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The Complete Technology Book on Minerals & Mineral Processing

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Description

Mineral is defined as a naturally occurring solid chemical substance formed through biogeochemical processes, having characteristic chemical composition, highly ordered atomic structure, and specific physical properties. By comparison, a rock is an aggregate of minerals and/or mineraloids and does not have a specific chemical composition. Mineral resources of India are sufficiently rich and varied to provide the country with strong industrial base. The country is particularly rich in metallic minerals of the ferrous group such as iron ores, manganese etc. It has the world largest reserves in mica and bauxite. In the field of extractive metallurgy, mineral processing, also known as mineral dressing or ore dressing, is the process of separating commercially valuable minerals from their ores. Mining is the extraction of valuable minerals or other geological materials from the earth, from an ore body; the term also includes the removal of soil. Materials recovered by mining include base metals, precious metals, iron, uranium, limestone, etc. There are three methods of mining; conventional or manual mining, semi mechanised mining and mechanised mining. Geopolymerisation is the processes which can transfer large scale alumina silicate wastes into value added geopolymeric products with sound mechanical strength and high acid, fire and bacterial resistance. One of many useful applications of geopolymerisation is the immobilization of heavy metals and radioactive elements. The production of non ferrous metals from natural mineral ores is, in general, highly energy intensive. Some of the non ferrous mineral sources are bauxite, granite, magnesite, limonite etc. Limestone is a sedimentary rock composed largely of the minerals calcite and aragonite, which are different crystal forms of calcium carbonate ($CaCO_3$). Limestone processing includes several steps; primary crushing (jaw crusher, gyratory crusher, impact breaker), secondary crushing (cone crusher), fine grinding and pulverization, conveying, screening, washing, heavy media separation, optical

mineral sorters, drying and storage. The non metallic mineral mining and quarrying industry segment covers a wide range of mineral extraction. Most of these minerals are found in abundance close to the surface, so underground mining is uncommon in this industry segment. Mineral resources of India are sufficiently rich and varied to provide the country with strong industrial base. The country is particularly rich in metallic minerals of the ferrous group such as iron ores, manganese etc. It has the world largest reserves in mica and bauxite.

This book basically deals with methods of mining, mining machineries, geopolymerisation of mineral products and waste, industrial and scientific aspects of non ferrous metals production, processing of alumina rich Indian iron ore slimes, limestone processing, limestone exploration and extraction, the mineralogy of asbestos, the use of asbestos and asbestos free substitutes in buildings, flotation column ;a novel technique in mineral processing, applications of thermal plasma in the synthesis of covalent carbides, nitrogenous fertilizers, manufacture of ammonium bicarbonate etc.

This book is designed to describe the details of mining and processing of different minerals like alumina rich iron ore slimes, conversion of waste to a high valued product, lime stone, asbestos, coal beneficiation, gravity concentration processes to recover values from coal and ore fines and many more. The book is meant for everyone who wants to study about the subject or wants to venture into the field of mineral processing.

Content

2. PROCESSING
General Consideration
Manual Methods
Mechanical Methods
1. Sawing
2. Polishing
3. Cutting and Polishing of Edges
4. Status of Granite Processing Industries in India

3. GEOPOLYMERISATION OF MINERAL PRODUCTS AND WASTE
Principles of Geopolymerisation
Reaction Mechanisms and Material Properties
Immobilisation of Heavy Metals and Radioactive Elements
Encapsulation of Organic Residue
Stabilisation of Mine Tailings
Concluding Remarks

4. INDUSTRIAL AND SCIENTIFIC ASPECTS OF NON- FERROUS METALS PRODUCTION
Introduction
Resources in India
The Developed Metals Industry
Environmental Aspects: Life Cycle Assessment (LCA)
Metals for Secondary Sources : The Energy Aspect
Extraction as a Separation Process
Application of Thermodynamics and Kinetics - Some Examples
R & D for the Future
Nonferrous Metallurgy at Regional Research Laboratory, Bhubaneswar
Processing of Ocean Nodules
Processing of Chromite Overburden
Concluding Remarks

5. THE IMPORTANCE OF USING A MULTIDISCIPLINARY APPROACH IN THE EVALUATION OF AMMONIA LEACHING BEHAVIOUR OF MULTIMINERAL SULPHIDES
Introduction
Research Practice/Methodology
1. Overall Aim of Leaching Studies
2. Raw Materials
3. Analysis of Feed Material, Leach Solution and Residues
4. Leaching as a process involving Parallel Reactions
5. Experimental Options and Limitations during Laboratory Studies

Hydraulic Lime
Selective Calcination
Manufacturing Costs
Lime Plant Safety

12. LIMESTONE EXPLORATION AND EXTRACTION
Exploration Criteria
Land Use
Zoning
Coring
Extraction of Limestone
Stripping
Disposal of Overburden
Quarry Layout
Mining Layout
Drilling
Blasting
Loading
Haulage
Pumping
Extraction without Blasting
Environmental Controls

13. THE MINERALOGY OF ASBESTOS
Introduction
Definitions
Chemical Composition
Crystal Structures
Serpentine Minerals
Amphibole Minerals
Occurrences
Synthesis
Optical Properties
X-ray Diffraction Data
Electron Optical Characteristics
Non-asbestiform Amphibole and Serpentine Minerals

14. CHEMISTRY AND PHYSICS OF ASBESTOS
Asbestos : The Raw Material
Occurrence and Formation

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