

"Investigation of Petrography and geochemical characteristics of Andalusites of Azna area (Lorestan)"

Samira .Mokhtari asl

* 1.M.Sc Economic Geology

Zohre.Gholami

2. M.Sc Economic Geology

2-Dept.of Geology, Payame Noor University, Khorramabad Branch.
mokhtarisamira11@Yahoo.com.

Abstract

One of the aluminosilicate polymorphs is andalusite that often would be created in variability situation, high temperature and low pressure. Recent studies show that andalusite may be formed directly from magma crystallization and metasomatic processes. This mineral can be crystallized in magma environment, because of many properties such as: non-meltable and resistance in high temperatures and low coefficient of thermal expansion. It has a special place in the incombustible industry. Because of these properties, consumption of this mineral is increasing as incombustible in different industries. That the average amount of Al_2O_3 is (17-21) %.

By fissility, schistosity, mineral paragenesis and studies of mineralogy, it was determined that, regional metamorphism is in the range of weak to medium and between green schist, amphibolite facies. Finally with respect of mean weight efficiency of andalusite, i.e. 9.2% and high price of andalusite in the world. This region is economical; we can venture to create processing manufactory.

Key word: Andalusite, Azna, Pelite, Metamorphism, Schist, Shales.

Introduction

The region under study is located in the north of Azna city and near Marzian village and it has geographical coordinates of 45°30' 50" to 49° 34' 41" in the east length and 33°31'34" to 33°35'14" in the north width. The area of the under study region is about 5 square kilometers which is located in one kilometer distance from the west of Marzian village.

In this region, schistose rocks and Andalusite phyllites have outcrops and are considered as one of the most important regions having Andalusite mineral potential existing in Sanandaj – Sirjan zone.

Geographical positions

The region under study is located in the north of Azna city and access to it is via the village road. Azna city is located in a mountainous region, that the highest point of it Oshtorankuh Mount is 20 kilometer distance from the south of the city which is 4080 meters and the lowest point of it is 1900 meters high from the level of the free sea.

Discussion

In the region under study, most schistose and phyllitic rocks have outcrops dating back to the second age of geology (the former and late Simerian), then during important phases of the next metamorphism and magmatism gets involved in polymetamorphism and creating Andalusite and at times Sillimanite minerals, and also in some parts some veins of Siliceous and Feldspathic aplitite have permeated to the stones of the region. The texture of these stones have mostly been porphyroblast and big minerals are mostly Andalusite.

Andalusites existing in these stones are mostly dark red to gray.

And they are like cucumbers, that their size in handy samples at times reaches to 10 cm. The frequency of Andalusite minerals is different in these stones, and at times in some parts covers about 40 percent of the stone, so that the name of schistose and phyllitic stone of the regions changes to schistose Andalusite. Quartz minerals, Calcite, Dolomite, Iron oxides of the kind of Magnetite, Hematite, Garnet mineral like Almandine some how various, sometimes Sillimanite and Chiolite, Andalusite, Sericite Epidote, Chlorite Plagioclase and Graphite in all of the samples are seen.

Geochemistry of Andalusite schistose in the region under study Results of chemical analysis shows a relatively high percentage of Al₂O₃ (Aluminum oxide) in mineral rocks, the this amount changes from 15.6 to 22.7. The amount of this oxide in Andalusite crystals reaches from 36.3 to 47.2. Regarding these percentages we conclude that this region is from average to rich and the least mineral saving of sillimanite group minerals is relatively 10-15 percent. SiO₂ changes (silicium oxide) is from 44.1 to 80 weight percentage, that according to the secured results by increasing the grade of Al₂O₃ (Aluminium oxide), the grade of SiO₂ (Silicium oxide) decreases.

K₂O changes (Potassium Oxide) is from 1.6 to 6.7 weight percentage, that according to the results by increasing K₂O grade, SiO₂ grade decreases, and by decreasing this grade, SiO₂ increases. Also by increasing K₂O grade in concentrate Al₂O₃ grade also increases.

Fe₂O₃ changes (iron oxide) changes from 1.1 to 8.4 weight percentage.

Metamorphic rocks protolith of the studied region probably the schistoses of the region have been made as a result of metamorphism of shales. Because of the frequency of Muscovite, Biotite, Chlorite, Feldspar, and Andalusite, also the preferred distribution and complete sheeting parallelism of Muscovite they clarify low and average intensities of metamorphism, in higher intensity, Muscovite changes to Feldspars gradually and loses its own parallelism.

zoning and isogrades

In most parts of the world in a metamorphosed low pressure land, Chlorite, Biotite, Garnet, Andalusite and Sillimanite zones are respectively seen in pelitic rocks, and in lands with average pressure or Barroovian, Chlorite, Biotite, Garnet, Staurolite and kyanite are respectively mappable.

Metamorphic facies

Studies show that in region under study the metamorphism is regional and they are from green schistose facies to Amphibolite.

Andalusite source in metamorphic rocks are Aluminous Shales, that at the end of Cretaceous it has been metamorphic because of the effect of Laramide phase and then because of the

effect of processes of accompanying heat and pressure, their structural net broke and led to forming andalusite Schistoses .Regarding that Andalusite in the region under study comes with Sillimanite at times, and also existing schistosity in rocks can follow the acceptance of regional metamorphism.

Conclusion

From lithology point of view the regions rocks are most schistose and and phyllite full of Andalusite from 15 to 25 percent.

from minorology point of view , these rocks have Serisite Chlorite, Muscovite, Bionte, Quartz, Feldespat, Andalusite Sillimanite, Graphite, Garnet , Plagioclase by studying the thin sections of the regions rocks, it was clarified that Chiastolite type of Andalusite is seen quiet a lot in the region . Regarding the rocks , schistosity and orientation of sheeting minerals , we conclude that metamorphism is a weak to average regional metamorphism .Regarding mineral paragenesis , we found out that the rocks of the region under study are from green schistose facies to Amphibolite .By drawing the related diagrams , it was dear that the parent rock of the region under study are politic and semi – politic stones .

zoning in the region included Chlorite , Biotite , Garnet, Andalusite ,Andalusite- Starolite and Sillimanite zones. Studies of chemical analysis of samples , is indicator of average percentage of 17-21of Al₂O₃ (Aluminum oxide) in the rocks of the region .