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The Discovery of Skarn Mineralisation and its Geological Significance in the Mengyaa Deposit, Tibet

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1 Introduction

The Mengyaa Pb-Zn deposit is located in Rongduo village, Lhari County, Tibet autonomous region,. The structure belongs to the Lunggar-Nyainqentanglha Mesozoic eastern island arc chain in the middle of the Gangdisi-Nianqing Tangula plate. It is a very important lead-zinc deposit area in the Nyainqentanglha-Gangdise metallogenic belt Menba - Jinda copper-lead-zinc-silver-molybdenum polymetallic ore district. With the increasing prospecting, mine drill core shows a large number of garnet and wollastonite (skarn) minerals. This observation provides the basis for skarn type genesis of the Mengyaa Pb-Zn deposit.

2 Deposit Characteristics

Mining area strata are Upper Carboniferous and Triassic Laigu Group (C₂-P₁/I) sandstone and slate, Middle Triassic Luobadui Group (P₂/I) carbonate, Triassic Lielong Ditch Group (P₃/I) mottled sandstone and siltstone and Quaternary. Structure is mainly folds and faults. The Langyage syncline trends east-west through the mining area. Department of nuclear formation is the Lielong Ditch Group, two strata is Laigu Group and Luobadui Group. Mengyaa Pb-Zn deposit is located in the north wing of the syncline. Faults in the ore field have multiple period activities. East-West fractures are widely developed and are the main ore hosting structure of the mining area. The NE trending faults in the mining area of South East. As the structure broken ore. NS faults developed in the areas of central and Western, Pb-12 ore body formation is closely relationship with the fault. The major intrusive rocks in the mining area are granite porphyry, diabase and

diabase porphyrite. Small scale dyke intrusive are diabase and diabase porphyrite, distributed in the central and eastern of the mining area, output in E-W swarms. Granite porphyry distributed in the central and Northern Mining Area, and output in the dikes form in the Laigu Group, Lobadui Group and its contact boundary.

3 Research Status

Through the geology and isotope geochemistry study of Mengyaa deposit, Cheng (2008) hypothesized the mine granite porphyry played the decisive role of deposit formation. Mineral mainly derived from magmatic hydrothermal solution. The genetic types of the deposit belongs to magmatic hydrothermal metasomatic. LA-ICP-MS zircon U-Pb age in granite porphyry (Wei, 2010) is (13.9 ± 0.27) Ma, thought the Mengyaa deposit formed in the late Miocene. Wang (2010) analyzed the Mengyaa metallogenic geological conditions, sulfur, lead isotopic composition of the ores, and the characteristics of fluid inclusions. The results show that the ore-forming fluid was magmatic hydrothermal solution at early stage, and then mixed with meteoric water. The sulfur in ore-forming fluid is mainly magmatic in origin. The formation of the deposit is closely related with the Cretaceous granites, probably formed in late Yanshanian. Through the study of geological characteristics and geochemical characteristics of Mengyaa lead-zinc deposit, Zhang (2011) suggested that the deposit is related with the collision magmatism stratabound skarn type deposit, ore-forming material with strata and magmatic dual source, and Laigu Formation provided more the ore-forming material. The deposit is not high temperature silicate skarn minerals in early skarn stage, but a mesothermal deposit.

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4 Characteristics of Stem Skarn Mineral Output

No. 14 lead-zinc ore bodies and 21 iron lead-zinc ore bodies occur mainly in the skarn. Skarn is brown, gray green in color and block structure. Skarn mineralogy is garnet and wollastonite with minor tremolite and diopside. Garnet is mainly andradite and grossularite, with small amount of manganese aluminum garnet. Grossularite is yellowish green, euhedral to subhedral structure, size ranging from 2 mm to 0.2 mm, prolific out on calcium iron garnet or output with andradite common. Andradite is reddish brown, euhedral to subhedral structure, particle size ranging from 5 mm to 0.6 mm, intensive block. Wollastonite is mostly white, light pink, radial aggregates, single crystal length 2 cm to 3 cm, growth is widely, output in skarn rocks and with contact in marble and rock. Through detailed catalog drilling, it is found that skarn minerals form vertical zonation, shallow skarn mineral assemblage are andradite and Grossular, wollastonite, diopside and actinolite.

5 Genesis of the Deposit

The latest drillhole data of No. 14 and No. 21 skarn orebodies display that the deposit contains skarn minerals: calcium iron garnet, grossularite and wollastonite in No. 21 orebody showing a large amounts of magnetite and a small amount of molybdenite, direct deposit is high temperature minerals assemblage. In addition, deposit also

developed the typical mineral assemblage of Wet skarn stage, Oxide phase, Quartz sulfide stage. The mineral assemblage features from basic geology in fact further reveals the Mengya'a deposit formed through the typical skarn deposit from high temperature to low temperature transition "period five stages" metallogenic model. This is also from the mineralogy of the deposit that formed not exhalative sedimentation deposit.

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