Academicus Journal of Research
ISSN (E): 3054-3371
Volume 1, Issue 5, May, 2026
Website: https://researchiapress.com

STATUS OF THE GOLD-ORNE LOCATION AREA AT THE KYZYLALMASSAY DEPOSIT

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ABSTRACT

This article investigates the occurrence conditions, geological structure, and material composition of gold ores in the Northwestern sector of the Kyzylalmasay deposit. A total of 1500 kg of technological samples were prepared from core materials obtained from 23 drill holes. Comprehensive chemical, spectral, optical-emission, fire assay, granulometric, and mineralogical analyses were conducted. The ores mainly consist of quartz, pyrite, chalcopyrite, and secondary silicification products. The main objective of the study was to determine the material composition of the ore and to justify optimal processing technologies for gold-bearing raw materials. The results provide a scientific basis for selecting efficient beneficiation and gold extraction methods.

Keywords: Deposit, gold ore, mineral composition, quartz, pyrite, chalcopyrite, gold-sulfide-quartz type, technological sample, gold processing.

Introduction

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ISSN (E): 3054-3371
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АННОТАЦИЯ:
В статье рассмотрены условия залегания, геологическое строение и вещественный состав золотых руд Северо-Западного участка месторождения Кызылалмасай. Для исследования были использованы технологические пробы общей массой 1500 кг, сформированные из кернов 23 буровых скважин. Проведены химические, спектральные, оптико-эмиссионные, пробирные, гранулометрические и минералогические анализы. Установлено, что руды представлены преимущественно кварцем, пиритом, халькопиритом и продуктами вторичного окварцевания. Цель исследования — изучение вещественного состава руд и обоснование оптимальной технологии переработки золотоносного сырья. Полученные результаты имеют практическое значение при выборе рациональной схемы обогащения и извлечения золота.

КЛЮЧЕВЫЕ СЛОВА: месторождение, золотая руда, минеральный состав, кварц, пирит, халькопирит, золото-сульфидно-кварцевый тип, технологическая проба, переработка золота.

Technological samples from the North-Western region of the Kyzylalmasay ore field were presented for research. The technological samples consisted of 23 core samples from the North-Western region, the core samples were taken from the following numbered drilling wells: 1316, 1338, 1328, 1343, 1341, 1339, 1345,1383, P.T1. skv1315, P.T1a. skv1351, P.T3. skv1374, P.T3a. The total weight of the technological samples is 1500 kg.
The material composition of the obtained samples consists of quartz, pyrite, chalcopyrite, and altered silicification.

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The purpose of these studies is to study the material composition of the ore, to study the optimal technology for processing gold-bearing ores.

During the study, the analysis of gold and silver was carried out in the chemical laboratory of the State Institution "MRI."

About 600 deposits, ore occurrences, and gold mineralization points are known in Uzbekistan. 144 objects are registered in the cadastre of the State Geological Fund of the Republic of Uzbekistan. A total of 12 gold deposits are in operation, 15 have been identified, and 16 are being identified. The most significant are the following deposits, which are located in three geological and economic zones. In the Kyzylkum (Kokpatas, Muruntau, Balpantau, Amantaytau, Daugiztau, Adjubugut, Turbay, Altyntau, Aitim, etc.).

In Tashkent (Kuchbulak, Kayragash, Kyzylalmasay, Aktupyrak, Kauldy, Pirmirab, Gozaksay, Sartobutkan, and others).

The gold ore occurrences of the republic are concentrated mainly in three metallogenic zones. Kurama, Zarafshan-Turkestan and South Bukantau, to a lesser extent in the Turkestan-Alay and Zarafshan-Alay and North Bukantau zones.

In 1976, V.G. Garnovets, V.V. Martinov, R.V. Tsoy, and others, in their monograph "Mineral Resources of Uzbekistan," gave a brief description of the four gold ore formations of Uzbekistan:

1. Gold-quartz, low-sulfide.
2. Gold-arsenopyrite.
3. Gold-chalcopyrite.
4.Gold-silver.

Here, the intertwining of individual elements in modern classification is clearly visible: three main gold geological-industrial types (GIS) of endogenous mineralization have been identified: gold-quartz, gold-sulfide-quartz with 12 varieties, and 2 complexes: gold-silver and gold-copper-porphyry. The next two are described in GST silver and copper.

Gold-quartz GST includes low-concentration and low-sulfide deposits. The sum of sulfide minerals ranges from 1% to 3% in pure gold ores, localized in quartz, and partially unevenly distributed in sulfides. Three related species have been isolated from the gold-quartz type.

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1. Muruntau's lies in coal-bearing oleurites, sandstones, and schists, respectively, intersecting rocks of various shapes with bodies of hard rocks.
2. Zarmitan's lies in the inner crust of the earth's post with circular veins in the zone of exo- and endo-generalization, with layered rocks parallel to stockberk zones (rocks of various shapes).
3. Pirmirob (Pirmirob, Guzaksoy) lies in volcanic rocks and granitoids. Ore bodies - morphologically complex veins, vein zones, in some cases wedge-shaped bodies and ore columns.

Gold-sulfide-quartz GST includes deposits with sulfides (pyrite, chalcopyrite, dark ores, galena, sphalerite), lead, copper, silver, including sulfo salts, tellurides of gold, silver, bismuth, and other ore minerals, ranging from 6% to 13% (often from 10% to 15%). In the ores, pure gold is associated with sulfides, tellurium, and sulfo salts. Based on the above-mentioned characteristics, six genera were identified from the gold-sulfide-quartz species.

1. Kyzylalmasay (Kyzylalmasay, Aktupyrak) is often found in granitoids with quartz glass dikes, quartz-diorite glasses, diabase glasses, inter-formation deposits, mineralized and vein zones in andesatoid volcanoes.
2. Kuchbulak (Kuchbulak, Kauldy, Kairagash) - exclusive (volcanic rocks) consisting of tubular rotating basins, belonging to mineralized zones in the intervals of inter-breccia and inter-formation stratification and between faults.
3. Stepped quartz veins, mineralized along Balpantau faults and zones, lie in sheet-like volcanogenic-sedimentary rocks.
4. Marjanbulak occurs in carbonic siltstones, sandstones, shales, and gravels in various columnar and mushroom-shaped forms with plate-belt circular ore bodies.
5. Sarmich (Sarmich, Biran) lies in carbonaceous quartz, micaceous-soil schists, and other rocks with vein mineralized zones.
6. The Bulutkan (Bulutkan, Robinjon, Barkhanli) mineralized zones and the Sautbay complex lie in the syenite-diorite junction in limestones, dolomites, and jasperoids as skarn deposits (metasomatic formation of dolomite and limestone magmas with the formation of calcareous magnesites and iron).

Gold-sulfide GST includes deposits with the main role in their composition: pyrite, arsenopyrite, less often chalcopyrite, antimonite, and other sulfides, the content of which makes up more than 25% of the ore composition.

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From veins - sometimes quartz and carbonates. Primary gold is associated with sulfides, i.e., "resistant" gold. This type of oxidized ore has a high content of pure gold and purity. Based on the above characteristics, the described species is divided into three genera:

1. Kokpatas deposits and lenticular accumulations with expansion and compression, mainly with inclined, and sometimes with rotational bedding, lie in the flexural (structure of elbow bending of monoclinal rocks) parts of the strata and sandstones, in the crushing zone in siltstones and schists.
2. Dougiztau, with mineralized zones, lies in carbonaceous sandstones, siltstones, and schists of the Besapan Suite (the main rocks of the Besaman area) with stage-like deposits.
3. Amantaytau with ore zones and pyrite deposits lies in the carbon-terrigenous rocks of the Upper Besapan Formation. The ore body intersects the mineralized zones with intermittent vein mineralization. Encompassing rocks - quartz, feldspar, carbon-quartz-mica schists, feldspars, quartz sandstones, oleuroliths, subjected to metasomatism (substitution of rocks with solutions), propylitization (metasomatic alteration of rocks under the influence of sulfur-rich solutions) and berysitization (rocks formed as a result of the influence of granite rocks on hydrothermal solutions).

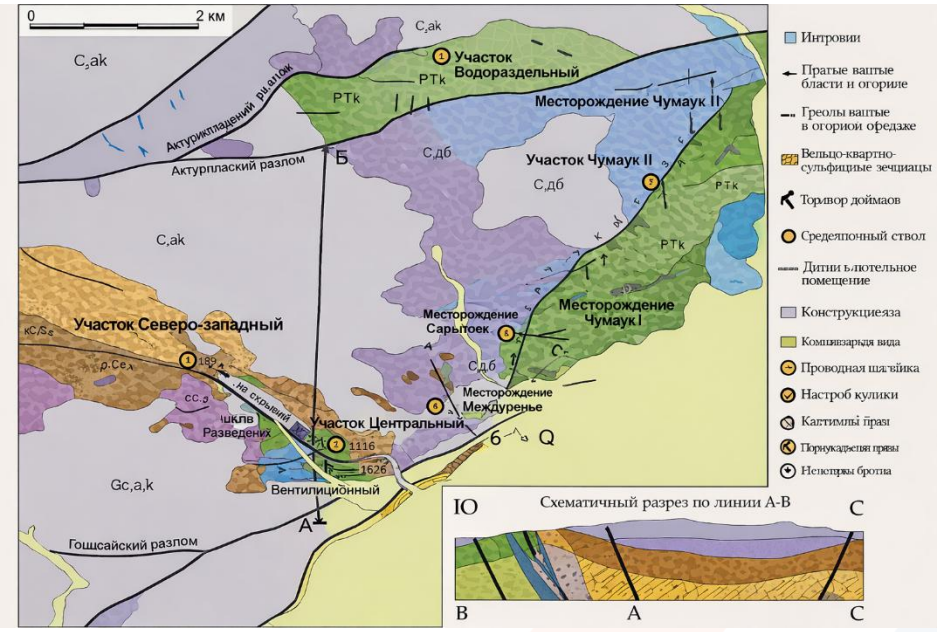

Figure 1. Schematic geological map of the Kyzylalmasay ore field.

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Mineralogical and petrographic reference materials were used in the description of minerals (Betextin 1954, Ramdor 1962, Lodochnikov 1974, Ukloniski 1940, Mineralogical Reference Guide, etc.).

The northwestern boundary of the Kyzylalmasay ore field, located in the Kyzylalmasay ore field, belonging to a tectonic block bounded by the Goshsay faults from the south and the Aktoprak faults from the north, is marked by the Karabau River. The Northwestern region, along with the central Samarchuk, Chumauk-1, and Chumauk-2, is considered one of the industrial zones. They are located in the fragmentation bends of these structures and form a practically continuous ore zone.

Within the region, volcanites of the Akchi complex, lying in Caledonian and Hercynian granitoids, are developed. Granitoid rocks are represented by the Bashkyzylsay granitoid intrusions (S1-2) and the Karamazar granite-adamellite complex. In the deposit area, two-mica granites with a difference in average grain size are more developed.

Within the area, volcanoes of the Achin complex, located in the Caledonian and Hercynian granitoids, developed. Granitoid rocks are represented by the Bashkyzylsay granitoid intrusions (C1-2) and the Karamazar granite-adamellite complex (C2).

Two-lobed granites, represented by a medium-sized difference, are widespread in the deposit area. The rocks are metamorphosed to varying degrees; biotite in them is partially replaced by muscovite. When approaching the mineralized zone, the degree of metamorphism increases, which is characterized by the appearance of a cataclastic structure and a weak subparallel orientation of rock-forming minerals. Rocks near the mineralized zone undergo stratification into gneiss.

Intrusive formations of the Karamazar quartz-monzonite-granodiorite complex are represented by granodiorites and quartz porphyries, syenite-diorite and quartz-diorite porphyries.

When studying the material composition of the ore sample of the Northwestern region of the Kyzylalmasay ore field, complete chemical, spectral, optical-emission spectral, test, rational, granulometric, physical-mechanical, and mineralogical analyses of the sample were carried out. These analyses allow monitoring the overall process through a number of indicators, such as the amount

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of useful and harmful components in the samples, the quality of the separated products, and the reactivity of the reactants introduced into the process.

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