

Metallogenesis of Mesozoic Orogenic Gold Deposit in Bangong-Nujiang Suture Belt: An Example from the Shangxu Gold Deposit

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Several medium- to large-sized Au deposits (i.e. the Shangxu and Dacha) have been discovered along Bangong-Nujiang suture belts in Tibet during the implementation of the China Geological Survey Project (CGSP). These gold deposits performance as same geological characteristics as that typical orogenic gold deposit, which confirm that an important orogenic gold mineralization event existed in the Bangong-Nujiang suture belt.

The Shangxu gold deposit is a medium size deposit with average grade of 6.8g/t and further prospecting potential, which located at Shuanghu County in Tibet. The host rock is middle to lower Jurassic mugagangri group mélangé. Ore-controlling faults are characterized by thrust-nappe and the mutiperiodic activity. The vein or lens shapes orebodies controlled by NWW brittle fracture or fault fracture zone, and consist of quartz-sulfide veins and altered rock. The ore minerals are natural gold and other sulfides. Quartz and sericite are mainly gangue minerals. Silicification and sericitic alteration distributed in the center mineralization zone with outer carbonatization and chloritization.

The homogenization temperature of ore-forming fluid concentrates between 195 °C to 225 °C; whereas salinity ranges from 2 % to 6 % NaCl eqv. The liquid phase in the fluid inclusion are enriched in Ca²⁺, Na⁺ and Cl⁻, and depleted in K⁺, Mg²⁺, NO³⁻, SO₄²⁻ and F⁻. The compositions of gaseous phase in the fluid inclusions are mainly N₂ and CO₂. The δ¹⁸O and δD values for the deposit range from +4.92‰ to +7.82‰ and from -104‰ to -136‰, respectively. The δ³⁴S_{V-CDT} data range from -4.5‰ to +4.6‰ for gold-bearing sulfides, which are similar to the sulfide from the surrounding rocks. The lead isotopes from the gold-bearing sulfide are enriched in radioactive lead. We interpreted that Mugagangri mélangé was the origin of the Au mineralization in the Shangxu deposit. The U-Pb ages of the hydrothermal zircons from the quartz veins containing gold range from 110±1 to 115±1 Ma with weighted average age of 113±1 Ma, indicates the ore formed in middle of the early Cretaceous and should be associated with the collision between the Qiangtang block and the Lhasa block.

We suggest that the ore forming processes of the Shangxu gold deposit are as follows: 1) Early-Middle Jurassic, the Mugagangri mélangé occurred as an Au-rich source bed, in which the initial Au were enriched; 2) Early Cretaceous, the closure of the Bangong-Nujiang ocean and the collision between the Qiangtang and Lhasa massifs initiated the regional metamorphism of the Mugagangri mélangé which formed the metamorphic ore-forming fluids that, constantly circulated in the host rocks, extracted and transported Au along the faults, and quickly decompressed and boiled from the closed system into the open system, and resulted in the accumulation of the metallogenic materials at the favorable faults in the Shangxu orogenic gold deposit.

References:

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