1 Regional Geological Background

The copper mine is located in the north-eastern margin of the Junggar basin, south of the Altay Piedmont zone. The terrain is flat, weakly cutting, only slightly undulating hills. The development of magmatic rock in the area is controlled by the Ertix fault, which trends roughly northwest. The main rocks are diorite and diorite porphyrite. The intrusion rock occurs as stock, with quartz veins distributed widely. Strata in this area belong to Junggar Formation and main strata at bottom are Devonian System, Carboniferous, Tertiary. Intrusive rocks are widely distributed in the southern part of the study area, and formed at Yuhaixi period, Yanshan period. Irregular apophysis and dike rocks occur mainly along the fracture structure. Diorite, diorite porphyrite, pyroxene diorite porphyrite, horns, glint conglomeratic diorite porphyrite, quartz diorite, etc.

2 Structure Features

Tectonically located at the northern margin of the Junggar Plate and the joint section of the Kazakhstan-Junggar Plate and Siberia Plate, the mining area belongs to the edge of the tectonic belt, and therefore frequently experiences strong crustal activities. There are two kinds of structures: fold and fault. Folds occur mostly as anticlinorium or synclinorium. The three kinds of faulting are found in this area. (1) NW-trending faults: Kekekudu fault, the fault in north of Fuqing road, fracture zone in the mining area, Sasekegen fault, Jiwuer fault, most of which extend from ten meters to ten hundred meters, and trend to 305° to 125°. (2) NE-trending tenso-shear faults: about 3 to 10 kilometres long, with trend of 60°, and striking northwest with a dipping angle of dip 70°. (3) NNW-trending structural belt is the dominant compression fault with a trend of 340° in this area.

3 Research

On the basis of previous research, especially the basic data of geophysical and geochemical exploration, researches carried on exploration in this mining area, figuring out tectonic features, intrusive rocks and geochemical characteristics. This study identified the relationship between mineralization and layers, structures, magmatic activities and some characteristics of formation, and further discussed the regularity of ore (mineralized) body enrichment and the main ore-controlling factors. The survey discovered dozens of mineralized zones which are auriferous quartz vein mineralization. Marine volcano rock and clastic rock with carbonate rock are the main host rocks of this area. Magmatic rocks and minerals are mainly diorite, diorite porphyrite, providing thermal power and some mineral deposit. Alteration types include: silicification, sericitization, chloritization, epidotization, dolomitization, pyritization, carbonation, limonitization. The mineralized alteration occurred mainly at low temperature to medium temperature, and this provides the signs of prospecting gold and copper deposit.

4 Geophysical and Geochemical Anomaly Features

The regional gravity anomaly, the regional magnetic anomaly characteristics, geochemical anomaly features were studied. Regional gravity field characteristic in this area is a set of northwest contour parallel arrangement. Gravity anomaly contour reduces gradually from south to north, and its gradient change is about 1.8 × 10 per
kilometer- 5 m/s², showing that the crust thickness in this area gradually thickens from southwest to northeast, basal progressively deep. It also reflects that the district tends to be a transition zone from Junggar platform edge fold belt to the Altai fold belt. Gradient zone of gravity anomaly in the northwest shows zonation of high and low values, mainly reflecting the tectonic line direction into a series of northwest of airborne anticlinorium.

5 Mineral Resources

This area is enriched in various minerals. The main minerals discovered in this area are iron, nickel, copper, lead, zinc and rare metal, mica, placer gold, gems, and a new refractory kyanite. Mineral deposits with industrial value and under exploitation and utilization contain: Karatongke large Cu-Ni deposit, Surkuduke mid-sized Cu-Mo deposit, Halasu large Cu-Mo deposit, Qiaoxiahala small Cu-bearing magnetite deposit, and Sarbulake mid-sized Au deposit. Comprehensive analysis shows that this area is endowed with copper, nickel, molybdenum, gold, lead, zinc, lithium, beryllium, white mica, gem minerals. Therefore, this area is of great metallogenic prospect and prospecting potential.

References