Laowangzhai gold deposit is the largest gold deposit in the Sanjiang Tethys metallogenic domain, whereby pyrite acts as the dominate gold-bearing mineral. Five generations of pyrite have been identified in diagenetic-metallogenic process, based on the crosscutting relationships of different auriferous veins, ore textures, and mineral paragenesis. Hydrothermal gold mineralization period could be further subdivided into four stages: Stage I quartz-sericite-pyrite stage, Stage II quartz-polymetallic sulfides stage, Stage III calcite-quartz-arsenopyrite-pyrite stage, and Stage IV calcite-quartz-stibnite-pyrite stage. The sedimentary-diagenetic period is mainly characterized by framboidal pyrite which is enriched in Pb, Zn, Mn, Co, Ni, and Bi. During the hydrothermal mineralization period, the crystal form of pyrite evolves as coarse xenomorphic grain → cube → pyritohedron → cube. These pyrites are also enriched in Pb, Zn, Mn, Co, Ni, and Bi. During the hydrothermal mineralization period, the crystal form of pyrite evolves as coarse xenomorphic grain → cube → pyritohedron → cube. These pyrites are also enriched in Pb, Zn, Mn, Co, Ni, and Bi.

**Key words:** Laowangzhai gold deposit, pyrite, trace element, ore-forming fluid

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