Different styles of hydrothermal alteration recorded in gold deposits: implications for gold exploration in west Junggar (Xinjiang), NW China

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Gold-bearing hydrothermal fluids fill fractures both in volcanic-sedimentary basin and in ophiolitic mélanges in west Junggar (north Xinjiang, NW China), and formed quite different gold deposits due to different chemical reaction between fluids and wall-rocks[1-4].

Two kinds of ore-bodies were recognized in the Hatu-Baobei region: quartz vein type at shallow and alteration type at depth. Native gold mainly occurs as inclusions and veinlets in arsenopyrite and pyrite. The ore-forming fluids and most elements mainly were derived from granitic rocks, which intruded into the volcanic-sedimentary basin at late Carboniferous. Such intrusive body provided hydrothermal fluid and drive fluid transporting along the Anqi fault in the Hatu-Baobei region, which controlled gold mineralization.

The Sayi gold deposit locates in the Sartohay ophiolite mélange. Gold-bearing quartz veins, hosted in listwaenite, contain native gold, chalcopyrite, pyrite, siderite, fuchsite and many other minerals. Our study demonstrates that listwaenite was formed via reaction between serpentinite and metamorphic fluid. Magnesite samples separated from listwaenite have higher $\delta^{18}O$ values (16.2‰ - 17.4‰) comparing with quartz (15.3‰ - 16.3‰) and calcite (14.9‰ - 16.0‰) separated from gold-bearing hydrothermal veins. SIMS zircon U-Pb dating suggested that the youngest U-Pb ages (278-277 Ma) could be interpreted as the re-crystallization time, which recorded a late-stage shearing process corresponding to uplift movement from ductile shearing condition to brittle-fracture condition in shear zone, and thus could estimate the ore-formation age of the gold deposits the Sartohay region.

[1] Zhu *et al* (2013) *Episodes* **36**, 205-220. [2] Zhu *et al* (2015) *Geol Mag* **152**, 41-69. [3] Wang & Zhu (2015) *Ore Geol Rev* **69**, 243-267. [4] Qiu & Zhu (2015) *Ore Geol Rev* **70**, 61–79.