1 Geological Background in Tongchang Area

Yimen mining is located in the southwest side of south-north direction tectonic system of the Sichuan Yunnan, the south of Yinmin-Yimen Trough, being close to the Kunyang archi-continent in the east and the Yuanmou-Xinping island arc in the west, which is an important copper resource region. Previous studies are few and old on this mine and are restricted to some brief studies, such as geological features, a small amount of ore bodies, structure, ore-rich stratum and the origin of deposit (Sun, 1995; Wu, 1989; Han et al., 2003; Ran et al., 1993; Sun, 1988; Shi et al., 1988; Ren et al., 1984). Base on careful and detailed field geological research and laboratory analysis, the authors gained new insights into mineralization zoning and the origin of deposit. The authors believe this understanding will be favorable for further prospecting.

Yimen copper belt located in E'lachang-Shizisan gripped between SN Yimen faults and Lvzhijiang faults in the southern section of Kangdian axis. There are Lvzhijiang enormous faults, Tanglang faults and Yimen faults produced in this area, the tectonic belt consist of which. Lots of folds are developed in the region. The main folds include Wanbaochang syncline, Qibulang anticline, Tongchang syncline etc. from east to west. The revealing layers mainly contain Dalongkou Group (Pt2_d), Meidang Group (Pt2_m), Yinmin Group (Pt2_y), Luoxue Group (Pt2_l) and E’touchang Group (Pt2_e). In particular the Luoxue Group (Pt2_l) is the primary ore bed (Fig. 1). Lamprophyre, diabase etc. intrude as dikes and stocks, and constitute the igneous rock in the mining area. The wall rock alteration includes silicification, dolomitization, baritization, as well as albitization, sericitization, choritization etc. near the igneous rock.

2 Mineralization Zonation of Tongchang Area

Some information can be obtained from the field of geology: the mineralization type mainly is chalcopyrite-bornite mineralization in the north Tongchang area. However elsewhere in Tongchang area there is obvious mineralization zoning. It is developed from bottom to top as follows: Bornite mineralization → bornite + chalcopyrite mineralization → chalcopyrite mineralization → pyrite mineralization. It also shows the intensity of
mineralization gradually weakens from north to south. In addition, pyrite mineralization is only seen in the E’touchang stratum of the north part to No.19 line, which shows discontinuous mineralization near the No.19 line. Therefore the authors conclude that the characteristic of mineralization zoning is contrary to typical magmatic hydrothermal mineralization. Moreover, it shows mineralization breakpoints near the No.19 line, which may be related to fold, fracture and fault effect in Tongchang area.

3 Deposit Genesis

Previous research shows the Tongchang deposit is single stratabound ore deposit. However through geological work, we confirmed there are two different kinds of genetic types in Tongchang deposit:

One is distributed from NO.10 line to No.23 line, mainly distributed in in dolomite stratum belongs to Luoxue Group (Pt2l2). It is mostly sedimentary-diagenetic ore body. Mineral assemblage is micro-grain bornite, contains a small quantity of chalcopyrite which is located in the interlayer micro-cracks and stylolites. This type of ore is newly described in the Tongchang ore body.

Another one distributed in the north of No.10 line to Xinzhuang - Dajianshan area also has vein type ore body in the tip of the souther. It is mostly vein type ore body. The most typical is Dajianshan ore block, which can be called Jianshan type ore body. Nervation ore has an obvious wear layer phenomenon cuts across Luoxue Group (Pt2l1, Pt2l2, Pt2l3), even cuts across the E’touchang Group. It comprises chalcopyrite and pyrite in quartz-calcite-barite veins. The mentality on the bedding prospecting restricted the prospecting breakthrough of the Dajianshan type vein ore body.

This new understanding of alteration and mineralization zonation can be directly used as indicator for prospecting, and can be helpful to deepen the understanding of ore deposit genesis, broaden exploring information and improve prospecting efficiency.

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