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Wall Rock Alteration Zoning Characteristics of the Shanggong Gold Deposit, Eastern Qinling Orogen, China

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Abstract: The Shanggong gold deposit is a large tectonic altered rock type (orogenic-type) gold deposit discovered in Henan provience, Central China. It has resources of about 30t Au , making it one of the largest Au deposit hosted in continental volcanic rocks in China. It's located in the Xionger terrane, southern margin of the North China craton.

The main strata developed in the Shanggong area can be divied into three units.The underlying unit is the Taihua Surpergroup(basement),which consists mainly of high-grade metamorphic rocks, with ages ranging from 2900 to 2200Ma(Xue et al.,1995), consisting ampho -gneiss, amphibole plagiogneiss. The Xiong'er group is predominantly a volcanic sequence that unconformably overlies the metamorphic basement, consisting basalt, alt andesite, andesite. Quaternary residual sediments and alluvium mainly developed along the gully, thickness of 0 to 15 meters.

The deposit contains 30 ore bodies which distribute as a horsetail-like. All ore bodies are located in altered tectonic belt and are controlled by the NE-trending belt, about 2200m long and 600m wide. The ore zones have not obvious boundary, depending on cut-off grades(Chen et al.,2006). Orebodies are commly lenticular, veins or tabular.

The ores occur as breccias , altered or cataclasite. The gangue and ore minerals are very complex. The ore minerals are predominantly native gold, electrum, pyrite, galena, calaverite, hessite, sphalerite, chalcopyrite, hematite; while the quartz, ankerite, sericite, chlorite, epidote, fluorite, calcite and feldspar are the gangue minerals.

Wall rock alteration is complicated due to the influence of ore-bearing hydrothermal, which contains beresitization, silicification, iron dolomitization, sericiti -zation, chloritization, and hematitization, with lesser kaolinization, epidotization, fluoritization, calcilization and little baratization. The main alteration types:

Beresitization has closely related to gold mineralization in this ore district and distribute in the breccia and cataclastic rock. Pyrite, quartz and sericite are closely associated in the breccia, mortar and its fracture.

Chloritization main developed in middle and late stage of mineralization. Chlorite and sericite are uniform mixing, accompanied by uneven ankerite microcry -stalline and sporadic quartz in middle stage,which w(Fe)/w (Fe+Mg) is 0.87~0.89. The late stage of chlorite assume granular or thin vein in carbonate, which w(Fe)/w(Fe+Mg) is 0.76~0.85(Hu et al.,2013).

Carbonatation mainly contains iron dolomitization, calcilization. The ankerite developed in the hydrothermal mineralization period. Polymetallic-sulphide-iron dolom -itization is important to the deposit. Calcite developed in the late stage.

These alterations have a certain order in time domain, but in space showed some zonation and has a superimposition of features. In this study, on the basis of

field findings, mineral and rock identification and the altered rock X-ray powder diffraction test(Table.1), discover a distinctive lateral zoning（Fig.1）, which from the orebodies to the country rocks includes: a 1 to 3 m wide Au-bearing zone with sulfide-ankerite-sericite-quartz(Ⅰ), which is controlled by fracture strictly, some area has reached production-grade and developed the different types of ores and the size of Au ore bodies; a pyrite-chloritization–ankerite-sericite zone(Ⅱ) mainly distributed in the internal or external contact zone of fault and developed intermittent, scattered, small; a 5 to 20 m wide zone of chlorite-sericite- ankerite (Ⅲ), which usually has a direct contact with Au-bearing zone and occur as a irregular strip; a 50 to 150m wide slightly altered zone of ankerite- chlorite(Ⅳ) is the edge of the altered zone.

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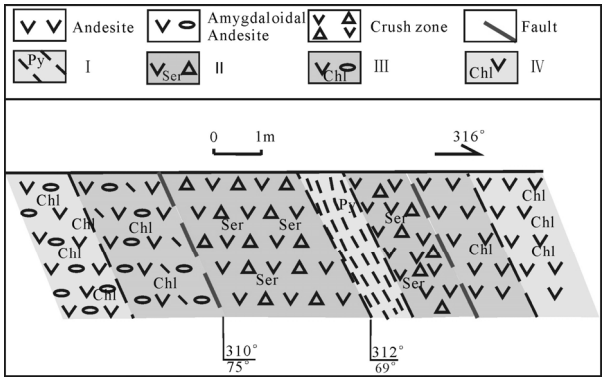

Fig. 1. No.3 orebody alteration zoning map

Table 1 X-ray powder diffraction data (The blank means not checked out)

number	chlorite	sericite	quartz	calcite	ankerite	pyrite	smithsonite
SG-05	40	5	41	4	10		
SG-06	10	25	50	0	15		
SG-07	10	25	45	0	20		
SG-08	5	0	55	2	38		
SG-09	0	5	20		75		
SG-13	5	15	35	0	41	4	
SG-10	0	20	50	0	5		25
SG-11	25	10	35		5		20
SG-12	35	10	30	3	15		2

Microelements in the alteration zones which have an obvious change contain Pb、Zn、Cu、Ag、Ni、As、Bi、Au、W. The above elements have a similar vary trends to the intensity of alteration from orebodies to wall rock by changing less.

About the relationship between wall rock alteration and mineralization, different stages of mineralization have the corresponding development of wall rock alteration. Only the alteration in the main mineralization stage has instruction significance for prospecting.

Key words: orogenic-type Au deposit, alteration zoing, X-ray power diffication，Shanggong gold deposit, Eastern Qinling.

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