

Mineral chemistry and ore microscopy study of a polymetallic Pb-Zn-Cu(\pm Au, Ag) mineralization, Akçakale-Gümüşhane, northeastern Turkey

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The aim of this study is to investigate a polymetallic hydrothermal type Pb-Cu-Zn (\pm Au, Ag) mineralization found Gümüşhane state located in southern zone of Eastern Pontide, which is one of the major tectonic units of Turkey. Mineralization is developed within and around the NW-SE and NE-SW trending fractures and veins cutting Late Carboniferous age Gümüşhane Granitoid in Akçakale area. The mineralized veins have N60W/35SW and N70E/80SE bearings and their length and width changes between 75-125 m and 4-12 cm, respectively. The width of silicification zone, including mineralized veins, ranges from 30 cm to 75 cm.

The mineral paragenesis of mineralization is determined as pyrite, sphalerite, chalcopyrite, galena, fahlores (tetrahedrite?) and gold. Hematite, limonite, malachite and azurite are the common oxidation minerals. Quartz, being the most abundant, calcite and ankerite are present as gangue minerals. Observed ore textures include cataclastic textures between pyrite minerals, replacment textures between sphalerite and galena, and intergrowths texture of sphalerite with chalcopyrite,

According to the mineral chemistry results, galena minerals are fairly to be pure, and not contain trace elements. It is determined that pyrite minerals comprise Cu and Zn as trace elements and some chalcopyrites show enrichment of Mn. Based on the chemical analysis results of sphalerite minerals Zn/Cd ratio changes between 117.87-119.16 and this indicate a magmatic origin for the occurrence of mineralization. Among the trace elements within sphalerite Fe bear characteristics of the most compatible element with the Zn ($r = -0.60$), that is the major component of sphalerite. This negative correlation between Fe and Zn shows that Fe replaced the Zn as a function of temperature. According to the mineral chemistry results, gangue mineral containing carbonate is determined as ankerite.