

SRD043-P03

Room:Convention Hall

Time:May 22 10:30-13:00

Oxygen isotopic variation of vein quartz at the Toyoha deposit: a reconnaissance study

Ken-ichiro Hayashi^{1*}

¹University of Tsukuba

The Toyoha deposit, an epithermal polymetallic vein-type deposit, was formed by two-stages mineralization. The veins in the northwestern part of the deposit were formed early mineralization (early-stage veins), while southeastern veins were formed by late mineralization (late-stage veins).

The oxygen isotope ratios of vein quartz were obtained for major veins. Delta ¹⁸O values of quartz from early-stage veins (Rebun, Rishiri, 3rd Chikugo, Bizen and Tajima veins) are +2.8 to +5.5 per mil, and those of late-stage veins (Izumo, Sorachi, Iwami, Shinano veins) are +3.3 to +8.8 per mil. The delta values of late-stage veins are higher than those of early-stage veins. Calculated delta ¹⁸O values of ore-forming fluid responsible for the veins are -9.3 to -4.2 per mil for early-stage veins, and -7.2 to +1.6 per mil for late-stage veins. These values are between local meteoric water (-11 per mil) and primary magmatic fluid (+5.5 to +9.5 per mil). The variation of delta values of ore-forming fluid can be explained by the difference of mixing ratio of meteoric water and magmatic fluid.

Previous mineralogical and geochemical studies have revealed that ore-forming conditions for early-stage and late-stage veins were distinctive. Early-stage veins were formed under relatively high oxygen fugacity, and ore-forming fluid was supplied by magnetite-series magma. Late-stage veins were formed under reduced condition, and have polymetallic nature. Difference of ore-forming conditions was explained by the model, where magnetite-series magma responsible for early-stage veins assimilated sedimentary rock then changed to reduced nature and supplied ore-forming fluid of late-stage veins (Ohta, 1995). If assimilation of sedimentary rock occurred, delta ¹⁸O values of bulk rock would shift to heavier. Then oxygen isotopic data of this study supports the model proposed by Ohta (1995).

Keywords: oxygen isotope, Toyoha deposit, ore-forming fluid, quartz