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STRUCTURE AND COMPOSITION OF THE TUNGSTEN MINERALIZATION KARATYUBINSKY DEPOSIT

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ABSTRACT:

The article describes the features of the geological structure of Karatube ore field, as well as rock, forming as a result of various types of metamorphism. The characteristics of the three wolfram ores. When searching for a revolutions prospects for tungsten, the area may become the main origin for developing the economy of Uzbekistan.

INTRODUCTION:

A feature of the geological structure of the Karatyubinsky ore field is the presence of two structural tiers, with the occurrence in the autochthon of the Middle-Upper Carboniferous terrigenous-olistostromic formations of the Marguzor Formation, and in the Allochthon (probably in the form of remnants of the regional nest) - carbonate rocks of the Madmon Formation and siliceous - the Akbasai suite.

As a result of regional, contact and dynamometamorphism, the primary sedimentary rocks (thin-bedded silty mudstones and mudstones, quartz-micaceous siltstones, polymictic and quartz-micaceous fine-coarse-grained sandstones) transformed into a variety of shales, and when approaching the contact zones Sarykulskiy and Karatyubinskiy intrusions emerging local areas of hornfels. The basis of metamorphic shales is feldspar-quartz-mica (biotite, muscovite, sericite, chlorite) and amphibole, and hornfels - biotite, cordierite, andalusite and sillimanite.

Various combinations of newly formed, in the process of integral metamorphism, minerals lead to the formation of two groups of metamorphic rocks with conditional boundaries: micaceous schists, containing feldspars in their basis - 20-50%, quartz - 15-60%, biotite - 5-25%, muscovite - 10-15%, sericite - 5-10%, chlorite - 5-10%, amphibole - 5-11%, and unevenly distributed graphite - 3-10% and tourmaline - 0.1-10%; as well as amphibole schists with amphibole - 30-55%, feldspars - 20-40%, quartz -2-20%, biotite - 2-10%, with insignificant amounts of chlorite and calcite.

The first group includes mica-quartz-feldspar, tourmaline-mica feldspar-quartz, amphibole-mica-quartz-feldspar-quartz, amphibole-mica-quartz-feldspar, chlorite-feldspar-quartz, graphite-biotite-feldspar, biotite-amphibole-feldspar varieties, and the second - biotite-feldspar-amphibole, amphibole-feldspar and pyroxene-amphibole-quartz feldspar shales. In general, both groups are dominated by parallel shale textures and lepidoblastic, granolepidoblastic, granoblastic and porphyroblastic structures.

The rocks are fine-crystalline, with a grain size of rock-forming minerals of 0.1-1.5 mm, more often 0.5-1.2mm [2] All identified shale varieties irregularly alternate with each other in within the metamorphic strata.

The Sarykul site is located in the northern exocontact zone of the Sarykul intrusive; Anjirlinskaya area - in the zone of the western exocontact of Karatyubinsky intrusion. The intrusions of the area are potentially tungsten-bearing (tungsten predominantly of magmatic origin, which was mainly concentrated in rocks of late phases of intrusion - granodiorite and granite formations). Distribution tungsten on intrusive formations: diorite - 1 10-5 - 2.1 10-4%, granodiorite - in average 3 10-3%; granite and alaskite formations - respectively, up to - 1 10-2 - 2.5 10-2% (52).

High tungsten content of rocks of granodiorite and granite formations due to the presence of the element as in the magma itself until it reaches the level of formation and contamination by rocks of the sedimentary-metamorphic complex, and (to a lesser extent) borrowing tungsten from host rocks.

The uneven content of tungsten in various types of granitoids is due to its unequal distribution in rock-forming minerals, their quantitative ratios in rocks and uneven distribution of accessory scheelite. When comparing the tungsten content of minerals, it is established that the main tungsten concentrating minerals are plagioclase and biotite. Quantity tungsten per gram. rocks - in plagioclase - 2.2 · 10-3%, in biotite - 1.4 · 10-3% (51.52). In addition to tungsten, the geochemical specialization of granitoids is expressed in superclark contents of tin, beryllium and boron. [one]

The western part of the Karatyubinsky mountains has a distinct rare metal metallogenic specialization (W, Sn, Be, Mo). In mineralized zones spatially separated from rare-metal positions, in high concentrations revealed V, Ni, Au.

The leading metal in the rare metal association is tungsten, which forms industrially significant ore bodies at the Karatyube deposit. Mineralization of this object belongs to the skarn-scheelite formation. Ore-bearing skarns on the Karatyube deposit is traced by a curving strip in the exocontact zone Sarykul intrusion, developed along carbonate interlayers in the shales of the Marguzor Formation and are confined to interstratal delamination. The morphology of skarn-ore bodies is diverse. Most often (about 90%) there are interstratal bodies of sheet-like and lenticular forms. Much less often (about 9% of the total amount of skarn-ore bodies) are found contact bodies common in the eastern part of the deposit. Their parameters inferior to stratus and lenticular interstratal bodies. Even more rarely (about 1%) there are cutting bodies. Their shape is vein-like, the parameters are insignificant.

V.D. Otroshchenko identifies three types of tungsten mineralization for the Karatyube deposit: simultaneous, concomitant and lagging. Simultaneous - characterized by the synchronous deposition of scheelite with fine-grained pyroxene (uniform distribution of the finest dissemination scheelite among equally fine-grained pyroxene; their close accretions; corrosion phenomena scheelite with garnet, albite and quartz). Companion type by time of formation corresponds to the late manifestations of metasomatism of the early alkaline stage of skarn process and the beginning of the acid leaching stage. A new type of tungsten mineralization revealed at the Sarykul site, formed in an aluminosilicate environment and localized in multicomponent metasomatites of biotite-feldspar-quartz and sericite-chlorite-feldspar-quartz composition. This allows a new approach to assessing the prospects for the Karatyubinsky ore fields that, after preliminary reconnaissance in the West the Karatyube deposits were considered insignificant.

The revealed tungsten mineralization at the Sarykul site is confined to the nodal positions of intersection of longitudinal (northwest) and transverse (northeast) structures. This makes it possible to evaluate in a different way the role of zones of increased permeability in the north eastern direction, confined to belonging transversely to the Tien Shan deep rift. In the formation of ore-bearing metasomatites and mineralized zones, and, in general, in determining the configuration of the Karatyubinsky ore cluster, which can combine a series of ore fields controlled by the intersection of trough structures with olistostrome filling by zones of northeastern dislocations. With this approach, the Jamsky, Karatyubinsky and separated into independent - Atkamarsky and Anjirlinsky ore fields.

The mineralogical potential of the Karatyubinsk ore field is estimated at 75 thousand tons. WO3. When identifying tungsten-bearing apoaluminosilicate metasomatites in the rest parts of a potential ore cluster, the region of the western part of the Karatyubinsky mountains may become in currently the main source of tungsten for the growing economy Uzbekistan [1]

In fine-grained pyroxene skarns, intense uralitization and replacement of albite - quartz - amphibole metasomatites of the beginning of the acid phase leaching. Scheelite is also formed simultaneously with quartz-albite-hornblende veins cutting through pyroxene skarns. The intersection of the indicated associations of later sulfide-scheelite, quartz-sulfide-scheelite and quartz-carbonate-scheelite formations of the lagging type. Together with quartz -feldspar metasomatites, these mineral associations develop in the most disturbed areas of skarn in the stage of acid leaching and spatially confined to the zones of crushing and fracturing of both skarns and enclosing rocks. Products from the later stages of the acid leach stage can be separated in time and space from the skarn very significantly.

The richest and largest accumulations of tungsten occur where superposition of two and three last paragenic complexes of minerals. Moreover, according to M.S. Kuchukova, the amphibole - quartz - scheelite stage is of decisive importance. mineral - education. Distribution of mineralization in all structural and morphological types of skarns uneven (with a coefficient of variation of the thickness of skarn-ore bodies of 89%, coefficient of variation of WO3 contents 150%). Scheelite grain size varies from fractions of mm up to the first cm, sometimes reaching 5 cm in diameter.

Typomorphic elements of tungsten mineralization at the Karatyube deposit are tungsten, tin, beryllium and molybdenum, which form endogenous geochemical halos, tens of times wider than the thickness of the skarn-ore bodies. Halos have a ribbon-like shape conformal to the morphology of skarn-ore bodies. In the northeastern part of the Karatyubinsky ore field at the Sarykul site revealed increased contents of vanadium, confined to the tectonic zone developed in allochthonous part of the regional thrust fault and represented by a series of breccia zones and mylonitization manifested in a member of interbedded siliceous and carbonate rocks. Siliceous schists predominate in the southeastern part of the zone; western - the ratio of siliceous shale and limestone is approximately equal. In the zone mineralization, siliceous rocks are transformed into microquartzites with fine-veined and metasomatic silicification, with abundant chlorite and sericite along the planes schistosis, and metasomatic limestones are silicified to form jasperoids.

According to chemical analysis, the content of V2O5 is 0.11-0.27% [2] The presence of rare-metal mineralization in the work area is presumably different ore-formational nature predetermines the possibility of detecting telescopic mineralization in favorable lithological-structural settings. Prospecting and exploration work at almost all stages of study. The Karatyubinsky ore field was accompanied by case studies. Special Kuchukova M.S., Dautov A.I. contributed to the study of skarn-scheelite mineralization and Otroshchenko V.D., whose works made it possible to study in detail mineralogy and material composition of ores and wall rocks of the Karatyubinsk skarn-scheelite mineralization and develop regional and local criteria for assessing tungsten ore occurrences throughout Karatyubinsky perspective zone. Kuchukova M.S. Karatyubinsky field attributed to the skarn-skarnoid type, which is the first attempt to expand the spectrum tungsten-bearing rocks. Dautov A.I. metaterrigenous rocks have been studied in detail, containing skarn-ore bodies and their enrichment with tungsten (in micaceous feldspar - quartz schists with an average scheelite content of 832 g / t; in mica-quartz- feldspar schists with scheelite amphibole 566 g / t, pyrite 3.4 kg / g; in quartz slates scheelite 462 g / t) [3] Otroshchenko V.D. in the study of geochemical halos of the Karatyube deposit the equivalent intensity of the halos of tungsten and molybdenum, contouring both skarn zones and zones of hydrothermal alteration in the host aluminosilicate rocks. However, the facts of the accumulation of tungsten in metaterrigenous rocks remained without due attention and further exploration work was aimed at studying scanning zones.

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