

## Linkage between gold mineralization and hydrocarbon accumulation in the Youjiang basin, South China: Petrographic evidence

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The Carlin-type gold deposits and paleo-oil reservoirs in the Youjiang basin, South China spatially show close association, suggesting a genetic linkage between gold mineralization and hydrocarbon accumulation. Petrographic studies show that bitumen in the gold deposits is commonly present as a migrated hydrocarbon product in mineralized rocks but is absent in barren sedimentary host rocks. Bitumen dispersed in ores is closely associated and/or intergrown with ore-stage hydrothermal minerals. Bitumen occurring in hydrothermal veins and veinlets is paragenetically associated with pre-, syn-, and post-ore stage mineral assemblages. These observations suggest an intimate relationship between bitumen precipitation and gold mineralization. In the paleo-oil reservoirs, bitumen occurring with calcite is typically concentrated along pore/vein centers and along the wall of pores and fractures, indicating approximately coeval precipitation. Fluid inclusion studies show that aqueous inclusions, hydrocarbon- and CO<sub>2</sub>-rich inclusions are dominant in the syn- and post-ore stage quartz and calcite, indicating that the ore fluid consisted of an aqueous solution and an immiscible hydrocarbon phase. In the paleo-oil reservoirs, similar types of inclusions including liquid C<sub>2</sub>H<sub>6</sub>, vapor CH<sub>4</sub>, CH<sub>4</sub>-H<sub>2</sub>O, and aqueous inclusions occur in diagenetic pore- and fissure-filling calcite associated with bitumen. The close association of gold deposits and paleo-oil reservoirs, the paragenetic coexistence of bitumens with ore-stage minerals, and the presence of abundant hydrocarbons in the ore fluids all suggest that the gold originated, migrated and precipitated along with the hydrocarbons in an immiscible, gold- and hydrocarbon-bearing, basinal fluid system.

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## Geochemical Characteristics and Tectonic Environment of Basement Granite in Weiyuan Structure, Sichuan Basin, Southwest China

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Based on the deep wells drilled into the basement in Weiyuan structure, and aeromagnetic negative anomalies, the basement of Weiyuan structure in Sichuan Basin of Southwest China, is proved to be composed of granitoids.

Well core observation and thin section identification results show that syenogranite is the main rock type. The features of major elements include high Si content, high alkali value, high K<sub>2</sub>O/Na<sub>2</sub>O ratio, high K content but low Na content, suggesting that it belongs to high-K calc-alkaline and metaluminous - weakly peraluminous series. The LREE is rich, with HREE loss and intensely negative Eu abnormality, while the chondrite-normalized distribution shows right tilting seagull-like patterns. High field strength elements Th, U, Pb, Nd, Sm and large ion lithophile elements Cs, Rb are rich, while high field strength elements Nb, Eu, Ti, Sc and large ion lithophile elements Ba, Sr are depleted (Fig.1).

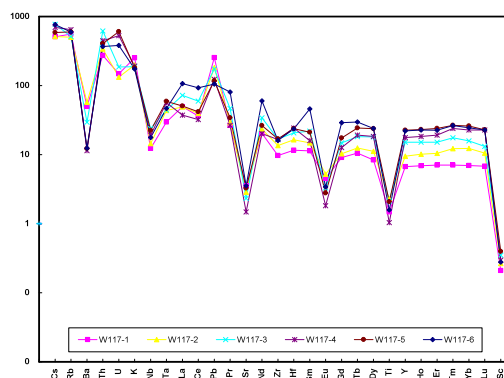


Fig.1 Spider diagram of primitive mantle normalized trace elements of basal granite in W117 well

The genetic type is A<sub>2</sub> granite, probably formed by highly fractional crystallization of crust molten magma mixing with a small amount of mantle magma. This type of granite is deduced to have developed from extensional rifting tectonic environment which may be related to Rodinia supercontinent break-up event in Neoproterozoic.