Study on Geological Characteristics and Metallogenic Model in the West of Junggar

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Keywords: Geological Characteristics, Metallogenic Model, Zhungeer, Control Charts, Process Capability

Abstract. The western Junggar area is the main gold producing area in northern Xinjiang. Therefore, it is possible to explore the prospecting mechanism of the geological ore in the west Junggar area by exploring the geological mineralization mechanism of the west Junggar area, looking for the source of ore-forming fluid and the mechanism of fluid evolution effect. Among them, the geological mine controlled by the Dalabute fault, 30 km west of the area has a large Hata geological field. There are many studies on the geology and geochemistry of the former, but the source of the ore-forming fluid and the evolution characteristics of the quartz vein type geological ore in the shallow water are controversial, and for the geological ore, The orefields have the same strata, and the mining is earlier, but the study of its geological characteristics is less, and the research of ore-forming fluids is not enough.

Introduction

The geographical area of the West Junggar area includes the western margin of the Junggar Basin to the Sino-Kazakh border, the northern Tianshan Mountains to the vast area between the southern Altai, with an area of about 20,000 square kilometers. 1966 Xinjiang Geological Bureau survey team in the fill 1: 2 million Karamay geological map of the region from top to bottom is divided into three groups: the Teregula group, the package group and the Sibelu Lula group The And according to the Hippocrates group and the ancient group of corals, brachiopods and plant fossils, that the three groups are warm and shallow environment of the deposition, are divided into the Lower Carboniferous. However, Feng Yimin found that a set of lava and siliceous rocks and volcanic clastic rocks developed on the north side of the Dalabute fault and the ultrabasic rocks along the Sarto Sea area are different from the classical Tyler group , So that it is divided into an independent rock stratigraphy unit, known as the Dalabut group, and divided into the middle mud basin according to the coral and radiolarian in the limestone lens and siliceous rocks of the group System. However, due to the large number of stratigraphic section evidence that the "Dalabut group" lithology, lithofacies combination and the Tailugula group consistent, therefore, Shen Yuanchao and so on according to the profile contrast and formation contact, that should be "Dalabut Group "is divided into the bottom of the classic Teregula group and the unexposed part, as a lithologic section of the Talegula group. The stratigraphy of this area is a volcanic-volcanic debris sedimentary structure. The rock strata are mostly massive or lenticular, and the stratum is not developed. At the same time, the tectonic complex and cleavage are strong, and the stratigraphic inversion and stratigraphic structure , Therefore, the stratigraphic sequence in this area has been controversial. The area of the area is divided into three groups: the Teregula Group, the Bugu Gutu Formation and the Sibekulas Group. Liao Zhaoting et al. (And Zhang et al., According to their radiolarian fossils found in the siliceous rocks of the Teregula group, accurately confirm that the Tyler group should belong to the upper and upper vateroles; The fossils contained in the group and the packs indicate that they should be attributed to the Lower Carboniferous, so the sequence of the strata is changed from top to bottom: the package of ancient groups, the Sibekulas group and the In 1987, Wu Haoruo, etc., Institute of Geology, Chinese Academy of Sciences, according to the lithology, sedimentary sequence and tectonic morphology and other evidence that: three groups of Taiergula is a set of deep-sea continuous deposition, top-down deposition sequence for the Greek

  DOI: 10.25236/acete.2019.149

The Bakelas Formation, the Buguutu Formation and the Tailugula Formation are inversely opposite to the three-group sequence determined by the 19.2-year geological survey of the Xinjiang Geological Bureau. It is considered that the age of the Teregula group may not be limited to the Devonian, and its upper limit can be extended into the early Carboniferous. The classical Sibelkulas Formation, the Baoguutu Formation and the Tailugula Formation stratigraphic section are established in Dalab Especially in the southern part of the fault due to the development of the fracture, the lack of the above three groups Therefore, the above three groups were established in three different locations, rather than in the same section, and there was no obvious division between the groups. Shen Yuanchao integrated rock formation, palaeontological fossils and tectonic Background and sedimentary facies, it is believed that the correct stratigraphic sequence in this area should be from the top to bottom: the Sibekulas group, the Baogu tectonic group and the Tailugula group, The early products formed in the palaeozoic basins, the ultrabasic rock blocks exposed in the Sartso and Dalabout areas, were not the product of the Late Paleozoic oceanic crust, but the ophiolite in the Caledonian metamorphic complex The rock mass is thrusted out later in the basins of the basin, and Xu Xin et al. Identified the pillow basaltic-tuffite-siliceous rocks associated with the ophiolite belt in the formation, and therefore the larger and complete Karamay The coexistence of the ophiolitic mélange and the thick Carboniferous siliceous mudstone illustrates the existence of the Junggar Late Paleozoic remnant oceanic basin, and the western Junggar Carboniferous strata is a deep sea.

Geology of Deposits

The mineralization process is divided into four stages: (1) albite-quartz stage; (2) silver geological ore - pyrite - arsenopyrite - quartz Stage; (3) polymetallic sulphide dip stage and (4) carbonation stage. The second stage and the third stage are the main metallogenic stages. This is similar to Wang Rui and Zhu Yongfeng (2007). The specific characteristics are as follows: The first stage (albite-quartz stage): along the fracture fracture zone hydrothermal migration and with the surrounding rock water-rock reaction, longevity of the long fossil, chlorite and silicification Alteration, with a small amount of ilmenite precipitation, ilmenite associated with graphite, rutile and apatite. The minerals formed at this stage include quartz, albite, apatite, chlorite, rutile, ilmenite, graphite, calcite, sericite, muscovite. The second stage (silver geological ore - pyrite - arsenopyrite - quartz stage): the stage of silicification, sericite strong, with fine vein through the albite - quartz stage, accompanied by a large number of arsenopyrite, pyrite And a small amount of sphalerite, chalcopyrite formation. The main minerals formed in this stage include quartz, rutile, arsenopyrite, pyrite, apatite and muscovite, and the arsenopyrite is distributed in the quartz vein and is often associated with rutile. The third stage (polymetallic sulfide-like mineralization stage): this stage to form a large number of arsenopyrite, pyrite, sphalerite, chalcopyrite, galena, pyrrhotite, these ore minerals in the surrounding rock Was scattered in the distribution of scattered. The fourth stage (carbonation stage): calcite was infested or pulsed through all the stages of quartz veins and metal sulfides.

Regional Ore - Forming Fluid Evolution

Stage I (quartz-albite stage): the formation of coarse-grained self-shaped semi-self-shaped albite, medium-grained semi-self-shaped quartz is characterized by mineralized weak, quartz-albite veins width is relatively large (Up to 10cm). Mainly composed of albite, quartz and sericite, which the highest content of albite (up to 60%), larger particle size (1mm or so), semi-self-shape. Quartz particle size is small (0.1 ~ 0.2mm), with wave extinction. Sericite is only locally developed. Metal minerals (such as pyrite, sphalerite and arsenopyrite) content is low (about 5%), generally distributed in the veins and the surrounding rock contact parts.

Stage II (pyrite - albite stage): The formation of pyrite - albite veins at this stage is significantly narrower (<0.6 mm), but the mineralization intensity is higher. The veins consist mainly of albite, siderite, calcite, quartz and rutile. Mineral ore accounts for about 20% of the veins, mainly including pyrite, arsenopyrite, chalcopyrite, sphalerite and pyrrhotite, of which the highest content of pyrite (up to 70%), self-shape is better, (0.1 ~ 1mm); arsenopyrite (particle size ~ 0.5mm), often in the form of long columns, rhombus and triangular form. The chalcopyrite appears only in the veins of the veins. Pyrrhotite is produced in its form, medium size (~ 0.4mm), associated with pyrite, which often wrapped pyrite.

Phase III (arsenopyrite - carbonate stage): ore minerals mainly include arsenopyrite, pyrite, chalcopyrite, sphalerite and natural gold, gangue minerals including siderite, iron dolomite, square solution. Stone, albite, quartz and rutile. The ore mineral content of this stage was significantly increased (up to 30%). Pyrite is often symbiotic with arsenopyrite. Chalcopyrite is shaped, generally distributed in the edge of pyrite or arsenopyrite. Natural gold with its shape, micro-granular pyrite wrapped.

Stage IV (chalcopyrite - carbonate stage): the main feature of the emergence of a large number of chalcopyrite. In the hand specimens see the stage formed by the chalcopyrite - carbonate veins through the pre - formed quartz - albite veins, pyrite - albite veins and arsenopyrite - carbonate veins. The gangue minerals formed at this stage include siderite, iron dolomite, calcite, albite, rutile and sericite, in which the contents of carbonate minerals (siderite and iron dolomite) are high (95% the above). Mineral minerals include chalcopyrite, chalcocite, natural gold, sphalerite, pyrite and arsenopyrite, of which chalcopyrite content of 30%. The chalcopyrite is often symbiotic with carbonate or with sphalerite. Pyrite and arsenopyrite size and content are lower than the third stage, sometimes see the sphalerite coated arsenopyrite phenomenon. Gold in the form of micro-natural gold in the form of toxic sand particles or pyrite wrapped.

Stage V (Quartz-Calcite stage): consists of calcite, quartz and albite, which does not contain metal minerals. However, the ore-forming fluid is not a typical magmatic hydrothermal fluid, but it is a volcanic late hydrothermal mixture with paleo-atmospheric water. With the hydrothermal evolution of the ancient atmosphere The degree of water mixing is enhanced. According to Fan Hongrui, fluid inclusions are mainly gas-liquid NaCl-H2O inclusions and a small amount of NaCl-CO2-H2O inclusions. The ore-forming hydrothermal fluids are rich in CO2, N2, Na +, K +, Cl- and 2-4SO, and the ore-forming elements are characterized by Au-As-Ag-Sb combination. The mineralization hydrothermal fluid is a low salinity fluid. The salinity of the main ore-forming stage is 4.1 wt% to 6.3 wt% NaCl equivalent, the density is 0.88 to 0.80 g / cm3, the ratio of bf is 10-35 to 10-31 Pa, Eh 0.60 ~ 0.80e V, for the reduction of the environment. The optimum temperature for gold precipitation is 230 ℃ ~ 260 ℃. Hartu geological ore fluid inclusions are generally small, mainly 3 ~ 5μm, development is not good, Wang Lijuan that this is due to the formation of inclusions by the reasons for the formation of extrusion. Based on the study of rare earth elements, trace elements, isotopes and burst temperatures of quartz, pyrite and mineral inclusions, it is concluded that the quartz vein type orebody of Hutu geological ore is closely related to granitic magma, and it is believed that the ore- granite. Trace Element Geochemical Characteristics of the Alteration of Lithologic Geological Ore in Hartu Geological Geology The fluid is derived from deep.

In the early stage of mineralization, the original fluid inclusions are mainly H2O-CO2-CH4 ± N2 system, but the fluid inclusions are linearly distributed in the fractures of quartz, and the fluid composition is H2O-CH4 system. Containing CO2; in the metallogenic stage, the native fluid inclusions are mainly H2O-CH4 ± CO2 ± N2, in which CO2 is rare or absent. In all quartz types, secondary fluid inclusions distributed along the quartz fissures and passing through the boundary between the quartz particles, the composition containing only H2O. I, II, III fluid inclusions can occur simultaneously in the same quartz grain, and the three are distributed in the quartz, which generally show a variety of changes in gas filling from large to small, and the shape of irregular, Large size changes, showing the characteristics of fluid boiling. In general, the presence of CH4 in the fluid indicates that the fluid has come from or has experienced a strong reduction during the migration process. The results show that the main mineralization temperature is 240 ℃ ~ 330 ℃, the weight is 280 ℃ ~ 300 ℃, the main salinity is 1.74wt% ~ 6.46wt% eq. NaCl. The distribution of the salinity / homogeneous temperature diagram shows that the supercritical fluid in the early stage of the ore-forming process causes secondary boiling due to a sudden drop in pressure until the mineralization-later is subject to the incorporation of reduced atmospheric atmospheric water, The ore-forming fluids are superimposed on multiple fluids.

Conclusion

The Junggar area is mainly composed of volcanic-sedimentary structures of the Carboniferous system of the Paleozoic Carboniferous, mainly basalt, tuff and arctic rocks. Large areas of the Hartu geological mine and its eastern margin of the geological ore are present in the Tyler group of rocks. It can be seen from the above that the magmatic hydrothermal fluid from the geological ore migrates upward along the migration channel created by the ductile shear zone, and the sudden decrease of the environmental pressure causes the secondary boiling of the fluid to become immiscible, and the volatile CO2 and CH4 Aqueous solution separation, at the same time, with the temperature decreases, CO2 and CH4 can also react to produce graphite, therefore, the fluid oxygen fugacity decreases, pH value increases, CO2 concentration also makes the fluid H2S content decreased, Medium-late, but also mixed with atmospheric precipitation, which makes the gold-containing sulfur complex decomposition, gold precipitation out. Compared with the geological mine, the metallogenic model of the Hartu geological mine is more complicated, and the Hartu geological mine is divided into two ore bodies - quartz vein type and alteration rock type geological ore from shallow to deep. Based on the study of rare earth elements, trace elements, isotopes and burst temperatures of quartz, pyrite and mineral inclusions, the Hutu geological ore vein type orebody is mainly related to granitic magma, and the ore-forming fluid is derived from nearby granite, From the mineralization - the late ancient atmosphere of water into the leading mineralization.

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