Journal of Economic Geology
Vol. 9, No. 2 (2017-2018)
ISSN 2008-7306

زمین‌شناسی اقتصادی
جلد ۹، شماره ۲ (سال ۱۳۹۶)
صفحات ۴۷ و ۴۸

Diagenetic and post-diagenetic fabrics in the Kamarposht fluorite mine (east of Mazandaran province): Explainaton and genetic interpretation

Faezeh Nabiloo, Behnam Shafiei Bafti* and Arash Amini

Department of Geology, Faculty of Sciences, Golestan University, Gorgan, Iran

Submitted: July 26, 2014
Accepted: May 25, 2016

Keywords: *The Kamarposht mine, Fluorite, Elika Formation, Mazandaran*

Introduction

Upper part of Elika Formation (middle Triassic) in the central Alborz as one of the most important fluorite districts in Iran is the host of some carbonate rock-hosted fluorite deposits such as Kamarposht, Pachi-Miana, Shashroodbar, Era (Alirezaee, 1989; Gorjizad, 1996; Rastad and Shariatmadar, 2001; Rajabi et al., 2013; Vahabzadeh et al., 2013; Zabihitabar and Shafiei, 2015). One of the main active fluorite mines in the central Alborz is Kamarposht which is located at the southeast of DoAb in the Mazandaran province. The Kamarposht mine has 75000 tons of ores and mining there has begun in 2005. The effects and evidences of underground mining in the northern and southern parts of this mine indicate high-grade and coarse-grained ore zones which have fluorite, galena and barite. Until now, basic economic geology studies in the Kamarposht mine including mineralogy, fabric and texture of mineralization for introducing a new fluorite mine in Iran have not been carried out. The present study is based on field observations and macroscopic as well as microscopic studies aimed at identification of morphology and mode of occurrence of the ore body, mineralogy and fabric of mineralization and discussion of as well as presentation of a new genetic model for the Kamarposht mine.

Materials and methods

For the present research study, field geology and sampling were carried out to collect 100 samples from various fluorite ore-types and carbonate host rocks. The samples prepared for thin section (n=55) and polished-thin sections (n=22).

Results

Field observations indicate that economic mineable ore zones of the Kamarposht mine are mainly hosted by dolomitic limestone and silicified carbonate horizons of the Elika Formation. The ore zones have fluorite, barite and galena which are mainly located in fractured and faulted zones as well as karstic cavities in the host horizons. Coarse grain and euhedral fluorites with various colors, significant presence of barite as massive and vein, abundant galena and near contact between mineralization zones in carbonate host rocks (Elika Fm.) and pyrite-bearing coalified shales (base of Shemshak Fm.?) as faulted and/or interbedded are all distinctive geological features for the Kamarposht mine. Fluorite mainly occurs as interrupted, dense and voluminous massive bodies with/without galena which have occupied cavities and open spaces between brecciated fragments of dolomitic limestone relative to the form of disseminate grains, veinlets and geode. Massive and voluminous accumulations of barite in dissolution and karstic cavities and also as discordant veins relative to the bedding of the host rock which have been generated radial, breccias and zebra structures in barite ores. Galena occurs as veinlets and breccias with medium to coarse grain size with/without fluorite in dolomitic and silicified host rocks and also as vein-veinlets into and/or rime of massive barites.

*Corresponding authors Email: behnam.shafiei@gmail.com
DOI: 10.22067/econg.v9i2.37740

Discussion

Based on field evidences and mode occurrence of ore minerals and ore textures, mineralization in the Kamaposht mine has occurred as syn-diagenetic (primary) and post-diagenetic/epigenetic (main) fabrics. Ores with disseminate particles of ore minerals, stylolite, geode and tiny veinlets fabrics have been interpreted as primary textures that co-exist with diagenesis of host rocks. These fabrics have been formed under diagenetic processes such as nucleation, re-crystalization and disolution of host rocks by diagenetic phreatic reactions that have caused increasing temperature-pressure due to increasing depth of burial diagenesis (Force et al., 1991; Fontbote and Gorzawski 1990; Rastad and Shariatmadar, 2001; Haeri-Ardakani et al., 2013). The main textures of mineralization in the Kamarposht mine namely open-space filling fabrics including veins and breccias fabrics with replacement, network and zebra textures which are associated with dolomitized and silicified host rock have been caused by late and/or post-diagenetic processes (Fontbote and Gorzawski 1990; Sangster, 1996; Leach et al., 2005). Change and conversion of diagenetic mineralization fabrics to epigenetic ones which is associated with developing and increasing the intensity of fluorite-barite-galena mineralization, is attributed to the function of hydrothermal solutions/basianl brines generated due to the main Cimerian orogeny (Rajabi et al., 2013). The increasing dissolution of host rock along with its dolomitization and silicification were probably the main processes responsible for epigenetic mineralization in the Kamarposht mine. Finally, the present study shows that the Kamarposht mine is a fluorite-rich MVT deposit with poly-genetic origin.

References

Alirezaee, S., 1989. Contribution to stratigraphy and mode of generation of F-Pb-Ba deposits in Triassic of eastern Alborz. M.Sc. Thesis, Tehran University, Tehran, Iran, 87 pp. (in Persian with English abstract).

Fontbote, L. and Gorzawski, H., 1990. Genesis of the Mississippi Valley-Type Zn-Pb Deposit of San Vicente, Central Peru: Geologic and Isotopic (Sr, O, C, S, Pb) Evidence. Economic Geology, 85(7): 1402-1437

Force, E.R., Eidel, J.J. and Maynard, J.B., 1991. Sedimentary and diagenetic mineral deposits: A basin analysis approach to exploration. Society of Economic Geologist Publication, Reviews in Economic Geology 5 , USA, 217 pp.

Gorjizad, H., 1996. Study on geology, mineralogy, facies analysis and genesis of Pachi Miana fluorite deposit. M.Sc. Thesis, Tarbiat Modaress University, Tehran, Iran, 156 pp. (in Persian with English abstract)

Haeri-Ardakani, O., Al-Asem, I., Coniglio,M. and Samson, I., 2013. Diagenetic evolution and associated mineralization in Middle Devonian carbonates, southwestern Ontario, Canada. Bulletin of Canadian Petroleum Geology, 61(1): 41–58.

Leach, D., Sangster, D., Kelley, K., Large, R., Garven, G., Allen, C., Gutzmer, J. and Walters, S., 2005. Sediment- hosted lead-zinc deposits: a global perspective. In: J. Hedenquist, J. Thompson, R. Goldfarb, and J. Richards, (Editors), 100th Anniversary Volume of Economic Geology, Society of Economic Geologist Publication, USA, pp. 561-607.

Rajabi, A., Rastad, E. and Canet, C., 2013. Metallogeny of Permian-Triassic carbonate-hosted Zn-Pb and F deposits of Iran: A review for future mineral exploration. Australian Journal of Earth Sciences, 60(2): 197-216.

Rastad, E. and Shariatmadar, A., 2001. Sheshroodbar fluorite deposits, sedimentary and diagenetic fabrics and its depositional environment (Savad Kuh, Mazandaran province). Journal of Geosciences, 10(41-42): Sangster, D.F., 1996. Carbonate-hosted lead-zinc deposits. Society of Economic Geology, Special Publication No.4, 664 pp.

Vahabzadeh, G., Khakzad, A., Rasa, I. and Mosavi, M.R., 2014. Fluorite REEs geochemistry in fluorite deposits of central Alborz. New Finds of Applied Geology, 16(1): 58-70. (in Persian with English abstract)

Zabihitabar, Sh. and Shafiei, B., 2015. Mineralogy and mode occurrence of sulfides, sulfates and carbonates at fluorite mines in East of Mazandaran province. Iranian Journal of Geology, 33(1): 62-78. (in Persian with English abstract)