Ore bodies can be isolated only by sampling. Oxidized ore is clayey, ocher-cleyey with relic schistosity. Gold content very varies, average 3.4 g/t with cut-off grade 1.4 g/t and reach more then 1 kg/t [Koshkin et al., 2009]. Au/Ag ratio also varies from 10 to 0.07, usually 1–3.

Goethite is prevailing ore mineral in heavy concentrate of ore independently of matrix. Rutile and semioxidized pyrite and chalcopyrite are occasional. Gold forms free particles with complex morphology up to 2 mm in size as well as micron-size inclusion in pyrite. Impurity of silver (10–20 mas. %) and mercury (up to 3.9 mas.%) is characterized for chemical composition of gold (fig.1). Impurity content is higher in free gold then inclusions.

Light fraction mineral composition depends of matrix. After XRD analysis (Shimadzu XRD-6000, Cu-Kα) it have been obtained that layer silicate part is higher in metavilcanites then metasediments. Oxidized and hydrated chlorite (chlorite-smectite) prevails in metavolcanites (fig. 2). Hydrated mica and kaolinite also presented in minor percentage. Layer silicates sum in this rock type is 60 % and more. Secondary minerals are quartz, albite, relics of actinolite and epidite. In general, metasediments consist of quartz and field spaar. The main layer silicate in chert is sericite and kaolinite. Carbon-bearing shale is enriched by sericite. But chlorite-smectite is in both rock type (fig. 2).

Degree of supergene change of chlorite depends after depth. At the 0–10(12) m chlorite is transformed into vermiculite-like mineral ("chlorite-smectite" with complete destroying of "brucite" layer and its replacing by smectite layer. These features are good identified using thermogravimetric analysis. After 10–12 m in depth the relics of chlorite structure became preserved. After 20 m chlorite are not changed practically.

These features of the mineral composition of oxidized ores are the base for planning of hydrometallurgical processing of Ikryanskoye deposit.

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MINERALOGY OF THE OXIDIZED ORES FROM THE VERKHNYAYA ARSHA Pb-Zn DEPOSIT, SOUTH URALS

В работе представлены первые данные о минералах бурых железняков и полуокисленных руд стратиформного Верхне-Аршинского Pb-Zn месторождения. Набор минеральных видов схож с Амурским Zn-месторождением, представлен золотом, галогенидами серебра, галенитом, минералами семейства алунита и другими.

The Verkhnyaya Arsha deposit is located 1.5 km to north from the village of Verkhnyaya Arsha in the Republic of Bashkortostan. It belongs to the West Urals metallogenic zone and is hosted in the Riphean dolomites. The deposit was exploited before 1958. The ores include sulfide (Fe and Pb-Zn), semioxidized and oxidized types. The major minerals of the sulfide ores are pyrite, galena, and sphalerite [Rotar et al., 1976]. Anglesite, cerussite, jarosite, and Pb-jarosite were identified in the oxidized ores in addition to Fe-hydroxides [Shumikhin et al., 1956]. The technogene supergene mineralisation was previously described [Blinov et al., 2011].

The oxidized ores (or brown ore) are characterized by heterogeneous chemical composition and contain up to 0.7 % Zn and Pb and up to 0.3–1.5 % Ag in some samples. The brown ore with high amount of sulfides represent semioxidized ore with the higher Zn and Pb contents.

The objective of the abstract is a characteristic of supergene minerals in the oxidized and semioxidized ores from the Verkhnyaya Arsha deposit.

Native metals

Native *gold* was revealed in the massive geode part and in the brown ore with a box structure. Gold contains up to 2 wt % Cu and 0.2 wt % Ag. Some grains of the pure gold contain less than 0.1 wt % of admixtures.

One grain of native *zinc* 10 ?m in size was found in the brown ore at the contact of Fe-hydroxides and quartz. The ED-spectrum is characterized by Fe and Al peaks.

Sulfides

Acanthite in the brown ore forms aggregates 3–5 ?m in size, intergrowing with iodargyrite. In the semioxidized ores, acanthite grains up to 7 ?m in size were found as thin veinlets and rims around pyrite.

The supergene chemically pure *galena* in the brown ore occurs as grains up to 15 ?m in size in Fe-hydroxides. In semioxidized polymetallic ores, galena forms cubic and occasionally case-like crystals 30 ?m in size, microdruses, rare framboids or rims around pyrite or Fe-hydroxides. The primary and supergene galena in semioxidized polymetallic ores contains admixture of silver. In semioxidized pyrite ores, supergene galena forms crystals, microveins 10–20 ?m thick or rims around pyrite crystals. Some grains are also characterized by admixture of silver.

Oxides and hydroxides

Fe-hydroxides are widespread minerals of the brown ore and occur as massive, radial, box-like or gel-like aggregates. Fe-hydroxides are characterized by Zn content up to 1.4 wt %, which is mostly typical of box-like aggregates. Based on the correlation analysis of 35 SEM analyses of Fe-hydroxides, zinc has positive correlation with lead (0.7) and negative, with sulfur (–0.8). In semioxidized polymetallic ores, Fe-hydroxides form pseudomorphoses after sulfides or rims around them. The concentration of admixtures is as follows (wt %): Zn 3, S 5, SiO_2 4, Al_2O_3 0.5. In semioxidized pyrite ores, Fe-hydroxides contain 0.2–2 wt % Zn and traces of S, Si, Al.

Sulfates

The *jarosite group* minerals were previously described by Zhumikhin et al. (1958). We have found several grains of Ba-bearing mineral similar to Pb-jarosite in the brown ore.

Ag-bearing *anglesite* in semioxidized polymetallic ores forms the low-thick crusts.

Halogenides

Iodargyrite in the brown ore forms the crystals 20–30 ?m in size in geodes. Iodargyrite was also found in thin acanthite microveins in the semioxidized ores.

Conclusions

Thus, native zinc and gold, acanthite, iodargyrite and supergene galena were found for the first time in the oxidation zone of the Verkhnyaya Arsha deposit. The joint occurrence of native zinc, supergene galena and Fe-hydroxides indicates the repeatedly varieted conditions during formation of the oxidation zone at the deposit.

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