Zn Supergene in Ozbakkouh Zinc-lead mine (North of Tabas - Iran)

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Abstract

Ozbakkouh Zn- Pb mine is located in north of Tabas town and geologically this is part of Central Iran zone. Old signs of Ozbakkouh Zn -Pb mine are located in the faults and fractures of the region. Studies shows that the faults mechanism follows a left-lateral shear system and the Zn and Pb mineralization has been made secondarily in the fracture and faults of the carbonaceous rocks. Calamine is most important nonsulfide Zinc that formed by remobilization of Zn from sulfide protore and replacement of carbonaceous wall rock .In this process Zinc is mobilized and migrated by underground water through the carbonate wall rock. Activation and brecciation of faults is most important factor that is agent of influence of meteoric water through the sulfide ore. Zn supergene located in fault zones as a calamine ore in brecciated carbonate wall rocks.

Key words: *Zn mineralization – faults - underground water- brecciated carbonate wall rocks - Iran*

Introduction

This area is located in155 kilometer of north of Tabas and in 57 07 E & 34 40 N. according to the geology divisions, this area is a part of central Iran's zone [1]. Mineralization has occurred in carbonated rocks especially Bahram limestone and Sibzar dolomite formation (middle Devonian) Fig 1.

Ancient mining occasionally is done along the faults and fractures (Fig2) .Therefore, there are three tunnels in different levels that are accessible by means of raise and anchor and wells together and into the mineral mass. A calamine zone 3meter wide and 20meter long is observable on the entrance gate of the second tunnel [2]. The analysis of the area satellite images and the focus of studies on faults and crashed zone show the ore deposit focus on the fractures. Sampling of the fault zones and carbonate rocks outside the zone has been done. In addition Zn and Pb have been analyzed chemically by florescence x-ray method, (Table 1).

Dissuasion

Faulting mechanism of the area follows a sinisterly shear system. Secondary mineralization of Zn and fractures and faults of carbonate rocks has been supervision ally done. Zn secondary mineralization is none sulfide. Moreover alteration along the fractures is hematite, calcite،and samovar silica. Zn nonsulfide depositions have been composed of smithsonite and hemimorphite, calamine, hydrozinicite [3, 4]

One of the most important characteristics of Zn nonsulfide depositions in Zn and Pb minerals is that high grad of Zn and low grad Pb [5]. This mineralization is often secondary and in crème, white, pink, light brown. Its texture varies from massive to powdery and cryptocrystalline.

The study of minerals consisting Ozbakkouh Zn and Pb mine shows that their mine components include galena and low amount of sphalerite. Sphalerite has more solubility then galena in oxidation condition [6]. In Sherman series' is located. Lower in the series then Pb, ant it alteration become more quickly and changes into Zn secondary minerals such as smithsonite and hemimorphite, calamine [7]. Sphalerite is solved beside the ferric sulfate solutions and changes into Zn carbonate and gypsum carbonate environment or directly changes into Zn carbonate beside the bicarbonate.

When the sulfide deposit is made by the reactivity of the faults or following faulting, ore sulfide and its country rock shear and fracture (Table 1). As a result, the influence of sulfide mass increase and meteoric liquids will influence too [4]. The liquids rich in CO2,cause to substitute sphalerite for smithsonite directly .none sulfide zone mainly spreads along the upper part and around deposit and has a one to one relation with the size and value of the primary ore deposit[8].

The reaction amount of country rock is of an important role in concentration of none sulfide Zn zone. The reaction of limestone is more than dolomite. Because of this, in dolomite, the solution rich in zinc spreads along more distance and its Zn content deposit. So the dolomite of the enriched none sulfide zone have high dispersion and low grad. These low ore deposit grad raise problems in mineral dressing operations [9].

Conclusion

In order to explore the Zn none sulfide enriched zone, the fracture and fault zones must be studied carefully. The Zn secondary mineralization in Sibzar dolomite is more sparse than Bahram limestone. The area climate and age of ore deposit have an important role in the formation of Zn secondary mineralization zone [10]. The Zn nonsulfide enrichment mineralization with a high dispersion and low grad raise problems in mineral dressing process.

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Table 1: relationship between contrary rock, faulted zone and assay of Pb-Zn In Ozbakkouh

sample	Rock	Zone	Pb(ppm)	Zn(ppm)
1	Limestone	None faulted	17	39
2	Sandstone	None faulted	8	33
3	Sandstone	None faulted	1	33
4	Marl	None faulted	7	44
5	Sandstone	None faulted	7	22
6	Limestone	Faulted	94	1158
7	Limestone	Near faulted	135	35
8	Dolomite	Near faulted	203	271
9	Dolomite	Faulted	33	111
10	Dolomite	Faulted	28	106
11	Limestone	None faulted	19	52
12	Limestone	None faulted	51	18
13	Dolomite	Faulted	43	519

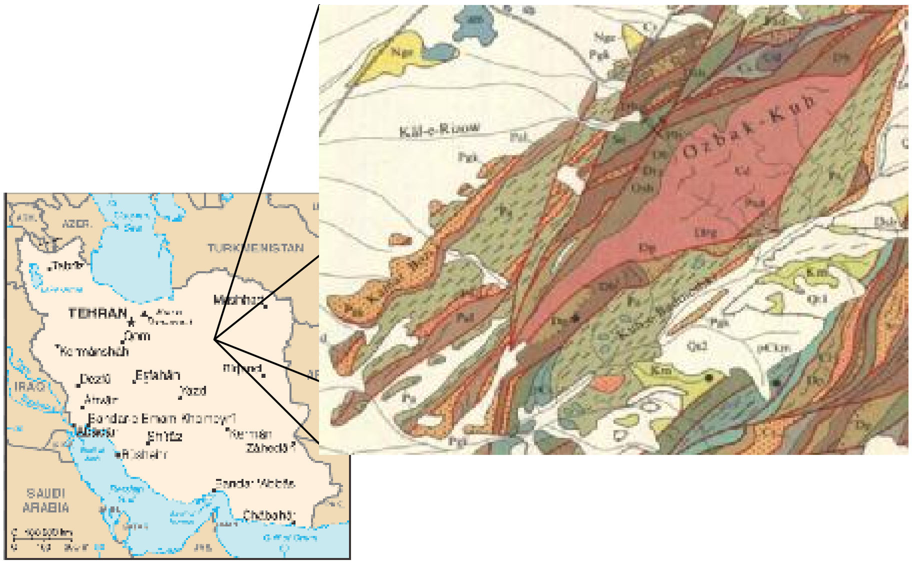

Fig. (1). Geological setting of Ozbakkouh mine

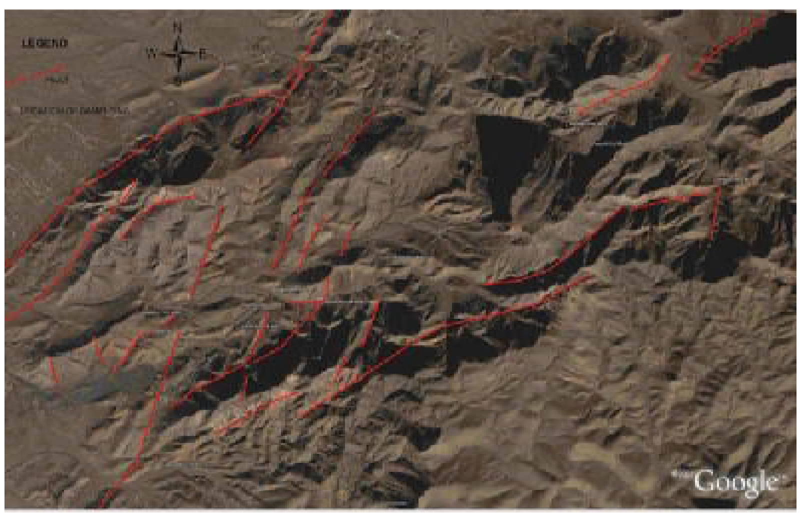

Fig. (2): Faulted zone in Ozbakkouh mine