

# Tungsten enrichment mechanism of gold-bearing quartz veins in the Youma'ao gold deposit, southeastern Guizhou Province, China

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**Abstract:** Host rocks of the Youma'ao gold deposit in southeastern Guizhou are mainly low greenschist facies metamorphosed rock series in the Neoproterozoic Qingshuijiang Formation of the Xiajiang Group. The Youma'ao gold deposit is a typical orogenic gold deposit. So far, the enrichment mechanism of high-temperature lithophile element of W in gold-bearing quartz veins is unclear. The petrography and inductively coupled plasma mass spectrometry (ICP-MS) are used to determine trace elements and REE contents of the gold-bearing quartz veins, wall-rocks and ore-hosted strata rocks collected from the Youma'ao gold deposit. The results show that the lithophile element W is also relatively enriched besides the enrichment of main ore-forming elements (e.g. Cu, Pb, Zn, and As, etc.) in the gold-bearing quartz veins. There are slightly right-declined REE patterns, with enrichment of LREE, no obvious Eu anomaly, and weakly negative Ce anomaly. The R-type cluster analysis shows that W, Mo of ore-forming elements have close genetic relationship with Rb, Sr, Ba, Ta, Zr, Sc, V, Sn of upper crust disperse elements or weak mineralized elements. Above all, the W enrichment mechanism is believed that the W in the W-bearing fluid was firstly combined with the local high-content calcareous minerals under low temperatures and pressures to have formed the scheelite particles in the quartz-bearing vein. Secondly, with the increase of the metamorphism intensity, the W was reactivated by the chemically active fluid and then gradually transported into the wall-rock. Thirdly, at the stage of phyllitization, almost all of the W which was activated and removed from the quartz veins was then transported into the wall-rock and ore-bearing strata.

**Keywords:** Southeastern Guizhou; Youma'ao gold deposit; Gold-bearing quartz veins; Trace elements; REE; Tungsten enrichment mechanism