic salicylaldehydehydrazone ligands to form dinucleating metal salt extractants. Piperidinomethyl, piperazinomethyl and dihexylamino groups were incorporated into various positions of the ligand including 3- and/or 5- positions of the salicylaldehyde or incorporated into the hydrazone. Solvent extraction results obtained for 3,5-bis(dihexylamino)methylsalicylaldehyde-octanoic hydrazone (L20) are consistent with transfer of 1 mol of copper sulfate per mol of ligand in the organic phase between pH 2.0 and 2.5. This result is indicative of the formation of [Cu₂(L20)₂(SO₄)₂]. Conventional salicylaldehydes are "strong" copper extractants which require concentrated acid electrolyte to efficiently strip the copper from the organic phase. However, as the use of concentrated acid affects the quality of the copper cathodes, oxygen-containing equilibrium modifiers are often added. These facilitate copper stripping without adversely affecting the loading. The affect of 2-ethylhexanol (2-EH) and trioctylphosphine oxide (TOPO) on the extractive ability of 5-toctylsalicylaldehyde (19) in n-heptane is reported. Both are found to decrease copper extraction more under stripping conditions than loading conditions. 2-EH shows little affect at pH greater than 2.5. TOPO does not significantly affect copper loading at pH greater than 3.0. Evidence for the formation of the adduct [Cu(19-H)₂](TOPO)] was obtained from UV/Vis, IR, EPR and sonic spray mass spectrometry.

Recovery of Cobalt from Spent Copper Leach Solution Using Continuous Ion Exchange Elsevier

Using Solvent-impregnated Carbon to Recover Copper from Oxidized Mill Tailings Allied Publishers

Extractive Metallurgy of Copper Springer

The Separation of Cobalt from Copper-cobalt Ore Leach Solutions Using Solvent Extraction Tms

Extractive Metallurgy of Copper