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Identification of Composite Rock Body in Dongguashan Copper (Gold) Deposit, Anhui Province

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1 Regional Geological Setting

Dongguashan Copper (gold) deposit is located in the northeast of the Yangtze craton, which belong to the lower Yangtze Syneclise Fanchang Guichi concave fault-fold belt (Tang et al., 1998). It occurred in North East section of Qingshan anticline, secondary structure of Datong-Shunan multiple syncline. The formation closely related to mineralization including upper Devonaian Wutong formation (D_{3w}) quartz sandstone, middle-upper Carboniferous Chuanshan and Huanglong formation (C_{2+3}) carbonate rock, lower Permian Qixia formation (P_1q) limestone, chert and skarn. The complex reticular structure-framework in this area is compesed of NE trending folds and faults of Indosinian and nearly SN-, EW- and NNE trending faults, interlayer structure and joint. Magmatic rock emplaced along the complex structure systems, showed dyke and apophysis in shallow. Qingshanjiao composite rock body is closely related to mineralization, composed by granodiorite and porphyraceous quartz monzodiorite.

2 Identiffication of Qingshanjiao Composite Rock body

2.1 characteristics of petrology and petrochemistry

Qingshanjiao composite rock body can be divided into granodiorite and porphyraceous quartz monzodiorite based on rock-mineral identification.

Granodiorite colored gray- grey black is composed of plagioclase (40%), potash feldspar (15%), quartz (20%), hornblende (12%) and small amounts of biotite (3%). Plagioclase occurs in short prismatic or tabular crystal form, the polysynthetic twin and zonal structure can be observed. Potash feldspar mainly occurs in hypautomorphic tabular crystal form, the Casbas double crystal can be visible with muddy surface. The quartz is mainly allotriomorphic granular filled in mineral gap. Hornblende occurs in automorphic-hypidiomorphic granular crystal form, with two directions of cleavage. The characteristics of rock ia mainly automorphic - hypidiomorphic structure (Fig.1a).

Porphyraceous quartz monzodiorite colored grayish-white is mainly composed of plagioclase (55%), potash feldspar (20%), quartz (10%), hornblende (10%) and small amount of diopside, biotite. Plagioclase occurs in short prismatic and tabular crystal form, the particle size is large, the polysynthetic twin and zonal structure can be observed, potash feldspar and biotite poikilitic can be seen in plagioclase crystal, different degrees of corrosion occurred in the edge of crystal. Potash feldspar is characterized by columnar crystal form that contained Casbas double crystals, biotite poikilitic also can be seen in it. The quartz is mainly allotriomorphic granular filled in mineral gap. Hornblende appears long columnar, granular crystal form and the cleavage is clearly, chloritization occurs in the edge of crystal. The rock has porphyraceous structure and poikilitic structure (Fig.1b).

The average content of SiO_2, CaO, Na_2O+K_2O and $K_2O/(Na_2O+K_2O)$ of granodiorite are 61.69%, 4.91%, 6.89% and 0.44. The average content of SiO_2, CaO, Na_2O+K_2O and $K_2O/(Na_2O+K_2O)$ of porphyraceous quartz monzodiorite are 57.13%, 6.21%, 6.50% and 0.44. The content of CaO in granodiorite and porphyraceous quartz monzodiorite are higher than the similar rock of China (3.70% and 4.63%), it may be caused by assimilation and hybridization between rock body and Calcareous wall rock. Rittmann combination index (σ) of

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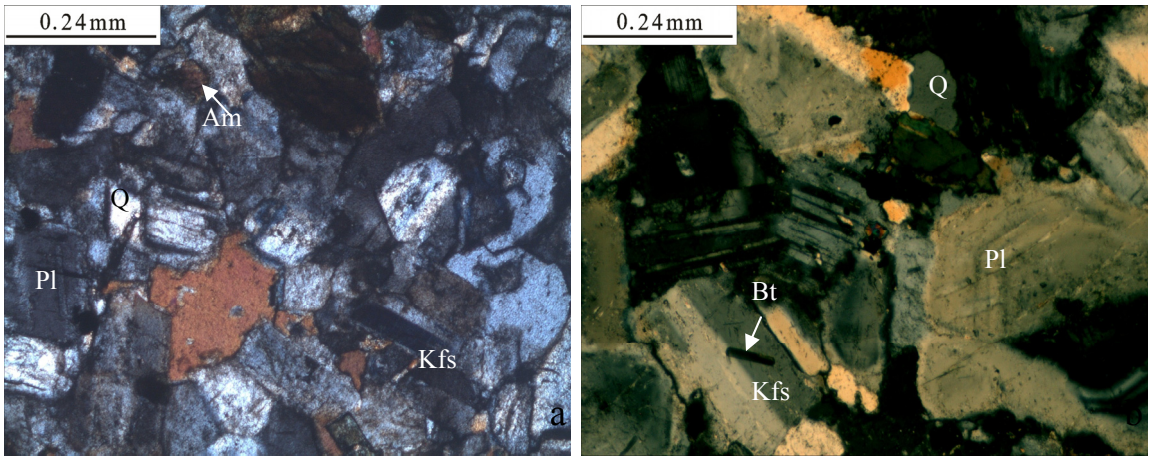

Fig. 1. The typical structure of Qingshanjiao rock body.
a, Automorphic-hypidiomorphic structure; b, Porphyraceous structure and poikilitic structure.

granodiorite and porphyraceous quartz monzodiorite are 2.55 and 3.01, in the 1.8 to 3.3 range, belonging to calc-alkaline rock. The consolidation index (SI) is 14.10, less than the consolidation index (SI) (17.09) of porphyraceous quartz monzodiorite. It indicates that the differentiation degree of is relatively high.

2.2 The relationship between the two classes of rock

It considered that granodiorite formed earlier than porphyraceous quartz monzodiorite based on field investigation and drilling documentation. It corresponded to the diagenetic age of rock body in the whole Tongling area, granodiorite took place between139.8 and 137 Ma and porphyraceous quartz monzodiorite took place between 137 and 135.8 Ma. The evidences are as follows:

(1) Based on the drilling documentation, it can be discovered that porphyraceous quartz monzodiorite contained the garnet and epidote breccias of early stage, during 121.5 to153.2 m of drilling 03 of exploration line 66, –850m middle piece.

(2) Based on the field investigation, it can be discovered that porphyraceous quartz monzodiorite contained the pyrite-chalcopyrite ore breccias (line 68 of –850 m middle piece) and hornfels breccias which altered from pelite (exploration line 44 of –730 m middle piece). Breccias with significantly edges contained thin metal sulfides.

(3) In the garnet skarn which formed by early granodiorite can be found porphyraceous quartz monzodiorite apophysis with 5 m wide (exploration line 63 of –730 m middle piece).

It can be seen that from the above analysis granodiorite and porphyraceous quartz monzodiorite have clear sooner or later relationships.

3 Rock Types and Mineralization

Different rock types correspond to different mineralization types. Mineralization associated with granodioriteis mainly contact metasomatism. Skarn, skarn mineralization and skarn ore bodies were formed during this process. Ore bodies which hosted in interlayer slip space and the contact zone of the Carboniferous strata were layered. Cupreous magnetite ore, copper-bearing pyrrhotite ore and pyrite -chalcopynite ore are mainly ore types.

Mineralization associated with porphyraceous quartz monzodiorite mainly porphyry mineralization. Its incidental alteration zoning were in sequence of rock body, the quartz-potash feldspathization bel, the quartz-sericitization belt, the sludging-propylitization belt, the skarnization belt, the hornfelsing belt, the marble and limestone. Disseminated and thin vein pyrite-chalcopynite ore is mainly ore types.

4 Conclusion

It can be seen that from the above analysis metallogenic rock body is composite body which formed in different stage of magmatic intrusive activities. Different rock bodies correspond to different mineralization, metallization patterns and deposit types.

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