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Mineralogical-Petrographic Study of the Mengyaa Pb-Zn Deposit, Tibet

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1 Introduction

The Mengyaa Pb-Zn deposit has attracted the attention of Chinese researchers because it is located in the highly prospective Nyainqentanglha-Gangdese metallogenic belt of Tibet. This paper reviews previously published work on the mineralogical-petrographic characterization of the deposit, new field work and laboratory work data.

2 Geological Characteristics of the Deposit

The Mengyaa Pb-Zn deposit is located in the central and southern parts of the Nyainqentanglha-Gangdese belt. The rocks belong to the Tibetan Tethys structure.

Exposed strata are mainly those of the Laigu Formation (dominantly from the formation's third lithologic section (C_2-P_1)₃), the Luobadui Formation (P_2) and the Lielonggou Formation (P_3) (Wang et al., 2011). The deposit is located in the northern limb of the Langyue syncline, the second fold of Serirong-Baga anticlinorium (Cheng, 2008). East-west-striking faults are mostly observed in the contact zones of middle and the southeast Laigu and Luobadui Formations. Magmatic rocks comprise granite porphyry, quartz porphyry and diabase porphyry. These rocks occur as dykes intruded in the Laigu and Luoba Formations.

3 Characteristics of Ore Bodies

According to their spatial position and features of mineralization and alteration, the different ore bodies can be divided into two mineralized belts. The Number I mineralized belt is distributed close to the contact between the Laigu and Luobadui Formations. The Number II mineralized belt is hosted by the Luobadui Formation (Cheng, 2008). The ore bodies are mainly of layered and vein type; many of them are observed at the contact surfaces between sandstones and slates. Many of the vein

orebodies crosscut calcareous siltstone and carbonaceous slates of the Laigu Formation.

4 Characteristics of Mineral Assemblages

From microscope examination, we have established that the gangue minerals in the deposit are quartz, calcite, sericite and skarn minerals such as andradite and grossular garnet, tremolite, diopside, actinolite, chlorite and epidote. The primary ore minerals are magnetite, ilmenite, molybdenite, stannite, pyrite, pyrrhotite, sphalerite, chalcopyrite and galena. Secondary minerals include malachite, anglesite, hematite and goethite. Ore textures include idiomorphic granular texture, hypidiomorphic granular texture, exsolution texture, metasomatic texture, skeleton texture.

We have reached the following conclusions:

(1) Early-formed pyrites have good euhedral-subhedral textures and skeletal textures which are metasomatoses by pyrrhotite.

(2) Magnetite displays euhedral-subhedral crystal textures; magnetite is replaced by pyrrhotite and forms dissolution structures.

(3) Galena is replaced by pyrrhotite and forms metasomatic relict textures or corrosion textures.

(4) There are two generations of chalcopyrite present. The first generation of chalcopyrite and sphalerite have formed exsolution textures, whereas the second generation of chalcopyrites replace sphalerite and form metasomatic texture, and stannites and chalcopyrites form exsolution texture.

(5) Sphalerite is replaced by galena and forms metasomatic relict textures and corrosion textures.

(6) Sphalerite and galena are replaced by pyrrhotite and formed corrosion textures; pyrites are replaced by chalcopyrites and formed corrosion textures.

Combined with identification of microscopic characteristics, we determine that the paragenetic sequence of the main ore minerals is: magnetite → molybdenite,

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Table 1 Mineralograph characteristics of pyrrhotites in the Mengyaa Pb- Zn deposit

Number	Ar	DRr
Zk131-4	weak heterogeneity	DRr=v>r
Zk071-1	2°	DRr=r≥v
Zk744-12	2°	DRr=r≥v
Zk426-1	1.8°	DRr=r≈v
Zk545-12	2.4°	DRr=r≥v

stannite, pyrite, pyrrhotite → sphalerite, pyrite, galena, pyrrhotite and chalcopyrite.

Mineral which formed in different environment is diverse in optical properties. In mineralography, reflectance and phase difference of the elliptical polarization of mineral are diverse in different environment. Thus, the apparent angle of anisotropic rotation (A_r) and the dispersion of reflection rotation (DR_r) are diverse. According to previous research, the apparent angle of anisotropic rotation (A_r) of hexagonal system of pyrrhotite is 2°, it indicates that the formation temperature is higher; The A_r of hexagonal system of troilite is 2.5°, it indicates that the formation temperature is 100°-170°; The A_r of monoclinic system of pyrrhotite is 1.3°, it indicates that the formation temperature is lower; Through the study of different pyrrhotites in Mengyaa deposit (Table 1), the variation range of the A_r of pyrrhotites is 1.8°- 2.4°, we

speculated that the range of formation temperature of pyrrhotite is wide. These results demand further research to identify the different stages of pyrrhotite formation.

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