The Baguamiao gold deposit, located in the northwest of the Fengxian-Taibai ore field in the western Qinling, is controlled by the NW-trending brittle-ductile shear zone. Strata outcropped in the deposit are mainly composed of Upper Devonian phyllite, silty phyllite, banded marble of the Xinghongpu Formation. The Xiba Granite intrusion is developed in the southeast, and a plenty of dykes, such as diorite porphyrite, granite porphyry, are developed in the whole ore field.

Ore bodies in the Baguamiao gold deposit are principally Au-bearing quartz veins and spotted altered rocks. The mineralization can be divided into 3 stages: I. NWW-trending straight and corrugated quartz-ankerite-sulfide veins. II. NNE-trending straight quartz-sulfide veins filling the joints. III. Quartz-sulfide veins filling the NE- or NW-trending faults. The main mineralization occurred during the stage I and II. Spotted altered rocks beside the Au-bearing quartz veins of the main mineralization stages are commonly high in gold grade.

Spot structure is generally developed in the Baguamiao gold deposit, and mainly developed in phyllite, silty phyllite, and muddy strips in banded marble. Chen (1992) concluded that spots in the Baguamiao gold deposit are the products of regional dynamothermal metamorphism. Jia et al. (2000) suggested that the spotted structure is resulted from the multi-stage activities of ore-forming fluid. In this study, we discovered that from the nonmineralized rocks to altered rocks, it is quite different in the mineral composition of spots, and in different mineralization stages, the spotted structure is different in style associated with different wallrock alteration and gold grade.

1 Classification of the Spots

The size of the spots from the Baguamiao gold deposit ranges 0.1–4mm, mainly 0.1–2mm, and the content usually ranges from 2% to 10%, with the maximum exceeding 20%. The major minerals in spots were quartz, pyrrhotite, pyrite, biotite, chlorite and ankerite, etc., with minor chalcopyrite, sphalerite, calcite, etc. The spots can be classified as 8 types based on their mineral assemblage and distribution characteristics (see Table 1 in detail).

2 Spots and Mineralization

Pre-stage I: The spot types are mainly S1, S2 and S3 (Table 1). S1 spots were developed without mineralization and deformation, with the rim of some biotite altering into chlorite, while the host rocks were altered slightly. The S2 and S3 spots are commonly found in barren rocks, displaying oriented arrangement resulted from shear and hydrothermal activities. The gold grade of S2 and S3 spots increased slightly.

Stage I: The alteration types of the wallrocks included sericitization, silicification, chloritization, and ankeritization, and the main sulfides included pyrrhotite, chalcopyrite, sphalerite and pyrite. The spot types are mainly S4 and S5 (Table 1), which might have derived from S1 and S2 experiencing both shear and hydrothermal activities. The closer to the Au-bearing quartz veins these spots are, the stronger the host rocks deformed, the higher gold grade of the spots is (comparing S5 with S4 spots).

Stage II: The phyllite, beside the NNE-trending quartz-sulfide veins, was fadened altered with sericitization, silicification. The ore minerals developed in the altered wallrocks included pyrrhotite, chalcopyrite, sphalerite and
pyrite. The oriented S_5, S_6 and S_7 spots (Table 1) occurred dominantly in the altered phyllite. S_6 spots were formed from the biotite in the S_5 spots totally altering into sericite. The superimposition on S_1 spots by the hydrothermal fluid resulted into the formation of S_7 spots, and the gold grade increased during this process. Stage III: Alteration types were mainly sericitization, silicification, and pyritization in this stage. The S_8 spots (Table 1) might result from S_2 spots during the alteration process, which are characterized by no deformation and non-oriented arrangement, with lower gold grade.

Among all kinds of the spots, S_4, S_5, S_6 and S_7 spots developed in stages of I and II, having the highest gold grade, are the important contribution to gold resource in the Baguamiao gold deposit.

3 Conclusions

The spotted structures in the Baguamiao gold deposit are closely related to lithology of wallrock, shear and hydrothermal activities. Spotted structures have formed in multistage and show inheritance in mineral composition. The shear activity caused the deformation of spots, and hydrothermal activities resulted in the complication of mineral assembles and high gold grade.

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