Mineralogy and petrography of the Keban Pb-Zn-(Cu) skarn deposit, Elaziğ, eastern Turkey

Ece Kirat and Halim Mutlu
Ankara University, Graduate School of Applied Science, Geological Engineering, Ankara, Turkey (ece.varoll@gmail.com)

The Keban Pb-Zn-(Cu) skarn deposit in the Elaziğ region, Turkey, was formed at the contact zone of the Permo-Triassic metamorphics and the Late Cretaceous plutonic rocks in the Eastern Taurus orogenic belt. The mineralization is hosted by skarn and meta-clastic/carbonate rocks of the Keban Metamorphics intruded by alkali syenite porphyry, which is associated with the Pb-Zn-(Cu) mineralization. The rock units in the region are partly hydrothermally altered graphite calc-schist containing crystallized limestone interlayers and lenses, meta-pelitic rocks (phyllitte/calc-phyllite), dolomitic limestone, calc-silicate hornfels, marble and plutonic rocks. Calc-silicate hornfels is an initial metamorphic product occurred in contact zone of the intrusive unit. Results of mineralogical studies indicate that garnet and pyroxene-rich skarn formed in early (prograde) stage of skarnization whereas epidote, chlorite, tremolite, phlogopite, muscovite, calcite, quartz and fluorite are typical minerals of the retrograde stage. Using the Raman spectroscopy investigations, garnets in alteration zone are subdivided into two groups. Garnets in andradite composition are zoned and occur close to the intrusion reflecting high-temperature conditions and those of grossular composition represent low-temperature conditions. The sill/dykes and stock-like Keban plutonic rocks hosting foid syenite porphyry and nepheline syenite are of holocrystalline hipidiomorph porphyritic texture including large nepheline and plagioclase phenocrysts. Metallic minerals comprise sphalerite, galena, chalcopyrite, magnetite, bornite, pyrite, fahlore and hematite, which mainly occur as dissemination, vein and massive forms and crosscut by late-stage quartz, fluorite and calcite veinlets. Sphalerite is medium-coarse grained, semi-euhedral and contain chalcopyrite inclusions. Blebs of chalcopyrite are widely recognized in sphalerite (chalcopyrite disease). Galena replaces sphalerite and in some cases, it hosts several sulfo-salt minerals. Magnetite partly or completely transforms to limonite and chalcopyrite inclusions in sphalerite occur among the magnetite grains.

Key words: Keban, Pb-Zn-(Cu) skarn deposits, Mineralogy, Petrography, Ore Microscopy, Raman Spectroscopy