

Mineralogical Characteristics of Apatite from the Jiadi Carlin-type gold deposit, NanPanjiang-Youjiang metallogenic area

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Jiadi gold deposit is the first large-scale primary gold deposit found in recent years in the NanPanjiang-Youjiang metallogenic area, which is closely related to Emeishan basalt. The content of apatite in the ore can reach 2–3% which can be divided into magmatic phase and hydrothermal phase, the hydrothermal phase can be divided into two stages.

Magmatic apatite (Ap1) formed during diagenesis of Emeishan basalt, is more in the ore, with columnar and acicular distributions of varying lengths, 20–100 μm in length and 5–25 μm in width. Part of the apatite split along the vertical long axis, showing obvious displacement, indicating the transformation and destruction of the late structure to the current apatite.

Hydrothermal apatite They are divided into stage I (AP2) apatite and stage II (AP3) apatite according to the order of formation time, with stage I (AP2) forming earlier than stage II (AP3).

Stage I apatite (AP2) is distributed in dolomite-quartz-pyrite veins as a vein semi-automorphic-allotriomorphic grain is the main structure of apatite, the particles are large, usually above 50 μm and a small amount can reach 100–200 μm, some of which are metasomatic early self-semi-self-shaped pyrite. Stage II apatite (AP3) is distributed in quartz veins with self-forming and semi-self-forming rhombohedral shape the apatite particles are mainly in the range of 30–50 μm, and a few of them can reach 60–80 μm.

The EPMA results of AP1, AP2 and AP3 show that the composition of the three kinds of apatite is quite different. The Cl, Mn, Ti, Mg and K in AP1 is higher than that in AP2 and AP3, and the concentration of Cl is the highest with an average of more than 10 times. Compared with AP3, AP2 is enriched in Ti, Mg, S, and deficient in Cl, Sr, Na. There is no significant difference between AP2 and AP3.