European Journal of Innovation in Nonformal Education (EJINE)
Volume 4 | Issue 1 | Jan-2024 ISSN: 2795-8612

Petrological-Geochemical Characteristics of the Mine-Covering Rocks in the Deep Horizons of the "Ortaliq" Mine Plot (Zarmitan Mine Area)

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A B S T R A C T
Minerals play an important role in the state economy. Taking this into account, today's article describes the ore-bearing rocks in the deep horizons of the middle section, their petrological and geochemical characteristics, on the example of the Zarmitan mine.

A R T I C L E I N F O
Article history:
Received 05 December 2024
Received in revised form
29 December 2024
Accepted 27 January 2024

Keywords: animation, Zarmitan, Nurota Mountains, Koshrabot intrusion, Shlif, 4th GMZ, Gold quartz veins

INTRODUCTION

Planned geological research and prospecting in the Zarmitan mining area began in the 1930s. In 1930-1933, geological mapping works with a scale of 1:500,000 were carried out in the entire Northern Nurota Range. As a result of these works, information was obtained about the geological structure of the area and the prospect of mineral deposits. In 1947-1952 N.A. Under the leadership of Losev, a 1:200,000 scale map of the Northern Nurota Ridge will be created. Based on the obtained results, it is recommended to search for gold and scheelite in the southern contact zone of the Koshrabot intrusion. In 1952, I.H. Based on the study of the Koshrabot intrusive massif, Khamraboev distinguishes a new gold-arsenopyrite formation for the Nurota Mountains. This formation is characterized by the high content of gold in ores in the endocontact and exocontact zones of the Koshrabot granitoid intrusion. As a result of these studies, the Charmiton (later called Zarmitan) gold mine was discovered. In 1980-1984, the Northern Nurota field mapping party carried out aerogeological surveys on a scale of 1:50,000 in Northern Nurota and its adjacent areas, and a geological map of the area on this scale. rock samples were taken, and their results are of particular importance, which will serve as a basis for future work in this direction. The practical significance of the results of the research was prepared in the area of 3 pieces of sandpaper and 4 pieces of anshlifi. Descriptions of results obtained as a result of laboratory analyzes of core materials were obtained. The results of these works will be of practical importance in prospecting in the Ortaliq section of the Zarmitan mining area. The average area of Zarmitan mines is about 8 km². The Zarmitan gold deposit is located in the southeastern part of the Koshrabot intrusion in large-grained granosyenite

aureoles and organic-rich metamorphosed volcanogenic-terrigenous Silurian quartz veins between the Jazbulok suite. The Zarmitan mining area was deposited due to highly active tectonic movements - it is rich in tectonic cracks and fissures formed by the crushing of metamorphic and intrusive rocks. Currently, more than 50 boreholes have been drilled in Zarmitan's mineralized zones. Based on the received evidence, the mine reserve was determined and the prospect was determined. Since 2010, the 4th GMZ of gold extraction of NKMK has been built at the entrance to the Zarmitan fortress, and now gold is extracted from the mines here.

Main part: Stages of mineral formation and mineral composition of minerals

The stages of hypogene mineral formation were developed on the basis of field observations and laboratory studies of rocks and minerals, taking into account the available data (Hamroyev, 2000). The following stages of hypogene mineral formation are distinguished in the sequence from morning to evening:

Stages of hydrothermal metasomatic alteration of rocks:

1. Pre-mining field berezitization.

2. Syn-ore berezitization and gumbeitization.

Stages of hydrothermal mineral filling of cracks:

3. Gold-quartz veins.

4. Gold-pyrite-arsenopyrite-quartz vein-vein, vein, scattered-vein.

5. Pyrite-carbonate-chlorite explosive-hydrothermal mineral breccias filling branched cracks, vein-like bodies.

6. Gold-polysulfide-sulfosalt-(carbonate)-quartz veins, veins.

7. Pyrite-melnikovite-chlorite and quartz-carbonate veins.

In the mine, pre-mining berezitization of granosyenites is widely manifested, and according to the nature of the new features, it corresponds to the outer zone of beresites. The gold-pyrite-arsenopyrite-quartz stage veins are everywhere accompanied by berezitization of the granosyenites of the intermediate and inner zones of the metasomatic column. Gumbeitization of granosyenites is accompanied by the formation of quartz bodies with gold-sulphide mineralization and develops directly in the contact area of quartz veins and veinlets.

Veins of the gold-quartz stage and accompanying veins are distributed throughout the mineralized structures of the Gujumsoy deposit in the northwestern part of the mine (ore body 59-660C), they are connected cracks in zones up to 1-2 m wide. is a system. "Gujimsoy" type mineralization takes place with metasomatic alteration of granosyenites of gumbeite formation. 164 point samples were taken, forming a database for statistical processing of mineralogical and petrographic sections, detailed observation and inspection points of gold ore bodies. Processing of the database was carried out on the basis of the following statistical methods: 1) primary statistical processing (minimum and maximum values, average, trimmed average variance, coefficient of variation, standard deviation, asymmetric, coefficient of excess); 2) calculation of pair correlation coefficients; 3) factor analysis based on the method of principal components. The ore geochemistry of Ortalik mine is characterized by the following features:

- the distribution of the composition of all studied chemical elements is polymodal, but the area of accumulation is the main representative for the group of ore-forming elements - Au, As, Ag, W, Bi, Pb, Sb;

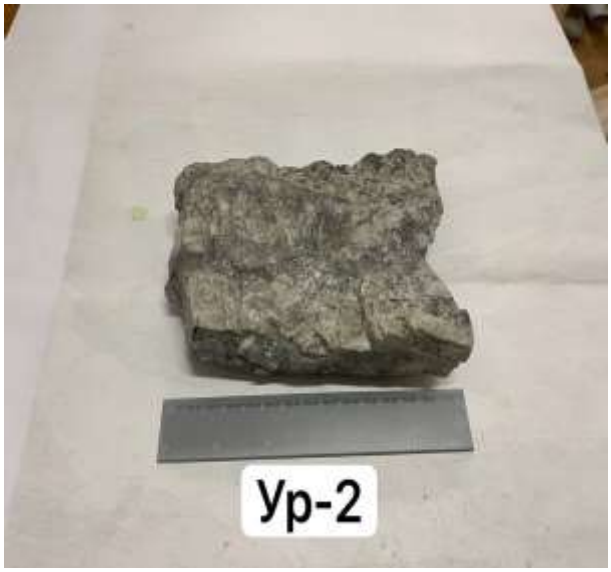
- the geochemical spectrum of accumulation in ore bodies is represented by Au, Ag, Pb, Bi, Sb, W, As, Zn;

- according to the results of correlation and factor analysis, two groups of chemical elements were identified: I - ore - gold-bearing quartz veins, Au, As, Ag, W, Bi, Pb, Sb, Zn vein-vascular zones and II - metasomatic (coherent) near-ore metasomatically altered granosyenites Mn, Ni, Ni, Cr, V, Ti, which are made from inner zones of near-ore metasomatites with gold-bearing widespread-vein mineralization.

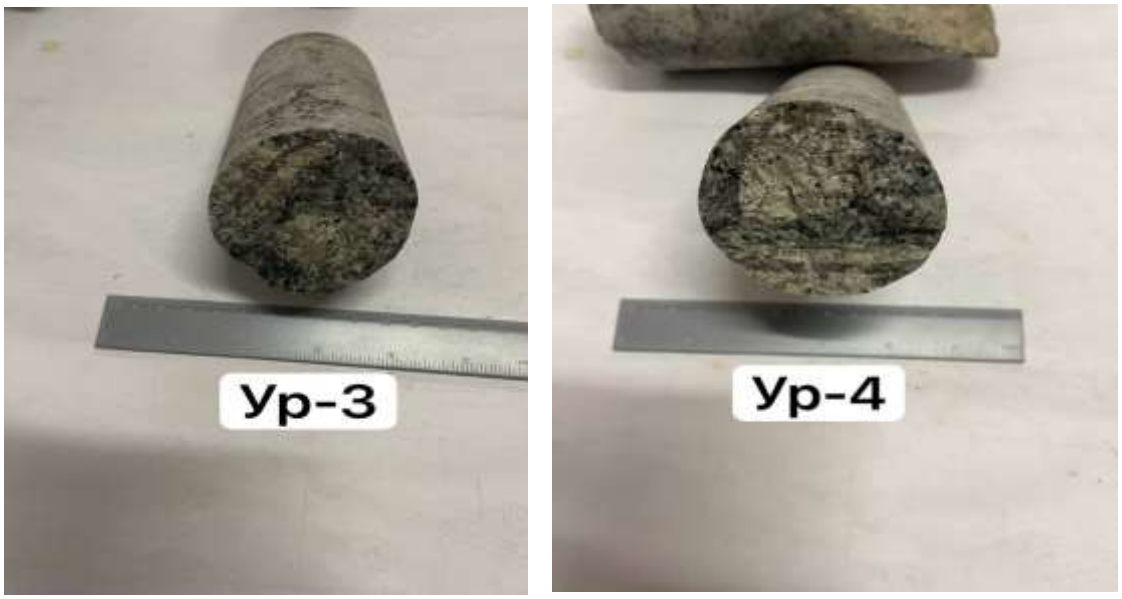
- the statistical analysis of the average composition of the components associated with gold deposits shows an increase in their concentration from weakly mineralized metasomatites to areas with intensively distributed veins, mainly gold-pyrite-arsenopyrite-quartz mineralization, which are all ma in the natural species of grains, it has a non-homogeneous and bright distribution;

- geochemical fields of gold and silver have a non-homogeneous structure, silver basins are located around gold anomalies of high intensity. Variations in the average composition of associated associated components by gold-retaining class show that their concentration increased from weakly mineralized metasomatites to areas of intense gold-pyrite-arsenopyrite-quartz mineralization. A high concentration of silver is not typical for the mine, even in rich ores its average amount is below 10 g/t. Mineralogical and petrographic studies have shown that the formation of gold mineralization is multi-stage, and rich ores, as a rule, are formed from mineral associations containing several gold, while they are associated with the concentration of the ore-forming elements has increased, which is clearly shown in the diagram. The database was processed using the Surfer-8 program, the kraiging processing method; grid 10x10, processing radius 20x100, anisotropy ellipsoid angle 20oC. The geochemical field of gold is non-homogeneous and has a mosaic structure. Halos of high-intensity (0.1-1 g/t) gold form two deposits, in which intervals with gold content of more than 1 g/t are locally developed. It is worth noting the methodological nature of the processing - the random sampling network is converted into regular data by calculating the average content of quantitative data in a 10x10 m grid. In this case, individual high gold reservoirs appear "disappeared" and displaced by the processing method, but create a growing geochemical background that defines the area that defines the location of the ore.

We processed a large amount of digital data in the Chormitan field, which is an analogue of the Ortalik mine. In general, 3,224 exploration plots (45 calculation blocks) for 14 ore bodies were involved in mine calculations. The mine is in operation, the estimated blocks of these mineral deposits have been mined, and therefore the exploration network in them has increased significantly compared to the exploration stage. Statistical indicators of variability similar to those described for the Middle Mine were determined to determine distribution type, complexity group, as well as correlations between thickness and gold (silver) reserves, gold and silver reserves.



It can be seen from the obtained data that the coefficients of variation for almost all blocks and ore rocks are higher than 150, which indicates that the mine belongs to group III of complexity, and the distribution of gold reserves obeys the log-normal law.



Samples taken from a borehole in the Ortalik mine

The relationship between thickness and content retention is inverse (that is, as thickness increases, content decreases and vice versa; secondly, this relationship is weak, since the value of correlation coefficients r is less than 0.5). As for the correlation between gold and silver, there are stable direct correlations in most samples.

CONCLUSION

Petrological-geochemical samples taken from ore-bearing rocks in the deep horizons of Ortaliq section of Zarmitan mining area and core samples taken from drill wells were analyzed. As a result of the analysis, petrological-geochemical samples taken from the ore-bearing rocks in the pit horizons and core samples taken from the drill wells were studied and statistically evaluated. In the master's thesis, the conditions such as the petrologic-geochemical composition of the existing gold mineral deposits in the area and the degree of connection of other prospective objects with geological structures were highlighted. According to this, the petrologic-geochemical properties were studied based on the description of the core samples taken from the deep horizons of Ortaliq section of the Zarmitan ore field and showed qualitative results. The Zarmitan mining area shows high levels of gold and silver in the slags and slags from the samples taken from the ore-bearing rocks in the deep horizons of the Ortaliq section. Based on the resulting analysis, mineralization of the mineralogical composition of the rocks in the Ortaliq section under favorable geological conditions for a long time was determined. Petrological-geochemical properties were studied based on the description of the core samples taken from the ore-bearing rocks in the deep horizons of the Ortaliq section through drill wells. The mineralogical composition of the rocks and the prospect level of the mine were determined through the samples taken from the rocks surrounding the mine. As a result of the statistical description of gold mineralization indicators through rock samples, it is possible to observe that the mine enters the type of productive industrial-scale mines.

As a result of the Zarmitan Field Geological Exploration Expedition, many new mineral zones were discovered in the following years, in particular, the large number of original gold deposits such as the Ortalik mine, the presence of alluvial deposits in the quaternary prolluvial deposits are of great importance to confirm this realistic perspective. can come to an idea. According to the theoretical significance of the research results, the results of taking samples from the ore-bearing rocks in the deep horizons of the Ortaliq section of the promising Zarmitan ore field are of particular importance, which will serve as a basis for future work in this direction.

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