

DEPHOSPHORATION OF MAGNETIC ENRICHMENT PRODUCTS

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The development of technology for the removal of phosphorus and the production of concentrate conditioned on phosphorus from Lisakovskiy ores by non-metallurgical way is of great practical interest and is relevant not only for Kazakhstan, but also for other countries. It is known that concentrates are subjected to dephosphorization due to the impossibility of a significant reduction of the phosphorus content in concentrates by mechanical treatment. To increase the efficiency of chemical leaching Lisakovskiy gravitational-magnetic concentrate (LGMC) was subjected to thermal treatment, as a result of which recrystallization of iron minerals in Fe_2O_3 and concentration of phosphorus occurred between grains of hematite. In order to study the behavior of phosphorus at the microlevel during the dephosphorization of the magnetic concentrate, electron microscopic studies of the original LGMC, the magnetic fraction of the cinder and the dephosphorated cake on the MIRA 3 electron microscope from TESCAN were carried out.

As a result of studying the microphotographs of the thin sections at 700°C it is possible to establish that the surface of the cinder oolite become more loose in comparison with the initial LGMC oolite due to the structural-phase transformations of hydrogetite \rightarrow hematite \rightarrow magnetite, a sufficient number of micropores and microcracks appear in oolites that allow free passage of the sulfuric acid solution to phosphorus compounds in the form of iron phosphates. Phosphorus passes into the solution in the form of phosphoric acid and phosphates in the process of leaching. The surface of the cake oolites acquires a matte and porous structure.

A comparative local X-ray spectral microanalysis of cake oolites is consistent with the results of chemical analysis, a decrease in the average phosphorus content from 0.91 to 0.25% is observed. As a result of the sulfuric acid leaching of the magnetic concentrate, a dephosphoric cake with a phosphorus content of 0.24%, iron 62.31%, SiO_2 6.63%, and Al_2O_3 4.27%, which is the raw material for iron and phosphorus content, can be obtained. The resulting concentrate is suitable for use in ferrous metallurgy.