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Textural and structural features Ore of the Gadabay deposit

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Abstract

The gold content in copper-pyrite ores of the Gadabay deposit is considered. The purpose of the research presented in the basis of the article, was to find out the features of the gold content of copper-pyrite deposits using the example of the Gadabay deposit, for the development of examples and the forecasting of new sites and objects. Gadabay Field is located in the axial part of the Shamkir uplift of the Lok-Garabakh structural-formational zone of the Lesser Caucasus. The character of gold and silver distribution in the ores of the Gadabay deposit was studied by atomic-adsorption methods. It was found that in different types of ores and monomineral fractions of basic sulfide minerals (pyrite, chalcopyrite, and sphalerite), noble metals (Au, Ag) are distributed unevenly.

***Keywords**:* deposit, gold-copper, ore.
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1. Introduction

Studying textural and structural features of ores, characterized by a combination of various mineral aggregates, have important scientific and practical significance for establishing the conditions of ore deposition.

Considering The above-stated textural and structural features of the ores of the Gadabay gold-copper pyrite deposit were studied by us using mineralogical studies.

The mineralogical study established that the following ore textures were identified in the described deposit: spotted, veined, brecciated and disseminated. The spotted texture refers to the so-called heterogeneous textures and has gradual transitions into disseminated ores.

This texture is characterized by the different times of crystals of mineral aggregates that make up the veins and the main mass of ores.

Such textural forms are usually characteristic of pyrite, often with a small content of chalcopyrite. In this case, the pyrite veins that were formed later are cemented by chalcopyrite.

2. Methodological part

Figure 1. Gadabay gold mine

The brecciated texture has a great resemblance to the loop structure in appearance. It has a limited distribution at the deposit and usually forms the peripheral parts of the ore bodies. It was formed as a result of the penetration of an ore solution of almost purely pyrite composition into secondary quartzites with interspersed pyritization along a network of cracks of all possible directions.

The disseminated texture is very widespread in the region and is characteristic of pyrite. Depending onfrom the size of grain density disseminated texture represent a significant variety. They are found both in direct contact with massive ore bodies and in secondary quartzites. This texture, in addition to pyrite, also forms chalcopyrite, sphalerite.

The structural features of the ores of this deposit are very diverse: granular,subgraphic structure, cataclastic and looped.

Among them, primary structures associated withdirectly with the processes of ore deposition, and secondary ones - formed as a result of ore crushing and in oxidation zones under the influence of external aggregates.

Cataclastic structures insolid ores are much less developed than depositional and replacement structures, but are relatively often observed near the contacts of diabase dikes that intersect pyrite ore bodies. Cataclastic structures are also encountered, mainly in zones after ore crushing – along the lines of tectonic faults.

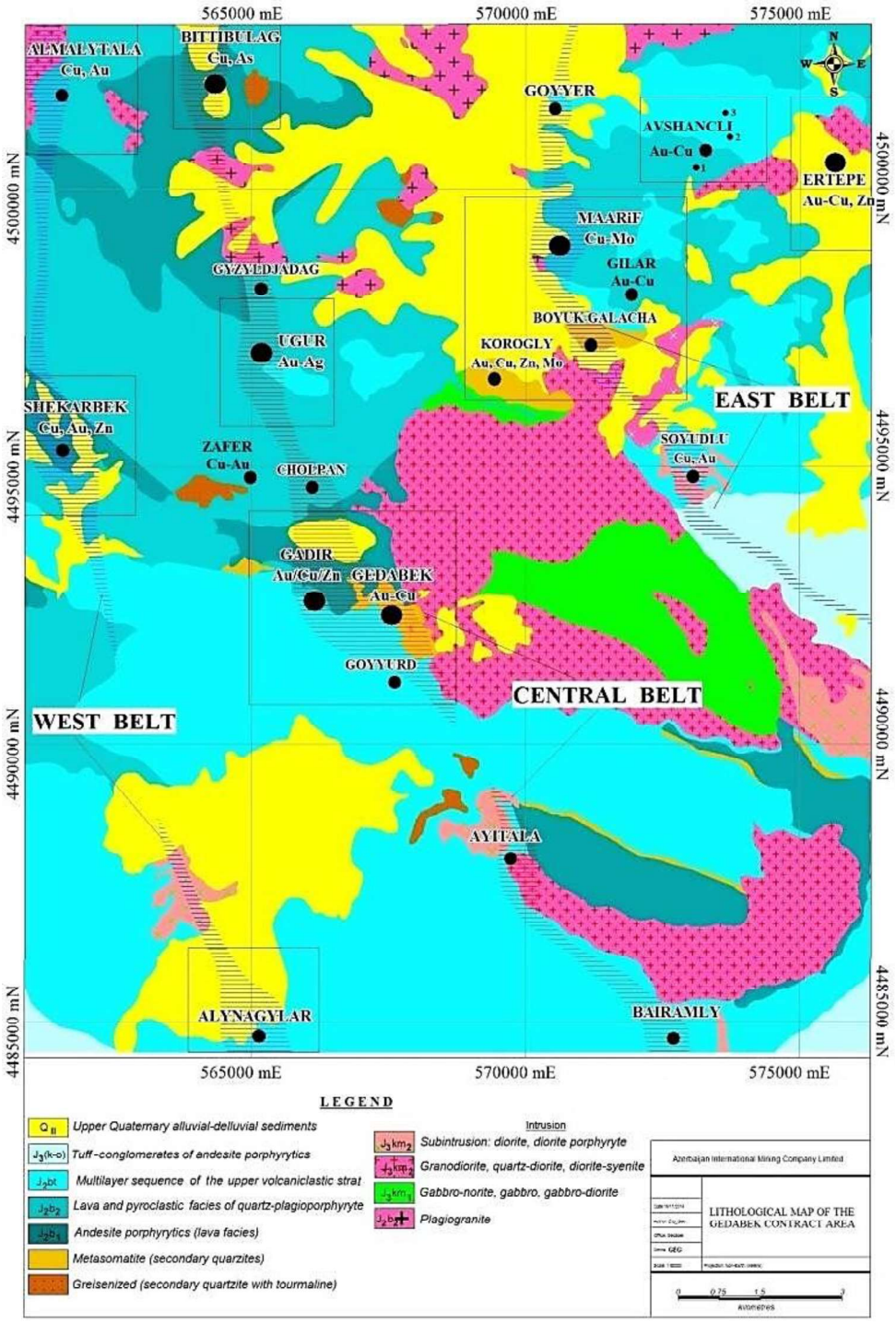


Figure 2. Lithological map of the Gadabay ore district.

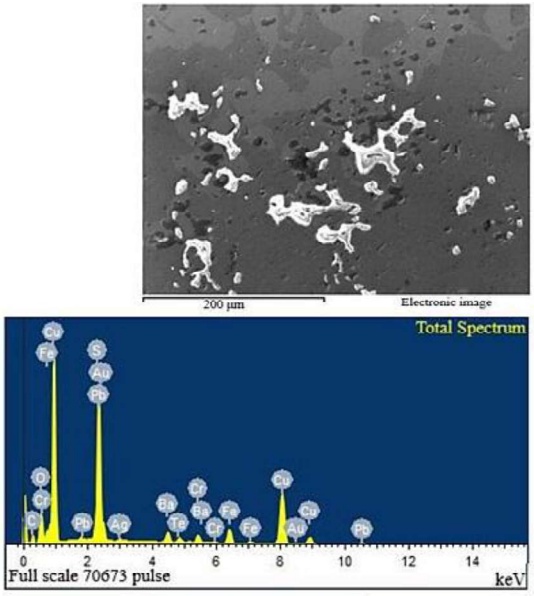
3. Results and discussion

Sample preparation was realized according to standard procedures: cutting or trimming, grinding, polishing etc. First, the samples were cleaned and then a small piece was put on the sample holder with carbon double adhesive tape on it. Before the observations under the reflected light microscope, surfaces of the polished section were cleaned with alumina polishing abrasives to prevent any extrinsic oxidation. Macro and micronutrient analysis (over 500 micro-nutrients, including Au, Ag, Cu) was performed by X-ray fluorescence (XRF) laboratory.

Figure 3. SEM (Scanning Electron Microscopy) analysis results.

Elements	Mass %	Atomic mass %	Compound. %	Oxide formula
S	14.19	13.48	35.44	SO_3
Cr	2.11	1.24	3.09	Cr_2O_3
Fe	4.83	2.63	6.21	FeO
Cu	35.39	16.96	44.30	CuO
Ag	0.70	0.20	0.75	Ag_2O
Te	0.00	0.00	0.00	TeO_2
Ba	5.11	1.13	5.70	BaO
Au	0.32	0.05	0.36	Au_2O_3
Pb	3.86	0.57	4.15	PbO
O	33.50	63.75		
Total	100.00			

Chalcopyrite
Baryte
Gold
Galena



During the observations the SEM analyses, ore minerals and gold inclusions were determined. Cop-per and gold grade are not uniform in the deposit. Gold inclusion mainly was observed in chalcopyrite. Small gold inclusion was observed with SEM anal-ysis in chalcopyrite in samples ZF21-319.2, ZF25-248.7, ZF37-322, ZF45-225. Gold was found inside arsenopyrite in the baryte part of the polished section on SEM analysis in sample ZF22-322.The calculated mineral formulas of the samples were described in tables beside photos of the SEM.

In the zone In the hypergenesis of the Gadabay deposit, framework, cellular and dripstone-shell textures are widespread, a characteristic feature of which is the development of concentrically zoned aggregates of oxides and hydroxyls of manganese and iron, as well as complex combinations of sulfide relics in voids filled with secondary minerals.

The described deposit also exhibits looped, concentric zonal structures.

4. Conclusion

Thus, the study of the textural and structural features of the ores show that the ores of the Gadabay deposit were formed in shallow conditions and did not undergo significant post-ore metamorphism, as evidenced by the widespread development of meta-colloidal formations and the presence of unstable minerals.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research.

References

1.Abdullayeva, Sh.F., Baba-zadeh, V., Kekelia, S.A., Imamverdiyev, N.A., Mansurov, M., Takhmazova, T., Kekeliya, M.A., Romanko, A. Principles of compilation of prospecting multiplefactor models of volcano-genic deposits of non-ferrous metals .2017. Journal Citation Reports, Thomson-Reuters. 2014. Vol. 8. No. 34.P.2495-2522.

2. Abdullayeva, Sh.F., Babazadeh, V.M., Kekeliya, S., Imamverdiyev, N.A., Kekeliya, M., Romanko, A. Genesis of Au-containing magmatic deposits of the non-ferrous metals in island-arc structures (Lesser Caucasus and East Pontids), data on inclusions and isotopic investigations. 2017. International Journal of Mining Science (IJMS). Vol. 3. No. 2. P.26-39. https://dx. doi.org/10.20431/2454-9460.0302003.

3. Abdullayeva, Sh.F., Takhmazova, T.H., Baba-zadeh, V.M., Kalandarov, B.H. Endogenous and Exogenous gold mineralization in the territory of Azerbaijan Republic. 2016. The reports of National Academy of Sciences of Azerbaijan. No. 3. P.56-58.

4. Aliyarov, R.Y., Guseinov, G.S., Abasova, S.A., Valiyeva, Sh.E. Ximicheskiy sostav samorodnogo zoloya v razlichnix gorizontax Gedabegskogo mestorojdeniya. Chemical composition of native gold in various horizons of the Gadabay deposit. 2023 // Tashkent. Mejdunarodnaya nauchno-texnicheskaya konferenciya. [International Scientific and Technical Conference]. P.488-493.Russian.

5. Babazadeh, V.M., Kekelia, S.A., Abdullaeva, Sh.F., Takhmazova, T.G., Imamverdiev, N.A., Kekelia, M.A., Kalandarov, B.G., Mansurov, M.I., Ismailova, A.M., Karimli, U.I. Zolotorudnie mestorojdeniya, usloviya ix obrazovaniya I xarakternie osobennosti geodinamicheskogo razvitiya (Bolshoy i Maliy Kavkaz). Gold deposits, conditions of their formation and characteristic features of geodynamic development (Greater and Lesser Caucasus). 2017. // Vestnik Bakinskogo Universiteta. Bulletin of Baku State University. Seroya estestvennix nauk. Natural Science-Series. No. 1. P. 83-110. (in Russian).

6. Baba-zadeh, V.M., Abdullayeva, Sh.F., Kekeliya, S.A., Imamverdiyev, N.A., Kekeliya, M.A., Mansurov, M.I., Takhmazova, T.G., Ismayilova, A.M., Rasulova, S.K., Ismayilova, N.N. Gold deposits of paleoisland arc of the Lesser Caucasus and Eastern Pontide. 2018. The 36 National and the 3-International Geosciences Congress, 25-27 February, // Tehran, Iran. P. 9.

7.Neronskiy, G.N. Tipomorfizma zolota mestorojdeniy Priamurya. Typomorphism of gold deposits in the Amur region. Blagoveshensk. 1998. P. 256-268.

8. Nikolaeva, L.A., Yablokova, S.V. Tipomorfnie osobennosti samorodnogo zolota I ix ispolzovanie pri geologorazvedochnix rabotax. Typomorphic features of native gold and their use in geological exploration. Rudi I metalli. 2007. No. 6. P. 41-57. (in Russian).