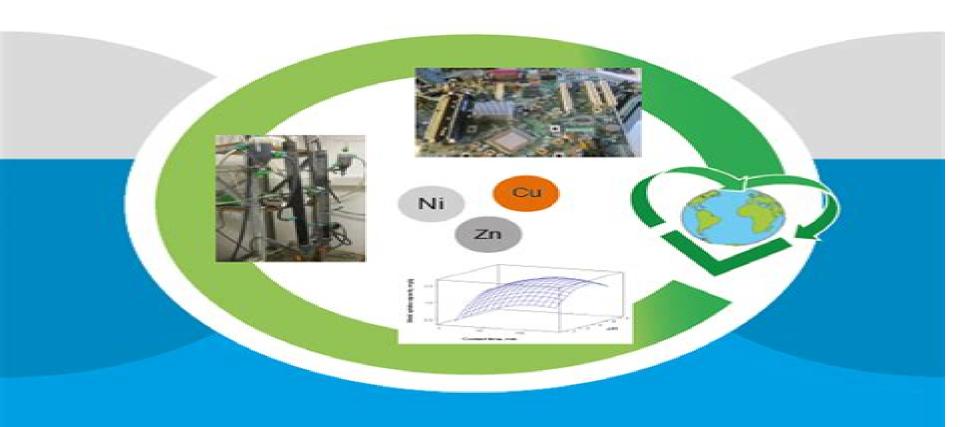
# METAL REMOVAL AND RECOVERY FROM MINING WASTEWATER AND E-WASTE LEACHATE



**SUTHEE JANYASUTHIWONG** 

# Metal Removal And Recovery From Mining Wastewater And E Waste Leachate

John W. Bell

#### Metal Removal And Recovery From Mining Wastewater And E Waste Leachate:

Metal Removal and Recovery from Mining Wastewater and E-waste Leachate Suthee Janyasuthiwong, 2020-02-18 Metal contamination in the environment is a persisting global issue The metal reservoirs in the earth have declined due to society s needs and due to uncontrolled mining activities Therefore the idea to recover metals from waste streams has emerged In this thesis cost competitive technologies such as adsorption using agro wastes and precipitation using an inverse fluidized bed IFB reactor were investigated with special emphasis on the recovery of base metals Groundnut shell showed good potential for metal Cu Pb and Zn removal From artificial neural network modeling the performance of the sulfate reducing bacteria SRB was found to be strongly pH dependent the removal efficiency of Cu and Zn in the IFB at pH 5 0 was 97% Electronic waste is a good candidate as secondary metal resource. The recovery of Cu from computer printed circuited boards PCBs using biogenic sulfide precipitation was investigated as well Using this technology Cu could be recovered at 0 48 g Cu g PCBs Wastewater Treatment Residues as Resources for Biorefinery Products and Biofuels Jose Antonio Olivares, Daniel Puyol, Juan Antonio Melero, Javier Dufour, 2019-11-21 Wastewater Treatment Residues as Resources for Biorefinery Products and Energy reviews wastewater treatment processes and the use of residues The viability of end use processes for residues such as incineration cement additives agricultural fertilizers and methane production are reviewed and analyzed as are new processes for the use of residues within a fuels production system such as pyrolysis hydrothermal liquefaction and syngas Specialized chapters discuss fractionation of biomass the production of compounds from volatile fatty acids that conceptually proceed from the anaerobic acidogenesis of residues and a final analysis of the overall productivity and viability that can be expected from these production schemes Discusses processes for the production of high value added products and energy development from sludge Provides value added technologies for resource utilization in wastewater systems Outlines sustainability assessments and comparisons of technologies and processes Proceedings of the 48th Industrial Waste Conference Purdue University, May 1993 Ronald F. Wukasch, 1993-12-28 Known and used throughout the world the Purdue Industrial Waste Conference Proceedings books are the most highly regarded in the waste treatment field New research case histories and operating data cover every conceivable facet of today s big problems in environmental control treatment regulation and compliance This volume representing the proceedings from the 48th conference provides unparalled information and data for your current waste problems Environmental Materials and Waste Majeti Narasimha Vara Prasad, 2024-07-13 Environmental Materials and Waste Circular Economy and Pollution Abatement Second Edition contains the latest information on environmental sustainability as a wide variety of natural resources are increasingly being exploited to meet the demands of a worldwide growing population and economy The book takes a multidisciplinary approach to fully realize the number of by products which can be remanufactured providing the foundation needed across disciplines to tackle this issue As awareness and opportunities to recover valuable resources from process and bleed streams is gaining

interest sustainable recovery of environmental materials including wastewater offers tremendous opportunity to combine profitable and sustainable production In this 2nd edition operational principles of circular economy for sustainable development with reference to environmental waste shall be covered Circular economy research is discussed in depth as it has gained considerable momentum in the scientific literature thus far and both conceptual debates and the creation of useful implementation strategies are still in their infancy Although circular systems are now being implemented this book will emphasize the importance to properly consider and convert circular economy goals and principles into actions As a whole this 2nd edition of Environmental Materials and Waste covers a wide range of issues that must be covered in order to improve environmental sustainability Presents a state of the art guide to environmental sustainability Provides an overview of the field highlighting recent and emerging issues in environmental resource recovery that cover a wide array of by products for remanufacture potential Details a multidisciplinary approach to fully realize the number of by products which can be remanufactured providing the foundation needed across disciplines to tackle these global issues **Environmental** Protection Research Catalog: Indexes Smithsonian Science Information Exchange, 1972 Proceedings of the 52nd Purdue Industrial Waste Conference 1997 Conference Purdue Research Foundation, 2020-02-06 The 52nd Purdue Industrial Waste Conference showcased 18 sessions on subjects such as biological aspects physical chemical aspects oil and petroleum wastes management and reuse strategies international activities and pollution prevention. This book compiles the work of nearly 200 international experts covering the latest practical techniques advanced research new methods actual operating Selected Water Resources Abstracts ,1991 data and important case studies Proceedings of the 49th Industrial Waste Conference Purdue University, May 1994 Ronald F. Wukasch, 1994-12-29 Known and used throughout the world the Purdue Industrial Waste Conference Proceedings books are the most highly regarded in the waste treatment field New research case histories and operating data cover every conceivable facet of today s big problems in environmental control treatment regulation and compliance This volume representing the proceedings from the 49th conference provides unparalled information and data for your current waste problems Proceedings of the 41st Industrial Waste Conference May 1986, Purdue University John M. Bell, 2018-05-04 This 41st Edition presents case histories with operating data and new research on most topics of this major subject in today s world This valuable Purdue Book will prove invaluable to all involved with waste treatment providing information and data to help solve current problems These proceedings of the May 1986 Purdue Conference include applications research methods and techniques case histories and operating data The 91 papers include two special sections 21 papers discuss toxic and hazardous wastes and 24 papers cover physical biological systems The book is further divided into papers on the following topics 1 Pretreatment Programs and Systems 2 Dairy Wastes 3 Oilfield and Gas Pipeline Wastes 4 Dye Wastes 5 Coal Coke and Power Plant Wastes 6 Landfill Leachate 7 Laws Regulations and Training 8 Physical Biological Systems 9 Pulp and Paper Mill Wastes 10 Plating Wastes 11 Food Wastes 12 Metal Wastes and 13 Toxic

and Hazardous Wastes Proceedings of the 43rd Industrial Waste Conference May 1988, Purdue University John M. Bell, 2018-05-04 This Purdue volume includes 89 technical papers presented at the 43rd Purdue Industrial Waste Conference held May 10 11 and 12 1988 at Purdue University The papers address topics within broad categories such as toxic and hazardous wastes site remediation landfills biological systems sorptive processes processes and product development industrial wastes and laws regulations and training The data and information contained in this volume reflect some of the latest information available on industrial waste and waste management **Proceedings of the ... Industrial Waste** Sustainable Heavy Metal Remediation Eldon R. Rene, Erkan Sahinkaya, Alison Lewis, Piet N.L. Lens, 2017-07-24 This book covers the principles underlying mechanisms thermodynamic functions kinetics and modeling aspects of sustainable technologies particularly from the standpoint of applying physical chemical and biological processes for the treatment of wastewater polluted with heavy metals Particular emphasis has been given to technologies that are based on adsorption electro coagulation bio precipitation bio solubilization phytoremediation and microbial electrolysis Metal contamination in the environment is one of the persisting global issues The adverse health effects of heavy metals on human beings and its impact on the environment has been well documented Several physico chemical and biological technologies have been successfully implemented to prevent and control the discharge of industrial heavy metal emissions On the contrary metal resource depletion has also accelerated dramatically during the 20th century due to rapid advances in industrial engineering and medical sciences which requires large amount of raw materials To meet the global metal demand in recent years novel research lines have started to focus on the recovery of metals from metal contaminated waste streams In order to conflate both metal removal and recovery new technologies have been successfully tested both at the lab and pilot scale The target audience of this book primarily comprises of research experts practicing engineers in the field of environmental chemical technology and graduate students Encyclopedia of Surface and Colloid Science - Arthur T. Hubbard, 2002-07-18 This comprehensive reference collects fundamental theories and recent research from a wide range of fields including biology biochemistry physics applied mathematics and computer materials surface and colloid science providing key references tools and analytical techniques for practical applications in industrial agricultural and forensic processes as well as in the production of natural and synthetic compounds such as foods minerals paints proteins pharmaceuticals polymers and soaps Microbial Biodegradation and Bioremediation Surajit Das, Hirak Ranjan Dash, 2021-11-24 Microbial Biodegradation and Bioremediation Techniques and Case Studies for Environmental Pollution Second Edition describes the successful application of microbes and their derivatives for bioremediation of potentially toxic and relatively novel compounds in the environment Our natural biodiversity and environment is in danger due to the release of continuously emerging potential pollutants by anthropogenic activities Though many attempts have been made to eradicate and remediate these noxious elements thousands of xenobiotics of relatively new entities emerge every day thus worsening the situation

Primitive microorganisms are highly adaptable to toxic environments and can reduce the load of toxic elements by their successful transformation and remediation This completely updated new edition presents many new technologies and techniques and includes theoretical context and case studies in every chapter Microbial Biodegradation and Bioremediation Techniques and Case Studies for Environmental Pollution Second Edition serves as a single source reference and encompasses all categories of pollutants and their applications in a convenient comprehensive format for researchers in environmental science and engineering pollution environmental microbiology and biotechnology Describes many novel approaches of microbial bioremediation including genetic engineering metagenomics microbial fuel cell technology biosurfactants and biofilm based bioremediation Introduces relatively new hazardous elements and their bioremediation practices including oil spills military waste water greenhouse gases polythene wastes and more Provides the most advanced techniques in the field of bioremediation including insilico approach microbes as pollution indicators use of bioreactors techniques of pollution monitoring and more Completely updated and expanded to include topics and techniques such as genetically engineered bacteria environmental health nanoremediation heavy metals contaminant transport and in situ and ex situ methods Includes theoretical context and case studies within each chapter Encyclopedia of Surface and Colloid Science, 2004 Update Supplement P. Somasundaran, 2014-05-08 Appending the Encyclopedia of Surface and Colloid Science by 42 entries as well as 3800 new citations 1012 equations and 485 illustrations and chemical structures this important supplement summarizes a constellation of new theoretical and experimental findings related to chemical characterization mechanisms interfacial behavior methods and mo Bio-organic Amendments for Heavy Metal Remediation Allah Ditta, Sajid Mehmood, Muhammad Imtiaz, Mike S Tu, 2024-07-23 Bio organic Amendments for Heavy Metal Remediation Water soil and plant focuses on these core continuum media to explore remediation options using microbial organic and combined approached A volume in the Plant Biology Sustainability and Climate Change series this book offers a comprehensive view of techniques and approaches for addressing contamination by heavy metals As anthropogenic activities increasingly negatively impact natural resources there has been significant disturbance of water soil and plant continuum due to the accumulation of heavy metals The bioaccumulation of heavy metals in the food chain could pose life threatening effects on plants as well as humans and there is need to find effective and sustainable remediation options. The application of bio organic amendments could serve as a sustainable solution to this problem Employing microbial organic and combined approaches to reduce the accumulation of heavy metals in the food chain ultimately would lead to the production of safe food for humans This book provides a comprehensive view of the challenge with a focus on the bioremediation of heavy metals contamination using ecotechnological approaches to protecting the soil water and plant continuum Highlights remediation techniques approaches for heavy metals under water soil and plant continuums Presents case studies for real world insights as well as current practices Includes regulatory aspects for ensuring safe implementation **Proceedings of the 45th Industrial Waste** 

Conference May 1990, Purdue University John W. Bell, 2018-01-31 New and timely research methods and processes are described in 92 technical papers This new volume in the Purdue series presents a compendium of valuable information that can be directly applied to today s big problems of environmental control treatment regulation and compliance E-waste Management Strategies and Future Implications Shashi Arya, Sunil Kumar, 2023-06-09 Global E waste Management Strategies and Future Implications provides in depth information about the global E waste problem and the potential opportunities Part 1 of this book starts with the introduction to the E waste sources critical composition and associated challenges opportunities Part 2 of this book further elaborates detailed overview of the current trends in E waste management and existing treatment options hydrometallurgy pyrometallurgy bioleaching and biohydrometallurgy and its implications The book also discloses the critical implications of the secondary pollutants on the environment and human health with special emphasis on the informal recycling practices in the developing nations Part 3 deals with the existing regulations in developed and developing countries which are illustrated using case studies for effective understanding and to bridge the gaps between the developed and developing nations Part 4 of this book includes scientific and technical information to get a better vision and understanding of the most advanced and innovative methods for E waste management such as life cycle assessment LCA tax credit extended producer responsibility EPR extended consumer responsibility ECR which is explained systematically with case studies Part 5 of this book covers the best E waste management practises such as reduce recycle recover and reuse 4R principles circular resource management value out of waste VoW solutions for smart cities green product design etc which is explained using the ideal case studies Part 6 summarizes the transition towards sustainability Provides information on the most advanced and innovative methods for urban mining of E waste Includes most suitable methods for maximum resource recovery Discusses project evaluation methods based on best available technologies and practices Presents best ways to delineate a sustainable roadmap for efficient E waste management Proposes technically and economically feasible projects worldwide Waste-to-Energy Abd El-Fatah Abomohra, Qingyuan Wang, Jin Huang, 2022-02-08 This book addresses the needs of students researchers as well as engineers and other professionals or readers interested in recent advances of biofuel and efficient waste management In the context of energy consumption over 85% of the total consumed energy comes from non renewable fossil resources Developing new renewable energy resources especially biofuel production from wastes has received increasing attention. The book is organized into three sections namely Section I Conventional waste management Section II From waste to green energy and Section III Case studies and future perspectives Each section presents topic specific chapters which contain comprehensive and advanced knowledge of the subjects Overall the book covers the recent advances breakthroughs challenges and future perspectives of waste to energy approach using different kinds of wastes as a feedstock for alternative biofuels and other integrated approaches such as wastewater treatment plastic degradation and CO2 sequestration in a cost effective and eco friendly way In addition different routes of waste recycling for enhanced biofuel production and case studies are presented with environmental and economic analysis. The presented case studies and future perspectives under Section III complement the chapters as they are authored by experts from bioenergy businesses who actually encounter real world problems

Selected Water Resources

Abstracts ,1991

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