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Mineral Processing: the Process of Enrichment

Mineral processing is a set of processes of primary processing of mineral raw materials aimed at separation of all valuable minerals from the rock, and also a relative separation of valuable minerals. The importance of mineral processing from the perspective of metallurgical, chemical and other industrial processes are based on the processing of enrichment minerals with useful component - products - concentrates. As a result of mineral processing, there are two main products: concentrate and tails.

Preliminary enrichment of minerals allows to:

- increase of industrial reserves of mineral raw materials at the expense of usage of the poor minerals with low content of useful components;
- increase of productivity of labor in mining enterprises and reduce the cost of extracted ore by mechanization of mining operations and continuous extraction of minerals instead of custom;
- improvement of technical and economic indicators of metallurgical and chemical enterprises in processing of enriched raw materials due to the lower costs of fuel, electricity, fluxes of chemicals, improvement of the quality of finished products and reduce the losses of useful components from waste.

Classification of enrichment processes. Processing of mineral resources at the concentrators includes several steps, which result is achieved by the separation of useful components from impurities. By their purpose the processes of processing of mineral resources is divided into preparatory, main (refineries) and auxiliary (concluding).

Preparatory processes. Preparatory processes are designed to disclosure or discovery of grains of useful components (minerals), whether part of a useful mineral, and dividing into size classes that meet the technological requirements for subsequent enrichment processes. The preparatory processes include the processes of crushing, grinding, screening and classification.

Crushing and grinding. Crushing and grinding process of destruction and reduce the size of the pieces of mineral raw materials (minerals) under the action of external mechanical, thermal, electrical forces, aimed at overcoming the internal forces of cohesion, connecting the particles of a solid body.

The main method of mineral processing encompasses: dry enrichment (in the air); wet (water, heavy environments); in a gravitational field; in the field of centrifugal forces; in a magnetic field; in the electric field, which are distinguished and classified by the type of environment in which produce enrichment.