

Geological and Geochemical Studies of Sarnamak Mine in Khorram Abad, Iran

T.Najibzadeh¹, F. Hakimi, T. Dolatsha

1-Islamic Azad University, Khorramabad Branch

2- Islamic Azad University, Khorramabad Branch and member of young researchers club

Abstract

The zone under study is located in Chaghalvandi, lying between latitude 33° 30' to 33° 45' and longitude 48° 30' to 48° 45'. The region is 1,760 meters above sea level on the average. The overthrust allochthonous unit of Chaghalvandi is situated in the folded Zagros Mountain Range, being known as Chaghalvandi unit. The south-west heights and Garrin overthrust aquifer are outcropped at the far north-west of the region. The region has been formed of such materials as sandstone, sandy Cenozoic, Oligocene, and Miocene eras. Its salt emerges as brine springs, witnessed as saline deposits due to evaporation. According to the analyses performed on the regional salt, its specific weight is 2.16 gr/cm³ while its solubility being 31.25 grams of salt in 100 grams of water. The maximum and minimum moisture contents of the samples are 0.52% and 0.18%, respectively. Based upon the analyses conducted, by means of XRF Method, the following results have been obtained. These samples lack potassium, and the highest element percentages are Cl= 59.77 %, Na= 38 %, So₃= 1.72 %, Ca= 1.55 %, and Mg= 15% at different stations.

key word : Geological, Geochemical, Sarnamak ,salt ,brine spring

Introduction

The vaporizable minerals are chemical alluviums that sediment after the condensation of soluble salt in water because of evaporation the major vaporizable mineral are plaster or gypsum (CaSO₄ · 2H₂O) enidrit (CaSO₄) and sodium chloride or halite (NaCl).

The vaporizable minerals have economic importance and wide spread uses.

In geology, the vaporizable minerals are so useful to study of old climates, because they are limited to dry lands with low (down) latitude, where the temperature is high and relative humidity is low, and also the rate of evaporation is more than the rate of rain. (talker, mouris E, 1373)

Sodium chloride or halite (NaCl) with specific weight 2.16, crystallized in cubic system.

Halite be found in the states of solid or solution in the water of lakes, ponds and seas.

Sodium chloride stocks would be found in playa salt layers and salt domes, salt in the ponds of warm and dry areas be found with clay and sand. In rainfall season, soluble substances carried with water and because of high evaporation, the soluble substances casted away to the earth's surface, then stay in a layer of salt components.

The salt components distinguished by sell, marl, gypsum and enidrit.

The salt domes are the most important salt supplies. (karimpour, mohamad hassan, 1378).

Halite can be used in the case of food industry as flavour and protector and in chemical industry for producing Cl₂, H₂, Na, HCl, NaOH and other salts and chemicals and in metallurgy as a substance to bringing down the freezing temperature and so on...

Chaghalvandi unit

In the south west of the studied area, there are volcanic – sedimentary displaced –dislocated stones, these stones located on the casted away heaps and introduced chaghalvandi top driven bed.

Casting away of these stones causes disorderation and chaos in the (miosen) heaps , the throughout of driven bed , there is a garbled and darkle unit that consist of sand sell with fine semens, also (aaosen) with fine semens lime, (dolomite)triassic and (spilit) lime with cream color .

The chaghalvandi displaced bed divided to below stone units:

Volcanic unit: ending of south west of this area in sarab sabz, kassian, merrikhy, baghlan kouh and daarbalout regions, there is a darkle unit that generally consist of (andezit porfirik) with dark grey to black color with a pillow structure, also sometimes with red color, sand or lime spall and lime spall with grey color, sand shell with fine semens and violent color, crystalline lime with grey color, micro conglomerate with violet color and lime (radiolarity) elements.

The breaking, casting away, and highly compaction of these stones in some places , causes movement changes and consequently makes wrinkle and schisto some in shells and spalls and crystallize the lime .

According to microfossils that be found, the age of it , assigned to up Jurassic .

Kn-1m unit :

the main part of carbonate stones of chaghalvandi unit , consist of lime and grey and green marl.

In the driven façade on the (mioosen) heap with marl , there is thin layer lime that because of locating in the driven façade and also being weakfish and flabby , they are highly tectonic and have less layer to see .

Kh-1 unit :

top of the dange , chale khouk and kavil mountains , organized with the heaps of lime with grey color and fine to medium semens that make the wall . one of its obvious characteristics , are existence of calcite vein and tecnoic stones .

Kn-m unit :

Lime , lime stones and marl are with the green and olive green marl veins , that because of thickness , distinguished as an independent unit .

According to microfossils that be found there , the age of lime stones of chaghalvandi is (aptin senomanin) .

Tectonic colorful tm :

Throughout the driven façade of chaghalvandi unit on the (mioosen) flishes, there are slabs with pen structure and purple color , micro conglomerate , grey (spelit) with calcite (amigdal) and (diabazic) organized stones. All of stones are tectonic and garbled and without arrangement .

According to fossils that be found there , age of those set is Triassic to (eosin).

Geology:

The top driven, displaced unit located in wrinkle zagros, and named *chaghalvandi* unit, that have mountains in south west and top driven *garrins* bed and in north west of the region. Of geological happenings, we can see the (kaldonin) happening to the end of *alpps* phase. The faults mainly are in the direction north west to south east with a directional stumble movement, also there are pressure faults that are older than direction stumble faults. The most important faults of this region, is top driven *zagross* fault, with the direction of north west to south east that is the place of *zagross* and sanandaj –sirjan collision, that in this place, concealed with youth alluvium sediments structural geology. The displaced stones of *chaghalvandi*, probably, driven on (miosen) stones in relation of the last *alpps* happening and on the front of expulsion, we can see a darkle displaced unit that consist of Triassic, (eomen) lime (radio serit kertase) (espelit) and sand shell.

THE GEOCHEMICAL STUDY OF CHAGHALVANDI AREA:

According to accomplished analyzes with approach *XRF* in the organization of geology and mine discoveries (table 1), the following data obtained about salts components and elements from four assistant stations on *chaghalvandi* area.

Within the studied elements, the quantity of potassium is zero in four stations, and the maximum amounts of elements are related to chlore and maximum quantity of it, is 59.44 percent and the mean quantity of it, is 58.30 percent.

From the quantity, Na is after chlore and the maximum quantity of it, is 38.68 percent and the mean quantity of it, is 37.49 percent.

The amount of SO_3 in two stations, a and f, is zero and in stations have maximum quantity 1.72, Ca and Mg also have maximum quantities 1.55 and 0.15, the amount of humidity in analyzed samples is in the range of 0.18 to 0.52 percent and specific weight of the areas salt is 2.16 g/cm³ and the ability of dissolution of it, is 31.25 grams of salt in 100 grams of water.

CONCLUSION

According to accomplished studies in this area, we can say that the available salts are in the water of springs of salts and these salts are pure, also as the result of comparing these salts with standard salts, due to specific weight, the ability of salvation and the available elements, we can say, the salts of *chaghalvandi* area have good quality and could be utilized in different consumptions.

SOURCES

- 1- karimpour, mohamad hassan, 1378, minerals and industrial stones, ferdosi ;university of mashhad publishers. pages 265 -266
- 2- talker, morris E –translated by mosavi, reza – mahboubi, asadolah (1373) – jahad daneshgahi of mashhad publishers – pages 341 – 342
- 3- geology map 1/100000 of boroujerd.

Table-1 Salt XRF analysis

Field Npo	Station B	Station F	Station A	Station S
Ca%	0/39	0/78	0/23	1/55
Mg%	0/04	0/10	0/04	0/15
Cl%	59/44	58/45	59/77	55/57
So ₃ %	0.73	0	0	1/72
Na%	38/33	37/32	38/68	35/64
K%	0	0	0	0
Moisture%	0/52	0/32	0/18	0/19