The Geological Characteristics of Xiachahe Au Deposit Zhenyuan, Yunnan

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1 Geological Overview

Xiachahe Au deposit is located in the northwestern region of the Ailaoshan gold belt. Its tectonic location is on the edge of the Yangtze platform and Dianxi fold belt (Luo et al., 2006).

Strata in this area comprise the Waimai Group and Zhuanmalu Group. Lithology largely consists of phyllite and sericite phyllite. Deformation and alteration develop strongly in this deposit. Contraction is dominated by fractures and folds. On the eastern side, it is bounded by the Ailaoshan deep fracture, on the western part, it is bounded by the Mojiang River deep fault. Zhuanmalu ductile shear zone that has the feature of multi-periodic activity is the primary ore-controlling structure. Ore body host structures are the secondary structures along with this shear zone. Magmatic rocks primarily include ultramafic rocks, granite porphyry and metamorphic diabase.

2 Mineral Deposits

2.1 Orebody characteristics

At present, there are three gold mineralization ore bodies. Ore bodies are strictly controlled by tectonic fracture zones and subordinate fractures system. Host-rocks are principally quartz veins, silicified limonite and sericitic phyllite. Shapes of ore bodies are vein and lenticular. Strike extends to NW-SE, direction of tendency is NE and dip angle is about 60 degrees. Occurrence of the ore bodies is consistent with the regional stratum. Ore bodies are primarily controlled by quartz veins and sand rock composition veins. Roof and floor of the orebody are sericite phyllite or quartzite sericite.

No. 1 ore body stretches to NW-SE, it’s orientation of tendency is NE and the angle of inclination is about 65 degrees. It is controlled by the engineering of CM1, CM2 and CM4 in PD1. Ore body is a vein and the length along the striking direction is about 90 m, extension length along the inclined direction has not been controlled up to now. According to analytical data, thickness of this ore body can range 2 m to 20 m. Single sample’s Au grade can range 0.50 g/t–12.26 g/t. Ore body average grade of Au is 3.26 g/t.

No. II ore body extends to NW-SE, its direction of inclination is NE and the angle of inclination is about 60 degree. It is primarily controlled by the engineering of CM1, CM2 and CM4 in PD2. Ore body is a vein and the length along the extension direction is about 60 m, extension length along the inclined direction has not been controlled at present. Thickness of this ore body can range 1m to 16m. Single sample’s grade of Au ranges 0.55 g/t to 28.5 g/t. The orebody’s medial grade of Au is 2.74 g/t.

No. III ore body extends to NW-SE, its direction of inclination is NE and the angle of tendency is about 57 degree. It is principally controlled by the engineering of CM1 in PD2. Ore body is a vein and the length along the stretching orientation ranges from 40 m to 50 m, extension length along the inclined direction has not been controlled until now. Thickness of this ore body can range 1m to 39m. Single sample’s average grade of Au ranges 0.55 g/t to 28.5 g/t. The ore body’s average grade of Au is 3.26 g/t.

2.2 Ore characteristics

Textures of ores largely have hypidiomorphic granular texture, filling accountable texture, crushing particle texture, proliferation texture and parcel texture. Primary ore constructions have disseminated structure, veinlet structure, mottled structure, brecciated structure and so on. Ore minerals are gold ores and the gold is given priority to

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the native gold. Sulfur minerals mainly are pyrite, arsenopyrite, stibnite, and antimony. Among these sulfur minerals, pyrite and arsenopyrite are the foremost minerals containing gold. Furthermore, fine-grained pyrite and arsenopyrite have higher content of gold. Native gold that is visible microscopic gold or gold, followed by submicroscopic gold particle with diameter of 0.01–0.1 mm, and followed by fissure gold and parcel intergranular gold.

2.3 Alteration features

Alteration generally develops in this deposit, which has made a great contribution to the gathering and mineralization of the gold. Type of the alteration majorly covers silicification (Fig. 1B), the arsenopyritization (Fig. 1C-D), pyritization (Fig. 1A), limonitization and so on. Moreover, silicification is the most developed type of alteration, the main manifestation of this alteration includes the thick quartz veins and the quartz stockworks along with the strata.

Partially, a more intensive alteration in the fractured quartz veins is obvious. Limonitization develops in the part of thick quartz veins being in contact with the phyllite strata. Superimposed alteration develops in the space of crumpled prostration. The alteration being related to mineralization of gold involves silicification, arsenopyritization, pyritization and ferritization. The concentration of gold usually develops in position of the superimposed alteration, where the gold particle can be seen locally.

3 Conclusions

(1) The occurrence of the orebodies is strictly controlled by the quartz-vein that has close spatial relationship with gold mineralization. The exact timing of mineralization is not known.

(2) From the field geological records the ductile shear zone is very crucial in the whole process of mineralization and plays a huge metallogenic role in the enrichment and precipitation of gold. However, there is a question if the Zhuanmalu ductile shear zone is an important metallogenic mechanism in this deposit as there are no specific geological facts to support this proposition.

(3) According to fundamental analysis, the genesis type of this deposit preliminary can be called the altered rock type gold deposit at present. Of course there needs further proof to demonstrate this standpoint.

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