



Mass change calculations of hydrothermal alterations within the volcanogenic metasediments hosted Cu-Pb (-Zn) mineralization at Halilar area, NW Turkey

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The Halilar Cu-Pb (-Zn) mineralization that is formed in the volcanogenic metasediments of Bagcagiz Formation at Balikesir province, NW Turkey, represents locally vein-type deposit as well as restricted to fault gouge zone directed NE-SW along with the lower boundary of Bagcagiz Formation and Duztarla granitic intrusion in the study area. Furthermore, This granite is traversed by numerous mineralized sheeted vein systems, which locally transgress into the surrounding metasediments. Therefore, this mineralization closely associated with intense hydrothermal alteration within brecciation, and quartz stockwork veining. The ore mineral assemblage includes chalcocopyrite, galena, and some sphalerite with covellite and goethite formed during three phases of mineralization (pre-ore, main ore, and supergene) within an abundant gangue of quartz and calcite. The geologic and field relationships, petrographic and mineralogical studies reveal two alteration zones occurred with the Cu-Pb (-Zn) mineralization along the contact between the Bagcagiz Formation and Duztarla granite; pervasive phyllic alteration (quartz, sericite, and pyrite), and selective propylitic alteration (albite, calcite, epidote, sericite and/or chlorite).

This work, by using the mass balance calculations, reports the mass/volume changes (gain and loss) of the chemical components of the hydrothermal alteration zones associated with Halilar Cu-Pb (-Zn) mineralization at Balikesir area (Turkey). It revealed that the phyllic alteration has enrichments of Si, Fe, K, Ba, and LOI with depletion of Mg, Ca, and Na reflect sericitization of alkali feldspar and destruction of ferromagnesian minerals. This zone has high Cu and Pb with Zn contents represents the main mineralized zone. On the other hand, the propylitic zone is characterized by addition of Ca, Na, K, Ti, P, and Ba with LOI and Cu (lower content) referring to the replacement of plagioclase and ferromagnesian minerals by albite, calcite, epidote, and sericite with chlorite.

Keywords: Mass balance calculations; hydrothermal alterations; Cu-Pb (-Zn) mineralization; Halilar area; NW Turkey