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Application of Tectono Geochemical Study in Deep Concealed Ore Body Exploration-------As the Huize Super-Large Lead-Zinc Deposit an exemple

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1 Geological Background of Minerlization or Geologic Setting

The northeast of Yunnan Pb-Zn-Ag-Ge polymetallic ore district is an important part of the southwestern margin of the Yangtze block Sichuan-Yunnan-Guizhou Pb-Zn polymetallic metallogenic domain, located in the east of Xiaojiang deep fault and in the southern part of Yunnan northeast depression basin, the distribution of the SN trending Xiaojiang deep fault zone and the NW trending Ziyun yadu deep fracture zone and the NE-trending Maitreya - Shizong deep fault zone surrounded by the "triangle", adjacent to the Longmen orogenic belt, the Nanpanjiang-Youjiang Hyperplasia of arc fold belt and Mojiang of Ailao Mountain - Lvchun orogenic belt. Because of multi tectonic superposition, strong geological environment change and the mechanism of metallogenic dynamics complex, metallogenic geological conditions are superior, not only the formation of China's unique germanium rich lead-zinc polymetallic ore district, and creating a super high grade rare in the world (Pb+Zn:25% ~ 35%) large super-large germanium rich zinc silver polymetallic deposit is typical in the Sichuan-Yunnan-Guizhou a lead-zinc polymetallic metallogenic domain(Han Runsheng,2014).

The Huize lead-zinc mine is composed of two lead zinc deposits in the Kuangshanchang and Qilinchang. 0re district strata by the composition pre-Sinian metamorphic basement, the Sinian and Paleozoic sedimentary cover. The rocks exposed in Huize lead-zinc mine area consist of the complete upper palaeozoic, Cambrian Qiongzhusi group formation, a part of Upper Sinian Dengying Formation, strikes NE and dips NW Lower Carboniferous Series baizuo formation that a wide range of area and the main ore-hosting strata. The structure of the mining area is mainly faults and folds, the three main strikes NE of Compresso -shear fault in the mining area, which are the kuangshanchang fault, qilinchang fault, yinchangpo fault, between the three faults Dongtou reverse fault connected.

They, derived NE-trending anticline structure (kuangshanchang anticline, qilinchang anticline, lanyinchang anticline and so on) and NW-trending pinnate transverse sectional form thrust fold structures. The NE-trending kuangshanchang, qilinchang, yinchangpo faults is the main control structure of the Huize lead-zinc deposit. For example, the kuangshanchang deposit is located in the hanging wall of the kuangshanchang fault. The same is true of the qilinchang deposit. The yinchangpo deposit is controlled by yinchangpo faults, and the orebody is strictly controlled by the NW trending faults in the area. There was a large area of the Late Permiangray of green to green black dense massive basalt, amygdaloidal basalt and Small amount of vesicular basalt in the mining area .

2 The Genetic Type of Deposits and Regularity of Ore Formation

The geological survey of Huize lead- zinc deposit began 30s and 40s of last century. Many geological prospecting units and scientific research institutions have been engaged in the exploration and research work in this area. For a long time, about the the genetic type of deposits can be argued endlessly. There have been "magmatic hydrothermal ore-forming"(Xie Jiarong 1963), " sedimentation-mineralization " (Chen Shijie, et al.1984)," Sedimentary reworking "(C Jin,1993)," Sedimentary reworking later "(Liu Hechang,1999)," Penetration - Extraction - control "(Han Runsheng), "MVT"(Zhou et al., 2001, Zhang Changqin,2005)and"Homogeneous fluid penetration mineralization "(Huang Zhilong, 2004) a variety of reasons view.

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The geologic study in the past 20 years, Han Runsheng summed up the Huize super-large-size lead-zinc deposit as rich(High grade: Pb+Zn = 25% ~ 35%), large(Large reserves of ore body and ore deposit), many(many Ge, Ag, Cd and other associated components) ,deep(Vertical extension of orebody deep), and strong(Hydrothermal alteration is strong in iron-dolomitization and dolomitization), zoning(The combination of metal minerals and altered lithofacies zoning are obvious) ,with higher(The ore-forming temperature can be as high as 255°C to 355°C), unique geological characteristics and metallogenic environment, it is different from MVT, VHMS, SEDEX and other types of lead-zinc deposits, and which is defined as the Huize type lead-zinc (HZT) deposit.

3 The application of tectonic geochemistry in ore prospecting

The breakthrough of deep ore prospecting in the mining area can not be achieved without combination of the metallogenic guidance theory and a set of exploration methods and means in accordance with the actual conditions of the mining area. The viewpoint of mine prospecting work in the mining area, and the prospecting significance of the larger "Penetration - Extraction - control "(Han Runsheng 2001a), examples are as follows:

Huize lead-zinc mine was established in 1951, the Southwest Bureau of Nonferrous Metals Geological Exploration Team 302 submitted a report of "geological calculation of Huize lead-zinc ore reserves" (the first stage), approved by the National Committee for review, submitted (B+C) level of lead and zinc reserves of 791 thousand and 400 tons, after this, although the exploration of sporadic reserves, but no breakthrough exploration.

In 1993, in the deep part of the deposit which the qilinchang of the Huize lead-zinc deposit, the No. 6 orebody was found (lead-zinc resources of 780 thousand tons). On a certain extent,this breakthrough alleviated the mine resource crisis. However, due to the lack of effective guidance and exploration methods, there has been no breakthrough in prospecting after long years, the mine has been caught in a crisis of resources. Unitl 2001, No. 8 orebody was found.

In recent years, Under the guidance of theory that penetration - Extraction – control. For the delineation and verification through the study on main ore bearing strata, control of main ore controlling structures and Tectonic geochemical characteristics. Huize lead-zinc deposit can achieve about 200 thousand tons of lead and zinc resources.

4 Study on structure geochemistry and exploration technology integration

In the process of controlling rock formation and deformation,not only regular permutation combination of structural feature constituted structural system, it affects the distribution, migration, accumulation and dispersion of geochemical elements (isotopes), accompanying mineralization and the formation of a series of geochemical anomalies.

The study of tectonic geochemistry mainly deals with ore controlling structure complex transformation and distribute regulation for ore-forming elements (isotopes) under certain geochemical conditions,it explore regular of the migration of ore-forming fluids and evolutionary process ofgeochemical elements, it reveale the occurrence regularity of matter composition in various tectonic environments, and then guide the metallogenic prediction and the development of prospecting and prospecting work in the mining area.

A large number of exploration examples show that the study of tectonic geochemistry can achieve the following six objectives. (1) To indicate the key prospecting target and specific target. (2) To infer the approximate occurrence of concealed ore bodies. (3) To provide information on deposit genesis. (4) To predict new type of deep ore deposit types and new mineral. (5) To reflect some types of ore controlling structures. (6) To infer the flow direction of ore-forming fluid (Han Runsheng, 2013).Deposit of controlled by structure such as the kuangshanchang lead-zinc deposit and qilinchang lead-zinc deposit, its experience of exploration breakthrough can be summarized as the following five aspects.（1）To analysis deposit of metallogenic structure and to build new model. （2）Construction, metasomatically altered mapping and structural geochemical fine measurement. （3）Extraction and interpretation of tectonic geochemical anomalies and the establishment of prospecting model by geophysical methods.（4）Optimization of key prospecting targets.（5）Engineering verification and feedback validation information.

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