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Quantitative Analysis of Mineralization-Alteration Index about the Huize Lead-zinc district in Northeast Yunnan, China

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1 Introduction

The super-large Huize lead-zinc ore district is one of the most representative lead-zinc deposits in Northeastern Yunnan poly-metallic deposit concentration district. So far, studies（Liu and Lin, 1999；Han et al., 2007）on the type of deposits like the Huize lead-zinc deposit, focused on deposit genesis, the sources of metallogenic materials, tectono-geochemistry, metallogenic dynamics and ore-finding model and metallogenic epoch, etc., had achieved numerous research achievements. However, there are still some problems to be solved, such as the migration characteristics of elements in different alteration zones, and the quantitative analysis of hydrothermal alteration index.

2Geological Structural setting

Tectonically, the Huize ore district is located in the southern central part in northeastern Yunnan ore concentration district which looks like a triangle surrounded by SN-trending Xiaojiang fault, NW-trending Ziyun-yadu fault and NE-trending Mile-shizong deep-seated fault. Structurally, the ore district is situated at the composite junction of NE–SW-, N–S-, and NW–SE-trending faults in an area roughly between the Xiaojiang fault and the Zhaotong-Qujing concealed deep-seated fault. The Huize lead-zinc ore district is located at the Jinniuchang-Kuangshan ore-controlling fault zone in the southwestern segment of the NE–SW-trending Dongchuan-Zhengxiong tectonic zone (Han et al., 2012). The ore district is an important part of the Sichuan-Guizhou-Yunnan Poly-metallic Metallogenic Area, which is situated along the southern margin of the Yangtze Block, comprises the Qilinchang, the Kuangshanchang and the Yinchangpo deposits.

The main stratigraphic sequence in the Huize ore district is comprised of Upper Proterozoic, Permian, Carboniferous, and Middle–Upper Devonian rocks. The Lower Carboniferous Baizuo Formation (C_1b), which is the most important ore-hosted strata, is widely exposed in the district. The orebodies mostly hosted in the macro-crystalline dolomite, which is the middle–upper parts of C_1b. Magmatism is represented by the Late Permian Emeishan basalts, which are exposed in areas surrounding the deposits

3 Studying Method and discussion

The authors try to apply large-scale alteration lithofacies mapping method (Han RS, 2016), taking the typical levels of 1249m, 1274m and 1163m as an example, to analyze the levels' mineralization-alteration types, compositions of altered rocks, structure and other characteristics. The main alteration types are dolomitization, calcitization and pyritization. Mineralization mainly includes sphalerite and galena. Based on comparative research on the characteristics of different mineralization and alteration, the authors have established the mineralization - alteration zoning rules of deep deposit. From surrounding rock to mineralized center, the mineralization and alteration zoning show that grayish-white coarse-grained crystalline dolomite which is far from the orebody（Ⅰ）, coarse-grained dolomite with pinholes（Ⅱ）, beige coarse-grained crystalline dolomite（Ⅲ）, grayish white coarse-grained crystalline dolomite which is closed to the orebody（Ⅳ）, orebody（Ⅴ） and grayish-white coarse-grained crystalline

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dolomite being closed to the orebody（Ⅳ）. From the surrounding rock to mineralized center, dolomitization, calcilization and pyritization show the change regularities of alteration intensity from weak to strong. In this research, TiO_2 is used as an inactive component to calculate the migration of the main elements, Pb and Zn in different alteration zones. And then the hydrothermal alteration index（Haeussinger H, 1993） is introduced in calculation. The research may show as follows:

1) According to the mineralization - alteration zoning of the Huize lead-zinc ore district, the migration process is divided into four stages which are the stage of weakly alteration dolomite to Ⅰ, stage of Ⅰ to Ⅱ, stage of Ⅱ to Ⅲ and stage of Ⅲ to Ⅳ. During four stages, the elements Fe, CaO, MgO, Pb, and Zn in the different mineralization alteration zones almost keep transfer-in. Among them, the stage of Ⅲ to Ⅳ is the main enrichment alteration stage of each element.

2）The index of mineralization and alteration (MAI), Fe alteration index (AI_{Fe}), Pb mineralization index (MI_{Pb}) and Zn mineralization index (MI_{Zn}) increase with the decrease of distance from the orebody.

4. Conclusions

The index of mineralization and alteration has further showed the relationship between hydrothermal alteration and mineralization, thereby has pointed out the significance of ore prospecting. This research is of great significance to predict the similar lead-zinc deposits in the Sichuan-Guizhou-Yunnan Poly-metallic Metallogenic Area and its contiguous areas.

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