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Enrichment Regular of Trace Elements in the Huijiabao Gold Field

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1 Regional Geological Background

Huijiabao gold field is one of the type localities in the ore concentration area of Carlin-type gold deposits in Southwestern Guizhou. It is located at the intersection of the southwest margin of Yangtze Para-platform and Youjiang fold belt in the South China fold system (Guo zhenchun, 2002). Huijiabao gold field mainly consists of Shuiyindong super-large gold deposit, Zimudang large gold deposit, Taipingdong large gold deposits some other gold deposits (points).

2 Geological Characteristics of the Deposit

Orebody of Huijiabao gold field are mainly present in unpurified carbonatite of Upper and Lower Triassic and obviously controlled by Huijiabao anticline and secondary faults. The ore bodies mostly are stratiform, veinlike and occur in the fault structure and interlayer fracture zone. Ore texture mainly is euhedral or subhedral texture, zonal texture and metasomatic texture, ore structure are dominated by disseminate, veinlike and brecciated. The main ore minerals include pyrite, arsenopyrite and native gold, gangue minerals are calcite, quartz and dolomite. Gold was present in crystal defect of pyrite and arsenopyrite in the form of enclosed gold (Peng yiwei, et al, 2013). The predominant wall-rock alteration is the decarbonation of carbonates, pyritized, silicification and carbonatization and closely to the formation of gold in the gold field.

3 Enrichment Regular of Trace Elements

By calculating enrichment coefficient of trace elements

of rock and mineral in the typical gold deposits, its enrichment regularity in the Huijiabao gold field is revealed. Based on sampling locations of rocks and minerals and content of gold in the sample, the rocks and minerals sample in the Shuiyindong and Taipingdong deposits are subdivided into four categories: surrounding rock ($\omega(\text{Au}) < 0.1 \times 10^{-6}$), mineralized wall rock ($0.1 \times 10^{-6} < \omega(\text{Au}) < 1 \times 10^{-6}$), lean ore ($1 \times 10^{-6} < \omega(\text{Au}) < 10 \times 10^{-6}$), rich ore ($\omega(\text{Au}) > 10 \times 10^{-6}$), we carried out test to select 24 kinds of trace elements that close to mineralization of Carlin-type gold. We calculate enrichment coefficient of trace elements in the rich ore, lean ore, mineralized wall rock and surrounding rock and compared them (Fig. 1), using element abundances of Chinese continental lithosphere (10^{-6}) data of Li Tong (1997) as a standard value.

By comparison, we find that Hg, As, Sb, Ag, Cd, Cu, Hf, Mo, Au, Pb, Sr, Tl, V, W, Zr and Zn are manifested as gain in the surrounding rock, mineralized wall rock, lean ore and rich ore, and just a few elements (Co, Cr, Ni and Th) performance loss. Rb and Sc are gain in the surrounding rock and mineralized wall rock and loss in the lean ore and rich ore, the enrichment coefficient is about 1 and indicates that there is a little enrichment and loss.

With the deepening of mineralization degree (surrounding rock $\rightarrow$ mineralized wall rock $\rightarrow$ lean orebody $\rightarrow$ rich orebody), enrichment coefficient of elements showed an increasing tendency in the ore-forming elements association (Au-As-Sb-Hg-Tl) of the Carlin-type gold deposit, the enrichment coefficient of gold significantly increases progressively ($29.47 \rightarrow 248.40 \rightarrow 2000.86 \rightarrow 20509.81$).

In addition to ore-forming elements association (Au-As-Sb-Hg-Tl) of the Carlin-type gold deposit, Ag and W shows a higher enrichment. Ag and W also were classified

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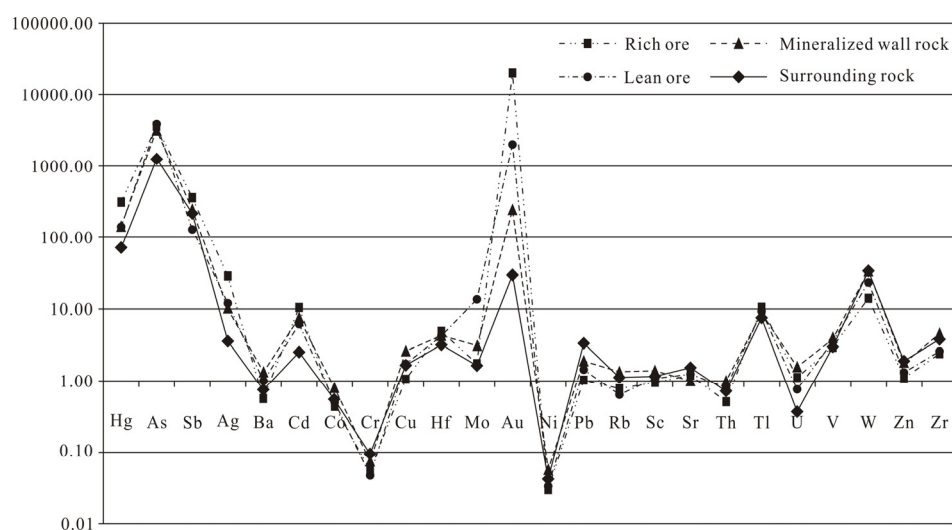


Fig. 1. Enrichment coefficient comparison of rock and mineral trace elements in the Huijiabao ore field

as the ore-forming elements of the Carlin-type gold deposit by the study of Wang Chenghui (2008). From the view of the elements enrichment rules, there is a certain rationality because Au and Ag had same properties.

Acknowledgements

Its main characteristics of enrichment coefficient coordinate with surrounding rock regardless of mineralized rock, lean ore or rich ore, indicating that ore-forming elements of ore enrich with rock simultaneously in the process of mineralization, suggesting that it has undergone the same geological processes (mineralization) with rock. Geological processes (mineralization) may be wall rock alteration which ore-forming fluid and rock have emerged in the process of mineralization. We can't

determine it that whether minerals diffuse from ore fluids to surround rock or migrate and enrich from rock to fluids, only through the study of enrichment regularity, so the further research is needed.

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