

Application of statistical methods in geochemical anomalies identification, Baidjan area, North of Iran

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The Baidjan exploration area is located in north of Iran that contains few deposits related to igneous rocks with important source for Cu, W, Sn and locally Au and U. This area contains several MVT base metal deposits, too. In these deposits types, tectonic structures are important. Also, alteration zone are useful for determination the location of igneous and hydrothermal deposits. Remote sensing technology has been a useful tools for recognition these phenomena. Landsat ETM+ data were used to study alteration zones and tectonic structures. Different approaches were used in this project, such as band rationing, principal component and digital filtering. In this area RGB ETM+541 were make better picture and RGB ETM+321 were make worse picture that these are result of spectrometer of geological phenomena. The structures were identified using low passfilter, edge sharpening detector filter, Laplacian detector, Sobel edge detector and specially sun angle filter. WE and N45°E are main orientation of these faults. These faults have homogeneous dispersal in this area. To determination alteration zone, we used the classic ETM+5/ETM+7 ratio for identifying clay mineral zone and ETM+5/ETM+2, ETM+1/ETM+4 and ETM+3/ETM+1 ratio for iron minerals and ferric oxides zone. In result pictures, alteration zone were showed by bright pixel zone. Field control showed these area were associated to clay or iron oxide planes that developed downward of trigenious formation and no have related to hydrothermal alteration. Only one area has true hydrothermal alteration. RGB ETM+541 and RGB ETM+735 pictures were used to determination and separation igneous rock unites. Base on the studies mention above and integration result with field studies, one area is favourable for further exploration. This favourable area in stream sediment exploration was a promising point for REEs, too.

Mineralogy and geochemistry of the Qoll-e-Anaroo deposit in the East of Iran

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Qoll-e-Anaroo mineral occurrence is located in north east of central Iran. This area has few small ancient mines. Paleozoic carbonate rocks hosted mineralization veins. These veins have N55°E to N65°E and N10°W to N30°W trends which correlated to shear fractures between the major faults. Geochemical analysis showed Zn and Pb are economic elements in ore samples with content of 40% and 9.8% respectively. Cu, Cd and Ag have high positive correlation with Pb and Zn and negative correlation with Ba, Rb, Y, Cs and W.

XRD analysis and thin polished sections showed smithsonite and cerussite are major ore in mineralization veins and galena, sphalerite, anglezite, hemimorphite and Malachite have low abundance in these mineralization veins. Dolomite is a major gangue in mineralization veins and Baroque dolomite recognized in many thin sections.

Calcite and Fe oxide and hydroxide and Pyrite are other minerals in these veins. Few Chalcopyrite minerals showed in polished sections.

According to above text we achieve to these results:

A) Mineralization controlled with tectonic structures, B) Pb and Zn are only economical elements, C) In these veins positive correlation of Cd and Ag and negative correlation of Ba with Zn and Pb can be result of low temperature of mineralization flow, D) Galena and sphalerite minerals showed primary mineralization in sulfide phases. Supergene activity has been replaced carbonate minerals to primary minerals. In addition low abundance of chalcopyrite and malachite minerals can be result of low temperature of mineralization flow and E) In addition Baroque dolomites are evidence for low temperature of mineralization flow, too.

So, we suggest that this occurrence could be result of low temperature mineralization fluid that makes a simple sulfide mineralization.