Shanxi Fanshi County tea shop mining development Co., Ltd. gold mine Geological characteristics and causes

Hongguo Huang[1,*], Zhen LI[2], Xiaolei Liu[1], Chungang Zhang[2]

[1]Zhongjin Environmental Technology Co., LTD., Taiyuan, 030032 Shanxi, China

[2]Shanxi Metallurgical Geotechnical Investigation Engineering Co., LTD., Taiyuan, 030000 Shanxi, China

[*]Corresponding Author

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Abstract: Chafang gold mine is located in Zhifang Village, Boqiang Township, Fanshi County, which is a small deposit with (in total) silver, copper, lead and zinc, with proved metal quantity 811kg, associated silver metal 35.05t, copper metal quantity 650t, lead and zinc metal quantity 8928t. The average grade of gold is 3.92g / t, the average grade of silver is 166.48g/t, the average grade of copper is 0.31%, and the average grade of lead and zinc is 4.27%. There is still a broad prospecting prospect in the area, which is expected to reach the medium-sized deposits.

1. Introduction

Geological background of mineralization,Chafang gold mine belongs to Boqiang mining field, which is located in the north of North China fault block (Grade II) Luliang-Taihang fault block (Grade III)[1]. Five granite gneiss (Yingyundiorite, granite, diorite) and the Great Wall- -Cambrian- -Ordovician continental shallow Marine debris-carbonate rocks in the mine field. The two are in sedimentary contact or fault contact relationship. Regional main deep fault —— Nanyukou-Hongan NNW torsion fault longitudinal through the mining field, and the NNW-N direction, NW-NWW to the secondary shallow secondary fracture is very developed[2].Yanshan period granite rock in south yukou-red fracture on both sides of the valley, boqiang, tea, GengZhuang into the granite gneiss and the Great Wall-Cambrian, granite rock by multi-stage invasion of diorite, granite diorite, long granite, granite porphyry, quartz porphyry and dibrase, sometimes with crypconglomerate. The gold and silver and polymetallic mineralization related to the rock mass are strong. According to the different lithology of surrounding rock and ore control structure factors, the genetic types of gold and silver ore include altered rock type, quartz-calcite vein type, hidden explosive breccia type, skarn type, etc. The surrounding rocks of the ore body have granite gneiss, carbonate rock and hidden burst breccia. The ore-controlled structure has the steep slope torsional fault, the shear zone of gentle slope, the contact zone of yanshanian granite rock mass, the annular fault zone related to the volcanic neck mechanism in the hidden explosive rock, etc. Mineral combinations include Au, Ag, Cu, Pb, Zn, MO, FeS 2. Various minerals are produced alone or associated together. The mineralogy and geochemical subdivision phenomena from Au, MO-Au, Ag, Pb and Zn are shown later. The mining field area is 80 Km 2, with more than 10 deposits and mining sites of various types[9].

2. Geological characteristics of deposit

2.1 Stratum

The exposed strata in the mining area from bottom to top are the Wutai stage transformer long granite (black cloud inclined long gneiss), and the Great Wall system is higher than the Zhuang Formation. Wutai transformer long granite (black cloud oblique long gneiss): a large area distribution in the mining area. The constituent rocks are mainly biotite long gneiss, and the secondary are oblastic gneiss, gneiss, long diorite and serene schist. The gneneen production is generally 270-340, and the sub-volcanic-hydrothermal gold deposit exists in this formation. The Great Wall strata are only higher than the Zhuang Formation: distributed in the north and south of the mining area ridge. Monooblique structure, production: generally about 320, inclination 15-20, lithology is composed of a set of flint strip nodules dolomite, manganese containing dolomite shale and huge thick layered dolomite. Unintegration covers the Wutai variable Olympic granite (black cloud oblique long gneiss)[3].

2.2 Guide ore-bulk ore structure

The structure in the area is mainly fault, and there are three faults developed in the mining area. F1 (Fangchenggou fault) is a regional pressure fault or thrust fault, NWW-NW across the whole area, the dip angle is 80; F2 is a fault, NNW to Fangchenggou fault; F3 fault and ore body, to north north west, dip is 80,250m long, about 1~2m wide, about 10 m long, the nature is reverse fault. Area developed a structural crushing zone (Bc 1), developed in five stage Olympic granite (cloud oblique long gneiss), the upper and lower disk properties are cloud oblique long gneiss, near east-west, south, average Angle of 25, length is more than 280m, depth is more than 360m, width 0.4~1.6m, surrounding rock alteration mainly sericite, chlorite, chlorite, silification, square.According to the analysis, the hydrothermal fluid of the tectonic crushing zone along the fracture, so as to enrich mineralization under appropriate environmental conditions, the fault in the area is the ore conduction structure, and the tectonic fracture zone is the ore deposit structure.The integrated model of the three faults in the mining area is shown in Figure 1.

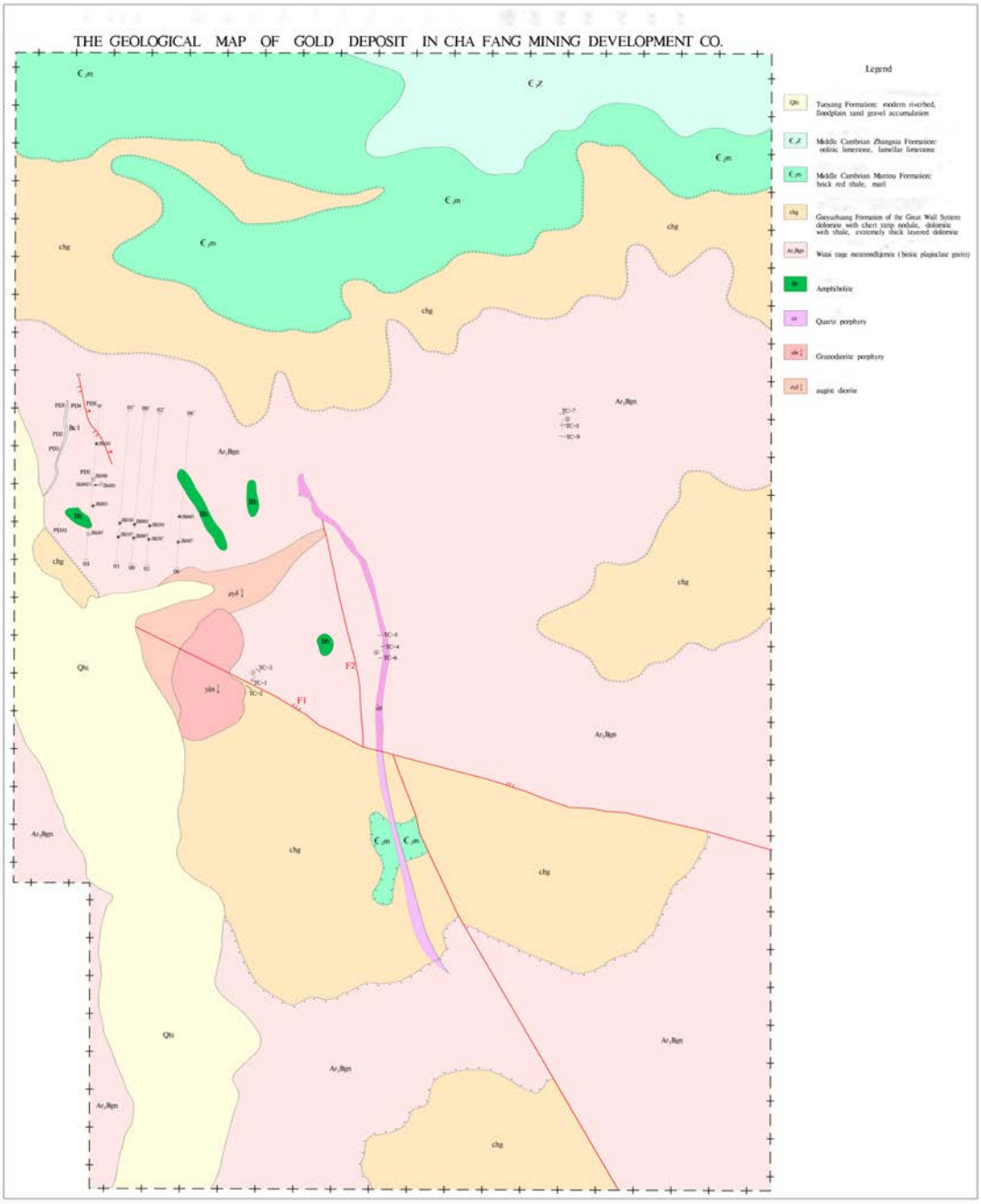

Fig 1 Geological map of mining are

2.3 The Yanshanian subvolcanic rocks

A large area of the mining area of long granite (Beitai rock mass) has deteriorated into black cloud inclined long gneiss. In the central and western part of the mining area, there are Yanshan granite rock plants and pulse intrusions, and the rock mass moves to the north and west, 1300m long and 50-200m wide. From the analysis of the output site and the distribution law of the alteration zone, the magmatic hydrothermal activity is related to the mineralization, which provides the material source for the formation of gold ore body[4].

2.4 Characteristics of the ore body (layer)

The ore body in the structure crushing zone control, developed in the five stage long granite (black cloud oblique long gneiss), circled 2 gold ore body, the ore body length of 40-280m, length

of 40-360m, 0.37-1.61m thick, the ore body is layered output, mostly slow wave extension, the overall direction is near east-west, tendency S, upper inclination 15-23, lower inclination 23-28, average 25. The main characteristics of the two ore bodies are shown in Table1.

Table 1 Geological characteristics of main ore bodies of Chafang gold deposit

Orebody number	Orebody (m)			Shape (Inclination)	Form	Elevation (m)	Deep (m)	Average grade of orebody					Keserves(Amoum of metal)				
	Extension	Extendeddepth	Thickness					Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	Au (kg)	Ag (t)	Cu (t)	Pb (t)	Zn (t)
I	86	108	3.62	$\frac{175^\circ}{25^\circ}$	Layered	1280~1418	90~260	3.92	166.48	0.31	1.68	2.25	809.35	34.85	650.29	4000	4928
II	40	40	0.45	$\frac{175^\circ}{25^\circ}$	Layered	1270~1295	30~65	1.67	10.6				1.97	0.2			

2.5 Seed the characteristics of ore

The ore body in the area is mainly composed of polymetallic sulfide ore. The main metal minerals are galena, sphalblite, pyrite, and limonite, copper ite: The main components are quartz, carbonate and sericite, and the auxiliary minerals are chlorite.

Galena: it is granular with chalcopyrite and zinc blenite, but also along the pyrite crystal or fissure. Pyrite: mass, pulse distribution in the ore minerals, mostly semi-automorphic crystal, monomer particle size of 0.5~2mm, generally 0.1~0.3mm, is the early crystalline mineral in the ore, with fragmentation structure, often by zinc galena, pyrite, zinc blite, a residual body shape. Zincblerite: distributed in a mass pattern, generally in gangue minerals and chalcopyrite, in which chalcopyrite is droplet or leaf distribution. Copalcopyrite: the other form of aggregate shape, often distributed in the crystals or cracks of pyrite or gangue minerals, and the particle edges are sometimes oxidized to cuprous blue. Posand: often and pyrite symbiosis, generally semi-automorphic-automorphic crystal, particle size of 0.1~0.3mm.Hematite: it is distributed in clumps or veins in gangue minerals. Copper ore: a small amount of granular, and copcopyrite symbiosis. Limonite: a small amount, filled in the pyrite cracks. Copper blue: a small amount, distributed on the edge of the chalcopyrite. Gold minerals are mainly silver gold deposits and a small amount of natural gold. They are fine-particulate monomer wrapped in pyrite, or fissure gold, crystalline gold exists in pyrite, chalcopyrite, galena, sphalblite or its contact sites and gangue minerals. The morphology of gold minerals are granular, irregular, dendritic, skeletal, spherical, and a few rod, sheet and intact cube crystals. The particle size was 0.01~ 0.06mm, a few 0.1~ 1mm, and some more than 1mm.Pulse minerals: the main components are quartz, carbonate and sericite, etc., auxiliary minerals occasionally see chloridite. Quartz: it can be divided into two stages. The first stage is coarse quartz, good crystallization, average particle size greater than 0.1mm, in the second stage, quartz particles are fine, aggregate and sericite symbiosis, poor crystallization degree, accompanied by a small amount of metal mineralization. Carbonate: can also be divided into two stages, the first stage is coarse grain, grain crystal structure, the particle size of more than 0.1mm, often associated with pyrite. In the second stage, the carbonate content is less and symbiosis with sericite, accompanied by metal minerals such as copper and lead. The ore structure is mainly semi-self-shaped granular structure, followed by fragmentation structure and solid solution structure. The ore is mostly massive, pulse, dense-sparse immersion structure and fine pulse immersion structure. The full chemical analysis shows that the useful components of the deposit are Au, Ag, Cu, Pb, Zn; the harmful components are As, Hg, C, S, Mgo; other elements have little or no content and no utilization value. The surrounding rock of the ore body (mineralization zone) is oblique long gneiss, which is metamorphic from long granite, and has occurred widely, sericite, chloridization, chlorite, silicization, carbonization and polymetallic sulfide alteration. The natural type of ore in the area is gold-gold-sulfide-quartz type ore, and the industrial type is gold-rich pyrite-polymetallic mixed ore. The division characteristics of various types of ores are shown in Fig. 2.

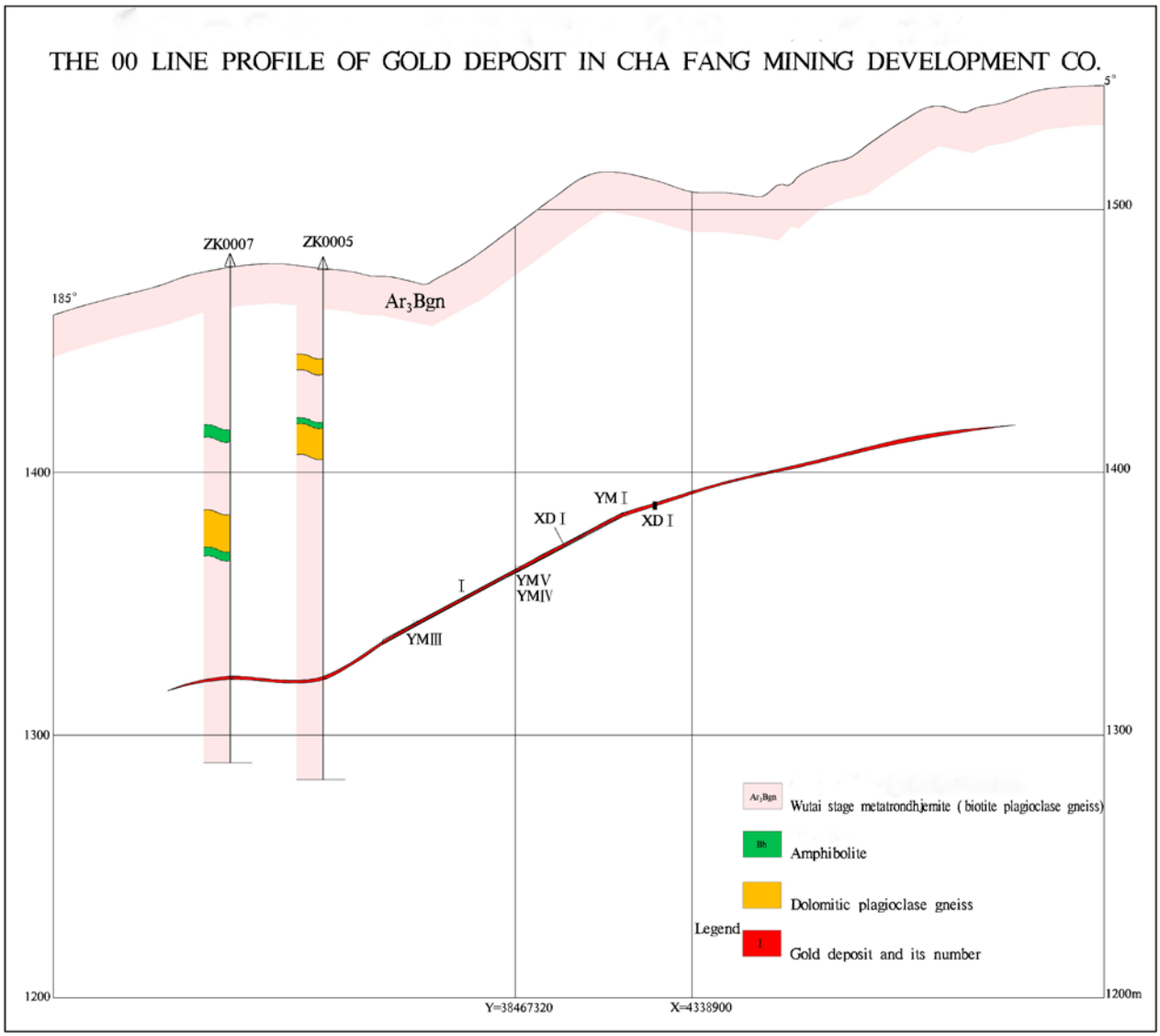

Fig2 line profile of gold deposit

3.Geochemical characteristics of the mineral deposits

The geochemistry of deposits was tested in early, and the test results show that Rb-Sr isotope of Yanshan granite rocks is 87 Sr / 86 Sr = 0.7062. In the mineral isotope composition, the δ 18O (‰) is between 8.8% -10.6%, the range of oxygen isotope of atmospheric precipitation, gas-liquid ratio changes between 8% -80%, and the mineralization effect is mainly carried out in the liquid phase[4-8].

4. Conclusion

Tea workshop gold deposit is the magmatic hydrothermal deposit related to yanshan subvolcanic rock, gold, silver and other minerals mainly comes from yanshanshan subvolcanic rock granite magmatic rock, ore magma hydrothermal along the fracture into structure zone, in high pressure, low temperature, weak acid, low oxygen, low salinity, low salinity of Na +, K +, Mg2 +, F-, Cl-, H2O CO2 and CH 4 gas water solution (hydrothermal water is magma water and precipitation mixed water) enrichment under environmental conditions.

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