

# Genesis of Chazangcuo Cu-Pb-Zn Deposit, Tibet, China: Constraints from Geological Characteristics and H-O-S-Pb Isotope Geochemistry

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The recently discovered Chazangcuo Cu-Pb-Zn deposit (210,000 t Cu @ 3.19%; 250,000 t Pb @ 3.04%; 370,000 t Zn @ 1.25%) is located in the Central Lhasa terrane in the Gangdese metallogenic belt. Vein-type orebodies are hosted by the volcanic rocks of the Paleocene Dianzhong Formation, Linzizong Group, and are controlled by NWW-striking faults. Ore minerals at Chazangcuo are dominated by chalcopyrite, galena, sphalerite, pyrite, malachite, and azurite. Hydrothermal alteration includes propylitization, silicification and limonitization. The ores primarily show euhedral to subhedral granular and metasomatic-relict textures, and mainly involve vein, crumb, disseminated, and speckled structures.

In this study, detailed field work, petrography, and H-O-S-Pb isotope analysis from the VII main orebody were carried out in an attempt to discover the genesis of the deposit. Calculated  $\delta D$  and  $\delta^{18}O_{H_2O}$  values of the fluids range from  $-111$  to  $-68\text{‰}$  and from  $-8.65$  to  $0.27\text{‰}$ , respectively, suggesting that the fluids are dominated by magmatic water mixing with meteoric water. The  $\delta^{34}S_{CDT}$  values of  $-1.6$  to  $3.1\text{‰}$  (avg  $1.42\text{‰}$ ), and the  $^{206}Pb/^{204}Pb$ ,  $^{207}Pb/^{204}Pb$ ,  $^{208}Pb/^{204}Pb$  values of  $18.66$  to  $18.726\text{‰}$ ,  $15.72$  to  $15.793\text{‰}$ , and  $39.221$  to  $39.48\text{‰}$ , respectively, for sulfide minerals at Chazangcuo deposit are different from those for Dianzhong Formation volcanic rocks.

The above data suggest that mineralizing fluids were dominated by magmatic water mixing with meteoric water and the ore-forming elements mainly come from a magmatic source in the upper crust. We interpret the Chazangcuo deposit as a magmatic-hydrothermal vein-type deposit. In addition to previously identified skarn and volcanic-hydrothermal polymetallic copper deposits, magmatic-hydrothermal vein-type deposit are also an important deposit type in the western part of the Gangdese metallogenic belt.