

# **Silicate and sulfide mineral chemistry of some carbonate-related Pb-Zn-Cu mineralizations and their effects on ore genesis in NW Anatolia, Turkey**

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The studied Pb-Zn-Cu deposits are located between Çanakkale and Balıkesir provinces in NW Anatolia. Two deposits are investigated in these provinces, Lapseki-Çataltepe and Yenice-Kalkım deposits, situated to the northwest and southeast of Çanakkale, respectively. The main rock units in the region range in age from Paleozoic to Tertiary. Paleozoic rocks are generally characterized by Karakaya Complex units which are represented by Permo-Triassic metamorphic rocks consisting of schists and calcschists with lens- and/or band-shaped recrystallized limestones and/or marble intercalations. Tertiary rock units are represented by Eocene granitoids and volcanics in Lapseki area, and Oligo-Miocene granitoids and Middle Miocene volcanic rocks in the Yenice area. Mineralized zones in both deposits occur as hydrothermal veins in carbonate levels of metamorphic rocks or rarely in the fractures of other metamorphic rocks. The main ore mineral paragenesis for both deposits is galena, sphalerite, chalcopyrite, pyrite and arsenopyrite assemblage, while gangue minerals are garnet, epidote, quartz and calcite. Manganiferous hedenbergitic pyroxene and hematite are only found in the Yenice-Kalkım deposits.

According to EPMA studies, the garnets from Kalkım (Handeresi, Bağırkaç and Fırıncıkdere adits) are grossularite, andradite and hydroandradite in composition, while the garnets from the Çataltepe deposits are andradite and grossularite in composition. Pyroxene minerals are determined as manganiferous hedenbergite, johannsenite and diopside based on XRD, EPMA and Raman Confocal spectrographic analyses. EPMA studies of the ore samples of the Lapseki area show that there are two types of galena: (1) low Ag-Bi-Te bearing galena and (2) high Ag-Bi-Te bearing galena. Trace element mineral data indicate that sphalerite minerals can be classified as two groups according to Fe and Co contents: (1) low Fe and Co bearing sphalerite, and (2) high Fe and Co bearing sphalerite. Pyrite and chalcopyrite minerals are also divided into two groups; (1) Co rich pyrite and chalcopyrite and (2) Co-poor pyrite and chalcopyrite.

Trace element analyses of sulfide minerals in Yenice-Kalkım area show that there is only one type of galena, sphalerite and pyrite formations. Trace element contents of Yenice-Kalkım ores are similar to the low sulfide bearing galena, sphalerite and pyrite minerals of Çataltepe ores. According to both geochemical analyses and EPMA studies, Kalkım area deposits with low Ag-Bi-Te-Fe-Cu-Zn-Co contents seem to be compatible with low Ag-Bi-Te-Fe-Cu-Zn-Co contents in the Lapseki area. In conclusion, EPMA results show that there are, at least, two different ore forming fluids active during the ore forming processes in Lapseki-Çataltepe deposits. Similar metallic element interactions for ore forming fluids in Kalkım area, Pb-Zn-Cu deposits, cannot be found as in the Lapseki-Çataltepe Pb-Zn-Cu deposits.