

## Biohydrometallurgy

**Recent Advances in Hydro- and BiohydrometallurgyMDPI**

*The development of biologically based processes for the treatment of hazardous inorganic and organic wastes is a multi-disciplinary effort requiring the consideration of a number of biological, chemical, and physical parameters, as well as the effective teaming of biologists, chemists, engineers, and regulatory agencies. This new text/reference bridges the disciplines in a unique way, allowing an exchange of fundamental information to take place. The book begins with a description of the biological transformations of inorganic and organic compounds and a review of strategies that may be used for the treatment of hazardous wastes. It continues with a discussion of the physiological and engineering factors that must be considered for successful process development and concludes with a discussion of the regulations that have influenced biological waste treatment and environmental remediation.*

**Biohydrometallurgy and the Environment**

**The Technological Transformation of the Mining Industry for Environmental Protection**

**Recent Progress in Biohydrometallurgy**

**Towards the Mining of the 21st Century**

Report of an investigation into the development of thermophilic biohydrometallurgy to enhance precious metal extraction from refractory sulphide mineral hosts. A literature review was conducted on mineral leaching using the thermophilic bacterium *Sulfolobus*, an explanatory laboratory experiment was conducted, and a pilot plant was developed, developing a *Sulfolobus*-based system within practical operating constraints, and an economic comparison of a thermophilic and mesophilic pretreatment process was conducted.

The major theme of the International Biohydrometallurgy Symposium IBS-99 'Biohydrometallurgy and the Environment toward the mining of the 21st Century', held in El Escorial (Spain) from 20-23 June 1999, is biohydrometallurgy and the environment since it is predicted that it will be the greatest contribution in this area. From the papers in these volumes it is clear that environmental issues are already of great interest to the biohydrometallurgical community. Although all the classical biohydrometallurgical topics - e.g. bioleaching, microbiology, molecular biology, and mineral processing - are covered, the continued emphasis is on the environmentally friendly aspects of the biotechnologies used. Given the interdisciplinary nature of the field, biologists, hydrometallurgists, geologists, chemists, physicists and engineers should be interested in this collection of papers which discuss the environmental aspects of the field.

International Symposium on Biohydrometallurgy ; 5

Biotechnology for the Treatment of Hazardous Waste

Proceedings of the International Symposium Held at Jackson Hole, Wyoming, August 13-18, 1989

Molecular biology, biosorption, bioremediation. B

Biohydrometallurgy

Presenting the highlights of an international forum for scientific and engineering experts and students addressing the progress and applications of Biohydrometallurgy as it enters the new millennium.

This book review series presents current trends in modern biotechnology. The aim is to cover all aspects of this interdisciplinary technology where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science. Volumes are organized topically and provide a comprehensive discussion of developments in the respective field over the past 3-5 years. The series also discusses new discoveries and applications. Special volumes are dedicated to selected topics which focus on new biotechnological products and new processes for their synthesis and purification. In general, special volumes are edited by well-known guest editors. The series editor and publisher will however always be pleased to receive suggestions and supplementary information. Manuscripts are accepted in English.

Proceedings of the ... International Symposium on Biohydrometallurgy

BIOTECHNOLOGY - Volume X

Biohydrometallurgical Technologies

Biohydrometallurgy: Bioleaching applications, bioremediation environmental applications

5th International Symposium on Biohydrometallurgy : Papers

**This book is a printed edition of the Special Issue Recent Advances in Hydro- and Biohydrometallurgy that was published in Minerals**

**The main focus of this collection of peer-reviewed articles is the role that micro-organisms play in the treatment of minerals, metals, coal, oil, waste materials; and also in related environmental issues. Nowadays, as well as developing new technologies for the production of raw materials and useful products, major efforts have to be directed at the remediation of former mining sites and at environmental protection tasks associated with the various kinds of mining. Volume is indexed by Thomson Reuters CPCI-S (WoS).**

**Fundamentals, Technology, and Sustainable Development**

**Biohydrometallurgy: Biosorption and bioremediation**

**Biohydrometallurgy and the Environment Toward the Mining of the 21st Century**

**Biohydrometallurgical Recycling of Metals from Industrial Wastes**

**Proceedings of the International Symposium, Warwick 1987**

Volume is indexed by Thomson Reuters CPCI-S (WoS). The main focus of this collection of peer-reviewed articles is biohydrometallurgy. This is the field of microbial ecology which is the key to answering central questions concerning not only the diversity and behavior of micro-organisms in commercial operations, but also possible applications in biohydrometallurgy of extremophiles coming from very different environments. The 134 papers are grouped as follows: Chapter 1: Microbial Ecology, Geomicrobiology and Bioprospecting in Natural and Mining Environments; Chapter 2: Omics, Molecular Genetics and Biochemistry of Microorganisms in Mining Processes; Chapter 3: Industrial Biohydrometallurgy: Studies, Practices and Operation; Chapter 4: Biohydrometallurgy as a Remediation Strategy.

Biohydrometallurgy is an emerging technology. It is used industrially for the recovery of copper and uranium from low-grade resources, and the liberation of gold and other precious metals from refractory ores.

Technologies are also being developed and applied to coal desulfurization, bioremediation of contaminated soils, and effluent solutions and bioenhanced tertiary oil recovery processes.

Special Issue: Biohydrometallurgy

Biohydrometallurgy and the Environment Toward the Mining of the 21st Century: Molecular biology, biosorption, bioremediation

Final Report

Biohydrometallurgy and the Environment Toward the Mining of the 21st Century: Bioleaching, microbiology

Bioleaching, microbiology and molecular biology. A

Volume is indexed by Thomson Reuters CPCI-S (WoS). The main focus of this collection of peer-reviewed articles is three different aspects of biohydrometallurgy: this is the field of microbial ecology which is the key to answering central questions concerning not only the diversity and behavior of micro-organisms in commercial operations, but also possible applications in biohydrometallurgy of extremophiles coming from very different environments. This covers metal recovery bioprocesses, including basic and applied studies of bioleaching and bio-oxidation; but also bioflotation. A large part of the book is given over to interfacial studies which contribute to the understanding of the interaction between surfaces and micro-organisms during those processes. Also covered are the remediation of mining activities and environmental protection as related to mining and mining industries. The volume is organized around these principal topics. In addition, section III and an invited plenary are dedicated mainly to biological studies at the molecular level and to bio-informatics; whose contribution to the elucidation of microbial mechanisms grows every day. Physiological and biochemical studies of mining micro-organisms are also added to this section. Section V includes studies of new biomaterials; which seem to be the new frontier in this field; it also covers new technological applications of biomass, especially that related to extremophiles, and the conversion of waste into new materials for environmental applications. This work will enable scientists and engineers, from the first to the third world, to study biohydrometallurgical applications and learn how to implement them within their own particular society. Peer-reviewed papers from a September 2009 conference report on recent work in biohydrometallurgy, the field of microbial ecology which addresses questions concerning not only the diversity and behavior of micro-organisms in commercial operations, but also possible applications of extremophiles coming from very different environments. A large part of the book is given over to studies of the interaction between surfaces and micro-organisms during metal recovery bioprocesses. Also covered are the remediation and environmental protection related to mining. A section is dedicated to biological studies at the molecular level and physiological and biochemical studies of mining micro-organisms. Another section contains studies of new biomaterials, and describes new technological applications of biomass. Some topics covered include the microbial ecology of a natural extreme acidic environment, microbial succession during a heap bioleaching cycle of low-grade copper sulphides, geomicrobiology of sulfidic mine dumps, and microbial diversity and genetic response to stress conditions of extremophilic bacteria isolated from the Escondida copper mine.

This Encyclopedia of Biotechnology is a component of the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Biotechnology draws on the pure biological sciences (genetics, animal cell culture, molecular biology, microbiology, biochemistry, embryology, cell biology) and in many instances is also dependent on knowledge and methods from outside the sphere of biology (chemical engineering, bioprocess engineering, information technology, biorobotics). This 15-volume set contains several chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It carries state-of-the-art knowledge in the field and is aimed, by virtue of the several applications, at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

22nd International Biohydrometallurgy Symposium

Biohydrometallurgy: From the Single Cell to the Environment

Biohydrometallurgy 2009

Bioleaching, microbiology. A

Selected, Peer Reviewed Papers from the 18th IBS (IBS 2009), 13-17 September 2009, Bariloche, Argentina

The application of microbiological methods to the extraction of metals from minerals is supported by several bioleaching and biooxidation processes operating in different sites over the world. This book details the basic aspects of the process with special emphasis on recent contributions regarding the chemical and microbial aspects of the bioleaching process and the use of microorganisms in the treatment of complex ores and concentrates.

Although many available metal recycling methods are simple and fast, they are also expensive and cause environmental pollution. Biohydrometallurgical processing of metals offers an alternative to overcome these issues, as the use of biological means not only helps to conserve dwindling ore resources but also fulfills the need for the unambiguous need to extract metals in nonpolluting, low-energy, and low-cost way. This book covers biohydrometallurgy and its application in the recovery of metals from secondary sources like wastes. It aims to provide readers with a comprehensive overview of different wastes for metal recovery and biological treatment methods that are both environmentally friendly and economically viable.

Biohydrometallurgy of Chalcopyrite

20th International Biohydrometallurgy Symposium

The Development of Thermophilic Biohydrometallurgy to Enhance Precious Metal Extraction from Refractory Sulphide Mineral Hosts

20th International Biohydrometallurgy Symposium, IBS 2013, Antofagasta, Chile, 8 - 11 October 2013

Proceedings of the International Biohydrometallurgy Symposium Ibs'99 Held in San Lorenzo De El Escorial, Madrid, Spain, June 20-23, 1999

*The 22nd International Biohydrometallurgy Symposium (24 - 27 September, 2017, Freiberg, Germany) was the global forum for experts from academia and industry active in the fields of biomining, bioleaching and bioremediation. These technologies have a high potential to establish environmentally favourable processes for the recovery of primary and secondary precious and base metal resources as well as the remediation of exploited mining sites.*

*The main focus of this collection of peer-reviewed articles is biohydrometallurgy. This is the field of microbial ecology which is the key to answering central questions concerning not only the diversity and behavior of micro-organisms in commercial operations, but also possible applications in biohydrometallurgy of extremophiles coming from very different environments. The 134 papers are grouped as follows: Chapter 1: Microbial Ecology, Geomicrobiology and Bioprospecting in Natural and Mining Environments; Chapter 2: Omics, Molecular Genetics and Biochemistry of Microorganisms in Mining Processes; Chapter 3: Industrial Biohydrometallurgy: Studies, Practices and Operation; Chapter 4: Biohydrometallurgy as a Remediation Strategy.*

*Biohydrometallurgy: Bioleaching, microbiology, and molecular biology*

*Fundamentals in Biotechnology*

*Recent Advances in Hydro- and Biohydrometallurgy*

*Metal-related Issues*

*Integration of Scientific and Industrial Knowledge on Biohydrometallurgy*

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Bioleaching of chalcopyrite is always a challenge and research hotspot. The low copper extraction and dissolution kinetics restricted the industrial application of chalcopyrite bioleaching. To solve this problem, the dissolution process and passivation mechanism of chalcopyrite in bioleaching should be first studied, then the rate-limiting steps should be analysed explicitly, and finally the intensifying method can be put forward. Many scholars have made efforts to investigate the dissolution mechanism of chalcopyrite in bioleaching. However, there is no congruence of opinion as yet. Biohydrometallurgy of Chalcopyrite summarizes and discusses the reported research findings. In addition, this book publishes the related results found by the authors' research. Then, the dissolution mechanism of chalcopyrite in bioleaching is interpreted. Finally, the process intensification techniques of chalcopyrite bioleaching are provided and discussed. Hence, this book provides useful reference and guidance in both laboratory research and industrial production. Interprets the dissolution mechanism of chalcopyrite in bioleaching Provides feasible technologies for intensifying chalcopyrite bioleaching Overviews the current situations of chalcopyrite bioleaching Helps the readers to deeply understand the bioleaching mechanisms of chalcopyrite Provides topics for future research and potential industrial applications

Geobiotechnology I

Microbial Processing of Metal Sulfides