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Technogenic raw material in enrichment plant of Zhezkazgan

Baibatsha, A.B.[1], Bekbotayev, A.T.[1], Duysembayeva, K.Sh.[1], Bekbotayeva, A.A.[1]

[1]Kazakh National Research Technical University named after K.I. Satpaev, Almaty city, Kazakhstan, baibatsha48@mail.ru

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Huge reserves of technogenic ores has accumulated in two tailings of Zhezkazgan enrichment plant. They have real prospects for expanding the mineral resource base and can be recycled to produce additional quantities of copper and other metals. The material composition and properties of the tails are completely determined by those of arriving at the factory initial Zhezkazgan ore deposits [1].

During the existence of the tailings it can precede various physical and chemical processes that determine the formation of a real (mineral and chemical) composition of the tailings and their technological properties (beneficiation of ores and metals recoverability). Changes in material composition can lead to a redistribution of useful components as the micro - and nanoscale. Using micro mineralogical techniques, we found the distribution and content of the main (copper, lead, zinc) and related (precious and rare metals) useful components in technogenic mineral raw materials [2, 3].

According to forecasts in the tailings are concentrated more than 1 billion tons of mineral reserves, when the content of the main component of Zhezkazgan ore - copper about 0.3%, and total reserves of the metal may be at least 3.0 million tonnes. In order to clarify and substantiate probable resources we conducted a research work. We have selected a sample of the entire volume of tailings, conducted laboratory chemical and mineralogical studies of samples; micro mineralogical studies of major components Zhezkazgan ores (copper, lead, zinc) contained in these precious (gold and silver) and rare (rhenium and osmium) metals on the micro - and nanoscale, using precision equipment.

A comparison of the descriptions of ores and tailings concentrator shows their similar composition. Among the copper minerals chalcopyrite predominates, the second highest prevalence is covellite, chalcocite rare, bornite, sphalerite, pyrite, arsenopyrite. The grain size of the sulfides is mainly 0.01-0.03 mm. The sulfides are mainly quartz or fused to it. Rarely observed such growths are covellite - bornite, chalcopyrite - covellite and chalcopyrite - bornite. According semi quantitative spectral analysis of three samples taken at the surface

portion of the tailings, found that the copper content of which ranges from 0.07-0.1%; Lead - 0,03-0,07%; Zinc - 0.01-0.03%; silver - 5-25 g / t.

References:

[1] Baibatsha A.B. Mushinsky A., Bekbotayeva A.A., Bekbotayev A.T. (2014) Study of ore minerals of Zhezkazgan copper deposit under electron microscope using EDS method // International scientific-practical conference "Problems and prospects of development of environmental cluster: education-science-production", dedicated to 80-years K.Turysov, Almaty: 152-156.

[2] Satpayev K.I. (1967) Selected works. Zhezkazgan copper ore rayon, Alma-Ata, Science of the Kazakh SSR: 290.

[3] Paul Ramdor.(1962) Ore minerals and ih srastaniya, edited A.G.Betehtin, Moscow, Foreign Literature: 132.