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Tungsten mineralization formed by single-pulsed magmatic fluid

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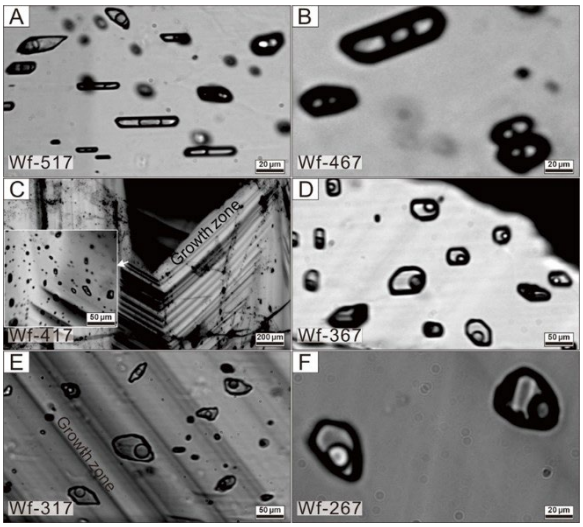
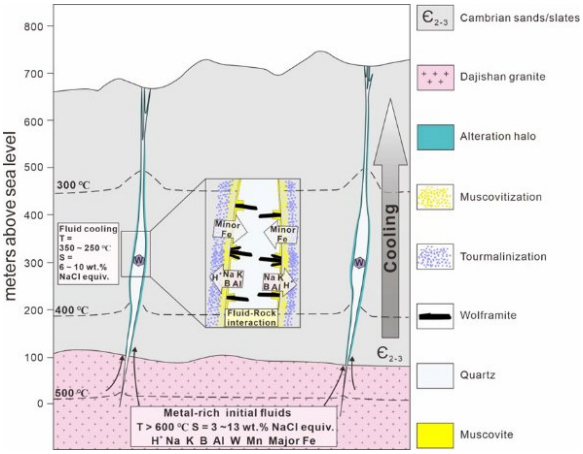
The giant Dajishan W-polymetallic deposit (24°31'40″N and 114°21'30″E), located in the Nanling metallogenic belt, is a typical steeply dipping wolframite-quartz vein-type deposit. The deposit contains a proven WO_3 reserve of 125,000 t averaging at 0.25%. In the ore veins of major industrial economic significance, abundant euhedral wolframite crystals are developed along the vein wall. In Dajishan, only one type of primary fluid inclusions was recognized in wolframite from the No. 23 vein. The fluid inclusions from different altitudes show similar phase ratios (20 – 30 vol.%) and salinities (6.3 – 10.0 wt.% NaCl equivalent), but slightly decreasing homogenization temperature from bottom to top. Hence, fluid cooling is one of the major wolframite deposit mechanisms. The microthermometry results show that neither fluid mixing nor fluid boiling/immiscibility is recorded during the wolframite deposition. LA-ICP-MS results of 24 individual fluid inclusions assemblages indicate that fluid chemical compositions contained from different levels are similar. However, only the contents of Al and Sr vary most greatly, and the results reflect the interaction between ore-forming fluid and the wall rock. Composition data of the wall rock at different positions show that fluid-rock interaction leads to addition of fluid-enriched elements K, Al, B, Nb, Mo, Sn, Ta, W, and Bi to the host metasandstone. In contrast, Fe and probably Si that are enriched in host rocks, are removed from the wall rock and added to the fluid. Fluid inclusion and wall rock analysis collectively show that the giant Dajishan vein-type wolframite mineralization is formed by a single-pulsed magmatic fluid. Vertical zonation is perhaps dominantly controlled by temperature, pressure, and local tectonic regime, but it is less dependent on the fluid chemical composition. Fluid cooling is one of the major precipitation mechanisms of wolframite at Dajishan, and fluid-rock interaction may play a subordinate role by the addition of Fe and change fluid pH to facilitating wolframite deposition during cooling.





References

Pan, J.Y., Ni, P., Wang, R.C., 2019. Comparison of fluid processes in coexisting wolframite and quartz from a giant vein-type tungsten deposit, South China: Insights from detailed petrography and LA-ICP-MS analysis of fluid inclusions. Am. Mineral. 104, 1092–1116.