Baolun Gold Deposit, An Orogenic Gold Deposit in Hainan Province, South China

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1 Intrudoction

The Baolun gold deposit is the largest gold deposit in Hainan Island, South China, containing over 80 tons of gold at an average of 29g/t Au. It is a lode type gold deposit and hosted predominantly by the Tuolie Formation, which underwent low-greenschist facies metamorphism.

The deposit, regionally within Wuzhishan fold belt of South China fold system, is situated between the NW-trending Jianfeng-Diaoluo and the EW-trending Jiusuo-Lingshui crustal fault zone. Fracture zones are the mainly geology structure, and the gold-bearing quartz veins are strictly controlled by the NW-trending fracture zones. Auriferous quartz veins are the main ores, secondary to altered rock-type gold. Through study, its geological and geochemical features are consistent with those of orogenic gold deposits, so it's an orogenic gold deposit.

2 Deposit Geology

Baolun gold deposit lies within Honggangling Anticlinorium. NNW trending fracture zones comprising a series of minor folds with the same general trend are the main ore-controlling structure. The gold-bearing quartz veins occur mainly in faults and their occurrences are controlled by the fracture fault zones. Apart from the main fold and fault, a series of different direction faults, including NE, NW, NS and EW trending, distribute in the region. And the NE trending series, which formed after the gold mineralization, widely influenced the structure of ore bodies and often cut off the ore-bearing quartz veins and resulted in sinistral displacement of the gold-bearing quartz veins (displacement ranging from several centimeters to tens of meters).

3 Re-Os Dating

In order to learn the ore-forming time and metallogeny of Baolun gold deposit, we selected molybdenite of ore-bearing quartz veins for Re-Os dating. The Re contents in all four samples are very low, ranging from 0.1417 to 0.2545 ppm. The model ages of four molybdenites are in the range between 223.8 Ma and 227.4 Ma with an average of 225.7 Ma. And their isochron age is 224.6±7.2 Ma, and the initial 187Os/188Os ratio equals to 0.002±0.013, MSMD=1.7 (MSMD=1.7). This result confirms that the metallogenic epoch.

4 Fluid Inclusions Study

Fluid inclusions were studied to reveal the primary ore-forming fluid characteristics. Samples for fluid inclusion study were collected from the main orebodies of the Baolun gold deposit, Native gold was found in the samples. We mainly studied the fluid inclusions of the second mineralization stage (Au and polymetallic sulfide massive quartz stage). Thick sections (300 μm) were used for petrographical fluid inclusion studies, within which were further analyzed by microthermometry. The aqueous inclusions give the homogenization temperature ranging from 147 to 220°C, the salinity varying from 1.6 to 8.4 wt.% NaCl (average 5.6 wt.% NaCl), the density ranging from 0.65 to 0.95 g/cm3 with an average of 0.86 g/cm3. The homogenization temperature, salinity and density of the CO2-rich fluid inclusion ranging from 260 to 340°C, 1.4 to 9.7 wt.% NaCl (average 4.9 wt.%NaCl%), and 1.01 to 1.09 g/cm3 (average 1.4g/cm3), respectively.

The studies on fluid inclusions in the Baolun gold deposit reveal that the mineralizing fluids were initially low salinity, low density, CO2-rich and originated from metamorphic fluids. Boiling of fluids at the Baolun gold...
deposit is strongly supported by petrographic observations showing that three different types of fluid inclusions coexist in the second (main mineralization) stage quartz. Gold deposition is possibly a consequence of boiling of an original H2O–CO2 fluid in response to pressure and temperature fluctuations in a relative reductive environment. Furthermore, the existence of CO2-rich, low salinity fluid inclusions provide further evidences that the mineralizing fluids of the deposit belong to metamorphic fluids.

5 Conclusions

As mentioned above, the features of the geology and minerogenic fluids of the Baolun gold deposit are consist with those of orogenic gold deposits. Therefore the deposit more likely belongs to an orogenic gold deposit(Chen, 2006, 2010; Chen et al., 2007; Goldfarb et al., 2001, 2005; Kerrich et al., 2000; Groves and Beirlein, 2007; Groves et al., 1998).

References