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Ore-Forming Process of Basalt-Hosted Carlin-Type Gold Deposits, Western Guizhou Province, China

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The basalt-hosted gold deposits in western Guizhou, China, are newly discovered Carlin-type gold deposits, and the typical deposits include the Jiadi large-size and Damaidi medium-size gold deposits. Gold mineralization mainly occurs in the Emeishan basalt and the unconformity (SBT) between the Emeishan basalt and the underlying Maokou Formation. Research indicated that the ore-forming fluids were released from the deep buried granitic magma. Ore fluids are enriched in ore-forming elements including As, Au, Sb, Hg, and Tl and volatile components including CH₄ and CO₂, and have the characteristics of high to ultra-high pressure. During the Yanshanian, ore-forming fluids upwelled to the regional structural detachment surface between P_{2m} and P_{3β} along the regional faults. Some ore-forming fluids migrated laterally and reacted with the rocks near the regional tectonic detachment surface by water-rock reaction to form the SBT. Some ore-forming fluids migrated upward along the fault to the tuff or basaltic breccia in the interlayer fracture zone of P_{3β}, and the ore-forming fluids kept migrating laterally due to the high porosity of the rock. When the ore fluids converged at the culmination, they reacted with the Fe-rich basaltic rocks. Orthopyroxene, clinopyroxene, plagioclase, magnetite, ilmenite, and other minerals of the basaltic rocks dissolved and released Fe²⁺, etc. The released Fe²⁺ combined with S and As in the ore-forming fluid to form arsenian pyrite and arsenopyrite. The Au-HS complex was decomposed, and Au was incorporated into the arsenian pyrite and arsenopyrite in the form of invisible gold. Sulfurization results in the precipitation of gold-bearing arsenian pyrite and arsenopyrite, and ultimately the formation of gold orebodies hosted by the SBT and P_{3β} basalt.

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