The types of hydrothermal alteration and behavior trace elements at around of Eastern Black Sea Volcanites and Sulfide deposits, Turkey

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The volcanic rocks of the Eastern Black Sea are predominantly andesitic to dacitic in composition and partly composed of rhyolitic and rhyodacitic lavas and pyroclastics. Widespread and intense hydrothermal alteration associated with volcanogenic massive sulfide and vein-type sulfide deposits are observed throughout Upper Cretaceous aged rocks in the Eastern Black Sea volcanogenic province. The ore deposits are accompanied by intense potassic, phyllic (sericitic), argillic, silicic, propylitic and hematitic alteration. To investigate the effects of hydrothermal alteration on the chemistry of the volcanic rocks, in addition to mineralogical analysis the parent and altered rocks, chemical composition (major and trace elements, including rare-earth elements (REE), was analyzed.

The results of this study demonstrate notable differences in the REE behavior in the different sample groups. The potassic, hematitic, illitic and smectitic altered rock groups are characterized by moderate LREE enrichment ($(La/Yb)_{cn}$ = 8.18, 8.95, 10.49 and 11.03, respectively), while other rocks groups have slight LREE enrichment. Most of the samples have pronounced strong and/or slight negative Eu anomalies ranging from 0.35 to 0.88, while hematitic and propylitic rock samples have slight positive Eu anomalies (1.5 and 1.11, respectively). Most of samples show positive Ce anomalies, except hematitic (0.95) and smectitic (0.97) samples. Mass gains of HFS, TRT, REE and LIL elements were found in nearly all sample groups. LRE elements are generally retained in illitic and smectitic samples, while HFS and TRT elements were retained in hematitic samples and LIL elements in potassic and illitic samples.

Introducing of alteration zones related to mineralization in Darreh-Zar area, Kerman, Iran

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The Darreh-Zar area is situated in a part of the Urumieh-Dokhtar Magmatic belt in the centre of Iran. The Eocene volcano-sedimentary rocks are the main geological units in the area. These rocks are intruded by the Oligo-Miocene intrusive bodies where they caused an intensive alteration and formation of copper mineralization.

Petrography and mineralization and XRD studies show pervasive alteration zones related to mineralization. The alterations are potassic, phyllic, argillic, propylitic and silicification. Mineralization frequently is associated to argillic and silica alteration. Also phyllic overprints with potassic alteration in the central to western parts of the area. The potassic zone includes K-feldspar, biotite and hornblende. Biotite and hornblende are frequently altered to chlorite.

The mineralization is in the form of disseminated, vein and vein let around of faults zone, dikes and intrusive missives. The main mineralization texture is open-space filling. The ore minerals are pyrite, chalcopyrite, covellite, bornite, chalcosite and galena. Copper carbonates with iron oxides are visible also frequently. Pyritization is associated mostly with pervasive altered rocks. The pyrites can be seen in the form of disseminated and vein let. Also, this zone is associated with disseminate chalcopyrites. It seems that alterations, disseminate chalcopyrites and pyrite have been formed by a primary high temperature hydrothermal fluids. Finally, the formation of carbonated and oxide minerals mostly occur on weathered surface rocks.