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Fluid inclusion study of Jinchang gold deposit and its constraint on ore genesis, western Hainan Island, South China

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Hainan lies between south China block and Indochina block. The geotectonic position of Hainan Island is in the junction of Eurasian Plate, India-Australia Plate and Philippine Plate. It is in the superimposed area of paleotethys tectonic domain and the Pacific tectonic domain. With complicated history of geotectonic evolution, Hainan Island is one of the key places to contact and explore the Mesozoic tectonic evolution of south China block and Indochina block (Zhang et al. [1]).

Jinchang gold deposit, a cataclastic altered rock-host gold deposit, locates at the northeastern end of Gezhen shear zone of western Hainan. The mineralization in Jinchang can be divided into three stages based on ore structure and mineral symbiotic combination, while the middle stage is the main stage for Au precipitation. Early stage: quartz-pyrite-arsenopyrite combination; Middle stage: quartz-polymetallic sulfide-natural gold combination; Late stage: calcite-quartz combination. According to the phases, composition of fluid inclusions and occurrence characteristics at room temperature primary fluid inclusions of Jinchang can be divided into five types. I CO₂ rich fluid inclusions, II CO₂ three phases fluid inclusions, III aqueous fluid inclusions, IV pure liquid fluid inclusions and V pure gas type. Fluid inclusions petrography study shows that the early and middle stage is rich in CO₂ fluid inclusions and the late stage is dominated by aqueous fluid inclusions (Diamond et al. [2]).

The homogenization temperature of each stage is 280~324°C, 211~303°C, 147~259°C while the salinity ranges from 6.20%~9.98%NaCleqv, 1.74%~10.73%NaCleqv, 0.18%~10.11%NaCleqv respectively. The ore-forming fluid is characterized by medium to low temperature and low salinity. Combined with laser Raman spectrum analysis, the ore-forming fluid belongs to H₂O-CO₂-NaCl type. Through isochore

intersection method of immiscible fluid the trapping temperature of the main stage is 330~360°C while the trapping pressure is 130~150MPa. Comprehensive research shows that fluid boiling and phase separation due to pressure reducing is the main reason for Au precipitation (Goldfarb et al. [3], Groves et al. [4]).

References:

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