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Preliminary Interpretation for Characteristics and Genesis of the Baxilute Tin-polymetallic Deposit, Southeast Pamir

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The Baxilute tin-polymetallic deposit, a comprehensive medium- to large- sized one, is located at the transitional tectostratigraphic facies area, belonging to one zone of the southeast Pamir fold thrust belt in Tajikistan. On the basis of the preliminary estimate of the mineral resource, total 36,200 tons of the metal tin has been calculated, with the associated and useful elements silver, copper and zinc, the amount of the same class resource is listed by 180.5, 19,800 and 24,200 tons, respectively. The natural mineralization type is interpreted as the cassiterite bearing sulfide stringer vein deposit.

33 tin orebodies have been controlled initially, of them the largest one is approximately 600m long and 2.78m wide, toward to the dip the extending depth is 210m. Moreover the averaged grade of tin mounts to 0.75%, and then the averaged grade of associated elements copper, zinc and silver are obtained with 0.68%, 0.92%, 47.4g/t, respectively. These associated minerals can be utilized comprehensively for the industrial requirement. The mineralization zones occur in the terrigenous detrital sediments of the upper Triassic Kelikijie Formation, which is a series of dark sedimentary rocks belong to the fluvial-lake facies sediments, the main rocks include sandstone, siltstone, phyllite, argillite and black shale, they are affected through the extensive folding process and faulting movement, and featured by the varying metamorphic grade universally.

During the Mesozoic and Cenozoic massive continental collision, large-scale thrust faults and folding uplifts as well as late extensional tectonics remade the metallogenic process complicatedly and lead to frequently tectonic superposition and overlap, the various and complex shaped ore bodies are resulted by the extensive tectonic activities. The most structural features of the deposit mainly are formed priority to the mineralization, especially faulting system is the most important to reactivate the mineralization zones, in which the different orebodies are shaped with four types of formation such as vein, stringer, stockwork and pillar etc. In spite of the

intrusive body is short of the only hypabyssal lamprophyre dike outcropping in the area, the epithermal activities are remarkable, the case is possibly relation to the concealed intermediate-acid intrusive being inferred in the east area of the deposit proved by the negative gravity anomaly with a circle shape has been measured through the geophysical exploration. In general, the wall rock alteration is present and relatively weak, the mineral assemblage is still complex.

The boundary line between the ore body and wall rock is clear and the scope of the wall rock alteration is quite narrow with only 0.2-2 m wide, which is distributed along two sides of the ore body straightly in common, the alteration types present the silicification, chloritization, sericitization and carbonatization, and the orebodies are obviously filled and injected. Comparison to the space division and time continuity among the different minerals formation, total 8 mineral assemblages are divided in proper order, including quartz-arsenopyrite-tourmaline-muscovite, cassiterite-quartz, pyrite-marcasite, ankerite-pyrite, chalcopyrite-stannite-sphalerite, chalcopyrite-cassiterite, chlorite-chalcopyrite, and quartz-sphalerite-galena-carbonate. According to the above mentioned mineral assemblages, the ore types related to the deposit contain three kinds such as (1) arsenopyrite-cassiterite-chalcopyrite, (2) pyrite-cassiterite-sphalerite, (3) cassiterite-stannite.

The structural features of the ore are dominated by the massive and disseminated types, subsidiary ones include the brecciated, stockwork, banded and stratoid etc, and various textures have been presented in the microscope with the granularity or aggregate, cataclastic and poikilitic, solid solution separating and filling or metasomatic texture etc. The main tin-bearing minerals have cassiterite and stannite, the ratio of them in the ore is 1.8:1.0-5.1:1.0. Meanwhile the cassiterites obviously have two generations from its formation features, during the first generation the cassiterite crystal is single and coarse-grained, with a size between 1.5 x 5-3 x 5 mm in common, the crystal shapes contain the isometric and short column,

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and their colors are different mainly of near black to gray. The second generation cassiterite is mostly intergrowth with stannite, the size is the microscopic grade with the shapes of long pillar or acicular and less than the colloidal or mushy mass, the features of the second generation are resulted by the low temperature hydrothermal environment, so the stannite mostly shape with a micro-fine grain or aggregate in the microscope.

In accordance with the tectonic features of the deposit, four metallogenic stages have been classified as (1) quartz-arsenopyrite-cassiterite phase, belonging to pneumatolytic-hydrothermal metallogenetic process, the ore-forming temperature is 230-320°C, the mineralizing fluid are deposited or filled into the fractures consisting of the cataclastic rocks, the stockwork and veinlet ore bodies occurred in, meanwhile during the stage the tin-bearing mineral is the single cassiterite, and the mineralizing level is weak. (2) Pyrite and no tin-bearing mineralization phase. (3) quartz-chalcopyrite-pyrite-stannite-cassiterite-sphalerite phase, the temperature of the ore fluid comes to 176-182°C. A great amount of stannite and cassiterite are presented and intergrown, the content of tin in the ore is high, and much copper and zinc are associated together. (4) quartz-sphalerite-stannite-galena-carbonate phase, the stannite has a micro-grained texture, which is the inclusion inside the sphalerite, simultaneously contains the useful components such as zinc, lead, silver and gold. The tin-

bearing minerals mainly are produced into the third stage.

The fault systems play an important role to the metallogenic process in this deposit, in general the Murgab fault, a large-scale and deep-seated fault, was serviced as the tunnel to transport the ore-forming fluids and the secondary fractures are mostly the ore-hosting structures, the ore veins are filled into the fractures with various features, which are referred that the sulfide likely occur in the compresso-crushed zone and mylonitization zone and also inside the vein the breccias from the wall rock are arranged in a certain direction and angular clearly, they can be matching each other, as well the plume fractures are assorted between two sides of the ore vein. The above-mentioned structural characteristics explain the stresses were acted with transpressional and tensional features jointly. The post-metallogenic fault has a small scale in the area, so the orebodies are broken negligible. All in all, the pre-metallogenic and inter-mineral structures activate intensely, and supply the favor rooms to transport or lead the ore-bearing fluids to be deposited. Moreover the folds, faults and ore veins are associated each other; the whole framework of the deposit is the tectonic control.

Key words. Baxilute, Tin-polymetallic , Pamir, Cassiterite, Genesis