



Spectrum Journal of Innovation, Reforms and Development

Volume 06, Aug, 2022

ISSN (E): 2751-1731

Website: www.sjird.journalspark.org

SIGNIFICANCE OF MINERALS AND ORE MINERALS AND ENRICHMENT TECHNOLOGIES

Xalikulova Xayat

Almalyk Mining and Metallurgical Plant, Ore Department
"Kalmakyr", Geologist Exploration party, mineralogist of I-category.

Abstract:

This article talks about the importance of minerals and ore minerals, their beneficiation methods and technologies. A mineral is a complex complex of various minerals. In addition, you can get detailed information about valuable components, useful and harmful additives, companion elements.

Key words: Minerals, ore minerals, precious components, concentration, beneficiation, asbestos ores, beneficial additive, rocks, beneficiation technique, electrical conductivity, magnetism, mechanization, similar ores, ceramic industry.

Introduction

Mineral beneficiation is an industrial branch that processes solid minerals in order to concentrate them, that is, to obtain a product whose quality is higher than the original ore quality, and which meets the requirements for later use in the national economy. The quality of mineral and enrichment products is determined by the amount of precious (useful) components, additives, satellite elements, as well as the size and moisture content of the product.

The higher the amount of valuable components and the lower the amount of harmful additives, the higher the quality of mineral and enrichment products. The better the quality of the product, the richer it is, because it contains a large amount of valuable components. Therefore, the processes of mineral processing in order to obtain a richer product than the original ore - beneficiation - are called mineral beneficiation.

A precious component is an element or natural compound that is mined to extract this precious component. For example, copper, lead, iron, asbestos, copper, lead, iron and asbestos are valuable components, respectively. Supplements can be beneficial or harmful.

Beneficial additives are elements or natural compounds that are present in a small amount of a mineral, are added to a valuable component, improve its quality and facilitate its separation.

Harmful additives are elements or natural compounds that are present in a mineral in small quantities, are added to a valuable component, have a negative effect on its quality, and make its separation difficult.

Companion elements are precious components that are found in small quantities in the mineral composition, and are economically expedient to separate from the mineral composition only because it is extracted from the ground together with the main valuable component.



The inclusion of beneficiation operations in the mineral processing cycle allows separating a rich product - beneficiation - from the extracted mineral composition and using raw materials with high economic efficiency. In this case, the following advantages can be achieved:

- production productivity increases and the mining system becomes simpler, that is, mineral extraction becomes cheaper, as it becomes possible to extract ore as a whole instead of selectively, and to achieve more complete mechanization of mining operations;
- the mineral is used comprehensively, because enrichment allows to separate all the valuable components contained in them;
- the industrial reserves of minerals will increase, because it will be possible to extract even poor ore;
- metallurgical or chemical processing of minerals becomes cheaper, production productivity increases, because the consumption of fuel, fluxes, coke, electricity, chemical reagents, etc. decreases with the increase in the amount of valuable components in the product entering these enterprises.
- transportation costs are reduced, since most beneficiation plants are built close to the mine and only the concentrate is transported long distances, not the entire volume of mined ore.

A mineral is a complex complex of various minerals. In a mineral, the valuable component is often found in the composition of the corresponding mineral. For example, copper-like ores include copper-bearing minerals: chalcopyrite, bornite, covellite, etc. Rarely, a precious component is found in a pure (native) state, for example, rare metals, diamonds, graphite, etc. Minerals that store valuable components are called useful minerals. Minerals that do not contain valuable components or useful additives are called void rocks.

With the development of beneficiation techniques and technology, as well as the increase in the national economy's need for certain raw materials, the minerals contained in one or another mineral can be transferred from the waste rock discharge to the useful mineral discharge.

Here, it is necessary to emphasize the relativity of the concepts of useful mineral, harmful or useful additive, waste rock. Which of these concepts a mineral belongs to depends only on the given type of mineral. One mineral itself may be useful in a primary product, while another may be waste rock. For example, quartz is a useful mineral for the ceramic industry, and in non-ferrous and ferrous metal ores, pumice is a harmful additive.

Mineral beneficiation is a mechanical processing that is not related to chemical changes of minerals. The chemical composition of minerals remains unchanged before and after enrichment. In beneficiation, mineral quality is improved by separating minerals.

In beneficiation, the improvement of mineral quality is achieved by separating loose rocks and collecting useful minerals into smaller volumes. In this case, the amount of the valuable component increases, because almost all of its amount is concentrated in the enrichment.

The amount of the component is the ratio of the weight of the component in the product to the weight of the product. The degree of enrichment achieved as a result of beneficiation is defined as the ratio of the amount of the precious component in the beneficiation to its amount in the original ore. The degree of enrichment indicates how rich the enrichment is compared to the original product.



The yield of enrichment products is the ratio of the weight of the product obtained as a result of enrichment to the weight of the initial product. It is accepted to express output in percentages or units. The inverse of output, expressed in unit shares, indicates the number of tons of primary product to obtain one ton of product as a result of enrichment.

The main part of useful minerals and useful additives is allocated to the products called enrichment, and the majority of waste rock and harmful additives are allocated to the products called waste. The waste is removed from the beneficiation process and collected at the waste site, and the beneficiation is sent for further processing and use.

The difference in physical and physico-chemical properties of separated minerals is used in enrichment. Table 1 lists the properties of minerals used in beneficiation and the corresponding beneficiation methods.

Methods of beneficiation and properties of minerals

Table 1

Enrichment methods	Properties of minerals
Gravity	Relative weight, density
Flotation	Difference in physical and chemical properties of the surface of mineral particles
Magnet	Ability to magnetize
Electricity	Electrical properties
Manual sorting	Color, gloss, shape, density

The main technological indicators of beneficiation include: the amount of the component in the original ore and beneficiation products, the level of beneficiation, the yield of beneficiation products, and the separation of components into beneficiation products.

The ratio of the amount of the component in the product to the amount of this component in the original ore is called the separation of the useful component in the beneficiation products. It is accepted to express the separation in percentages or unit shares. The separation of the useful component into the enrichment shows how much of this component has passed from the initial product to the enrichment during enrichment.

The amount of the component is the ratio of the weight of the component in the product to the weight of the product. The degree of enrichment achieved as a result of beneficiation is defined as the ratio of the amount of the precious component in the beneficiation to its amount in the original ore. The degree of enrichment indicates how rich the enrichment is compared to the original product. The yield of enrichment products is the ratio of the weight of the product obtained as a result of enrichment to the weight of the initial product. It is accepted to express output in percentages or units. The inverse of output, expressed in unit shares, indicates the number of tons of primary product to obtain one ton of product as a result of enrichment.

In the national economy of our republic, various types of mineral raw materials are used in large quantities. Currently, more than 200 types of mineral raw materials are used for the production of industrial and agricultural products. Natural mineral substances that can be used effectively in the national economy in the current technical and economic conditions are called minerals. They can be used naturally and appropriately processed.



Important minerals are divided into 3 main groups depending on their industrial use: ore, non-ore and fuel. A mineral aggregate that is technologically possible and economically expedient to extract a metal or its compounds is called an ore. For example, iron, manganese, zinc, molybdenum, tungsten, etc. Depending on the quality of mineral raw materials, ores are divided into rich (high grade), ordinary (average quality) and poor (low grade) ores.

According to the material composition, ores are divided into ferrous, non-ferrous, rare, rare and radioactive metal ores. Ores are also divided into monometallic, containing only one metal, and complex polymetallic ores, containing several metals. Polymetallic ores are more common than monometallic ores, and the metals they contain are often of industrial importance. Examples of polymetallic ores include copper and zinc, zinc and lead, molybdenum and tungsten ores.

Each mineral in the ore has a specific chemical composition and unique structure. This provides permanent and individual physical properties of minerals such as color, density, electrical conductivity, magnetism, etc.

References

1. N. Sh. Tulyaganova. Petrography: Textbook. -T.: "Science and technology", 2014
2. A.D. Olimova. Geology. Educational and methodological complex. Shahrizabz - 2021.
3. I.K. Umarova, G.Q. Solijonova. Enrichment and processing of minerals. Textbook. Creative house of publishing and printing named after Cholpon. Tashkent – 2009
4. N. Sh. Tulyaganova. General and historical geology. Textbook. -T.: "Voriz" publishing house – 2014
5. https://www.researchgate.net/publication/340429192_Rudali_foydali_qazilmalarni_boyitish_tehnologiyasi_o'quv_fanidan_amaliy_mashg'ulotlarini_bajarish_uchun_uslubiy_qo'llanma#read.