International Journal of Geology, Earth & Environmental Sciences ISSN: 2277-2081
An Open Access, Online International Journal Available at http://www.cibtech.org/jgee.htm
2023 Vol. 13, pp. 194-198/Amirov
Research Article

METASOMATICLY ALTERED ROCKS OF THE NORTH-WESTERN SECTION OF KIZILOLMASOY ORING FIELD

***Amirov Elyor**
Institute of Geology and Geophysics, Tashkent, Uzbekistan.
**Author for Correspondence: elyor_amirov@mail.ru*

ABSTRACT
In world practice, it is of practical importance to determine the genetic connection of gold and other types of mineralization with the metasomatic transformation of rocks of different composition, subvolcanic and hypabyssal nature. The results of scientific research made it possible to solve a number of problems in petrology and mineralization. At the same time, determining the role of metasomatic rocks in the formation of endogenous deposits is the main criterion in geological exploration and exploration. Methods of modern petrological research require a deep analysis of the significance of metasomatites in the formation of mineralization.

Keywords: *Methosomatite, trachyandesite, dacite, trachyliparite, rhyolite, effusive rocks, quartz vein*

INTRODUCTION
Metasomatism and metasomatic processes are practically synonymous. According to the definition of D.S. Korzhinsky, metasomatite is the transformation of rocks into other types of rocks according to their chemical composition, in which the dissolution of primary minerals and the formation of new ones occur almost simultaneously, because in the process of change, the rock maintains a constant solid state. In addition, V.A. Zharikov and V.I. Omelyanenko expressed the following opinions, according to their opinion, metasomatites are formed due to the same hydrothermal solutions that cause mineral changes. A structural and material approach is used to identify hydrothermal-metasomatic rocks, they have a certain mineral composition, structural and textural properties, which often differ from those of primary rocks. A certain complex of changes characterizes such well-known processes as grayening, skarn formation, berezitization and propylitization (Sayitov et al., 2021y.).

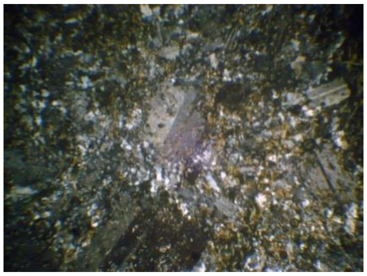
Such studies are currently being carried out on metasomatically altered rocks that are widespread in the Kizilolmasoy mining area, including in the North-Western section.

MATERIALS AND METHODS
Metasomatic processes are widely developed in the North-Western part of the following rocks: trachyandesites, dacites, trachyliparite, rhyolite (liparite), granite, quartz veins.

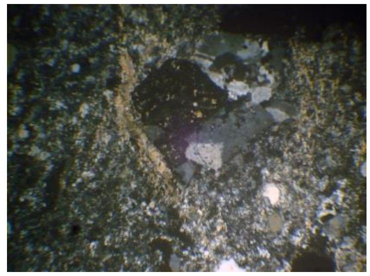
Trachyandesites with metasomatic changes. Macroscopically, they are gray to pale gray fine crystalline rocks, very hard, with rare porphyry-like inclusions of feldspars, ranging in size from 1-2 mm to 5 mm. The amount of porphyry inclusions is up to 10-15%, and sulphide inclusions and carbonate veins are noted in its composition (Fig. 1) [1].

The overall mass consists of quartz, feldspar, sericite, and chlorite, with mineral grains <0.01 to 0,2 mm in size. It contains plagioclase, potassium feldspar, and rare pure quartz grains with right-angled parts of porphyry inclusions. The size of the grains is 2,5-3 mm. The system of polysynthetic pairs is well represented in plagioclase. Plagioclase is followed by sericite, chlorite, less carbonate, biotite is very rare (Table 1). The chlorite accumulation includes fragments of clay particles and ore mineralization [2].

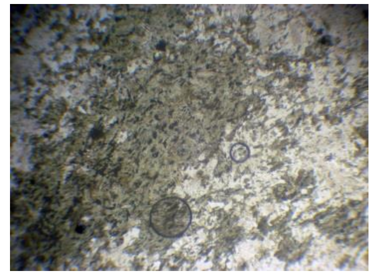
The main mass contains pyrite, rarely arsenopyrite inclusions, the size of grains is 0,0n-0,15 mm. Potassium feldspar grains are intensively pelletized, brown in color, and the grain size is 0,n-1,2 mm. Carbonate occurs in a honeycomb form.



a



b



v

Figure 1. Structural and textural features of metasomatically altered trachyandesite: a) Trachyandesite with porphyry feldspar inclusions (grit Nw-87. Zoom 40x, crossed nickel); b) Trachyandesite quartz with porphyry grains of plagioclase (cut Nw-89. Zoom 40x. Crossed nickel); v) Accumulation of chlorite in trachyandesite (grit Nw-87. Zoom. 80x. II nicol)

Table 1. Mineral composition of metasomatically altered rocks in the North-West section

Minerals	**Content in samples. %**									
	Nw-87	Nw-79	Nw-82	Nw-72	Nw-51	Nw-50	Nw-85	Nw-58	Nw-89	Nw-91
Quartz	20	26.5	35.5	24.2	29.5	35.6	35.2	45	46.6	60.2
Plagioclase	50.5	37.4	38.5	38	42.8	27	29.3	18	27.9	4.3
Potassium feldspar	6.5	12	12	12	20	18	15	23	18.7	18
Sericite	6.5	8	4.5	6.4	2	5.5	7	10	6.5	8.4
Chlorite	13	3	3.7	4.7	1.5	8.5	1.5	-	-	1.5
Carbonate	1	6.5	3	5	1	1	1	0.5	-	3.5
Iron hydroxides	-	-	~1	-	2	1	3	~1	0.3	0.6
Pyrite	0.4	-	0.3	~3	1	0.1	0.1	0.1	0.2	0.6
Clay minerals	1.3	4.1	~1	~5	-	3	7.5	2.4	-	2.5
Rutile	0.8	0.5	0.5	0.4	0.2	0.3	0.4	-	0.2	0.4
Yarosit	-	2	-	1.3	-	-	-	-	-	-

Note: Nw-87 - trachyandesite; Nw-78,79,82 - dacite; Nw-51 - trachyliparite; Nw-58, 89 - rhyolite (liparite); Nw-50, 85 - granite; Nw-91 - metasomatite with effusive.

Dacites are a widespread group of rocks. Massive medium and large-grained rocks; the size of grains is from 0.n to 3,0-3,5 mm. Microscopically, the rocks consist of quartz, feldspar (plagioclase, potassium feldspar) and secondary metasomatic minerals. Plagioclases are strongly sericitized, carbonated and chloritized, polysynthetic paired grains are rare. Potassium feldspar (KDSH) is brown in color and pelletized. There are rare additions of biotite, gneissified properties of muscovite; Among the thin-bodied compounds of feldspar, the grain size is up to 0,1 mm. Accumulation of green chlorite is observed in some places. In chlorite there are inclusions of clay minerals, remnants of biotite, as well as veins of quartz, carbonate, chlorite, and iron hydroxides.

Table 2. Petrochemical composition of various rocks in the North-West section

Sample number	Rocks	Amount of SiO_2, (%)	SiO_2 groups	Total Alkalinity (Na_2O+K_2O)	Na_2O /K_2O	Alkalinity series	Iron coefficient	Coefficient of alumina (Al_2O_3)	Classes of glycine
Nw-87	Andesites (trachyandesites)	57,9	Medium-sour	7,7	3,34	Potassium-sodium	0,62	1,39	High-glycemia
Nw-72	Dacites	63,7		7,22	1,64		0,74	2,44	
Nw-79	Andesitlidacites	62,2		7,35	1,49		0,81	2,79	
Nw-82	Dacites	63,3		7,09	1,8		0,79	2,64	
Nw-50	Granite	68,4	Sour	6,81	0,87		0,48	2,35	
Nw-51	Trachyliparit	68,8		8,63	1,4		0,8	5,03	
Nw-85	Granite	69,2		6,74	1,04		0,88	3,51	
Nw-91	Metasomatitis	68,0		4,54	0,13	Potassium	0,87	3,32	
Nw-58	Rhyolite (liparite)	74,6		6,01	0,53		1	-	Low-glycemia
Nw-89	Rhyolite (liparite)	75,4		7,24	0,83		0,99	-	

Porphyritic cleavages are rare, often occurring only in rectangular boundaries and along quartz grains.

The mineral content is as follows (%): quartz – 24,2-35,5; plagioclase – 37,4-38,5; KDSH-12; sericite – 4,5-8; chlorite - 3-4,7; carbonate - 3-6,5; iron hydroxides - ~1; pyrite – 0,3-3; group of clay minerals – 4,6-10; rutile – 0,4-0,5; yarosite - up to 1,3-2 (Table 1). According to atomic absorption analysis, the gold content is <0,1-0,56 g/t; silver up to 31,2 g/t.

Trachyliparit with metasomatic changes. This rock is very rare. They are mostly pale yellow-pink in color. It is fine-medium grained, the size of grains is 0,n-1,2 mm. Fine (0,0n-0,n mm) trachyliparite contains plagioclase, potassium feldspar and quartz grains. Quartz grains are xenomorphic, rounded. Quartz occurs together with feldspar. Plagioclase has simple paired, polysynthetic, weak sericitization and chloritization. Potassium feldspar is brown, pelletized. The mineral content is as follows (%): quartz – 29,5; plagioclase – 42,8; KDSH - 20; sericite - 2; chlorite – 1,5; carbonate - 1; iron hydroxides - 2; pyrite - 1; group of clay minerals; rutile – 0,2 (Table 1).

Metasomatically altered rhyolite (liparite). Porphyry structural rocks are massive and fine-grained types. The main mass is fine-grained (0,01-0,03 mm), with varying degrees of alteration, and it is often found in the composition of feldspar and quartz. Plagioclase also occurs in varying degrees, followed by sericite, carbonate, and chlorite. In some grains, the primary double structure is well preserved. Potassium feldspar is pelletized, brown in color. Quartz grains (up to 0,5-1 mm) are round, oval, xenomorphic, with smooth edges, as if melted. Pyrite is rare.

The mineral content is as follows (%): quartz - 45-46,6; plagioclase - 18-27,9; KDSH – 28,7-23; sericite – 6,5-10; carbonate-up to 0,5; iron hydroxides – 0,3-1; pyrite – 0,1-0,2; group of clay minerals-2,4 units; in rutile-0,2 units.

Metasomatically altered granite. The most common rocks in this area are massive, uneven-grained, large, moderately crystalline (Fig. 2a). It is mainly composed of KDSH, plagioclase and quartz. The rock has metasomatically changed to different degrees. Some of the feldspars in the composition are intensively sericitized along the cracks, and the KDSH are kaolinized. The mineralization of the ore is associated with rare inclusions of sulfides [3]. The mineral composition is as follows (%): quartz – 35,2-35,6; plagioclase - 27-29,3; KPSH - 15-18; sericite – 5,5-7; chlorite – 1,5-8,5; carbonate – 1,0; iron hydroxides - 1-3; pyrite – 0,1; group of clay minerals - 3-7,5; rutile – 0,3-0,4.


a


b

Figure 2. a) Granite fragments of the North-West section. The central part of the plot; b) Sericite, chlorite, limonite, quartz minerals with strong metasomatic alteration. The part of ore body No. 3 that has come to the surface of the earth

Metasomatites derived from effusive rocks. This group is a common group of metasomatites [4]. Spotted, massive textured quartzite rocks are often found in them; porphyry grains are rare. Microscopically, they consist of a fine-grained aggregate containing quartz, feldspar, sericite, and chlorite (Fig. 2b).
Grain size is 0,0n-0,n mm, rarely up to 1 mm. Plagioclase is intensively sericitized, sometimes complete, only in the form of rectangular grains. In some places, carbonation is small-grained, aggregated in lumps, and appears in the form of thin veins.
Carbonate along with sericite develops on feldspars. Potassium feldspar is pelletized, brown, with polished edges. Muscovite (up to 0,8 mm), sericite veins are rarely aggregated.
The rock belongs to the category of siliceous-potassium and high aluminum oxide rocks. The coefficient of iron content is equal to 0,87.
In the oxidation zone of metaeffusives, strongly altered pelitic, sericitized, kaolinized and carbonated rocks are found. The rocks are brittle, split easily, yellow-brown in color.
Quartz vein. Quartz is one of the most common minerals in the study area, containing feldspar, limonite, goethite and many rock fragments (Table 2). This rock contains 0,2-9,4 g/t of gold and 1,98-355,61 g/t of silver, and it is considered the main mineral structure in the site [5].


a


b

Figure 4. Metasomatic quartzes in the North-West section: a-strongly chloridized, b-strongly sericitized

Sometimes quartz rocks contain breccias composed of feldspar fragments. They are strongly limonitized and kaolinized, the gold content in them is 0.3 g/t.

CONCLUSION

These researches show which rocks can be searched for industrially important minerals in the area. The most important of them are quartz veins. Gold, silver minerals and quartz raw materials contained in ore veins are very important for industry.

REFERENCES

Amirov E.M (2022). Description of ore-bearing and metasomatic rocks of the North-Western section of the Kizyolmasoy mining area. Collection of the Republican scientific-practical conference on the topic "Reforms in the educational system: from the perspective of scientists and young people". T "NUUz" 76-80.

Amirov E.M., Khakimov Sh.S. (2023). Gold mineralization of the North-Western section of the Kizilolmasoy mining area and its prospects. News of the National University of Uzbekistan, [3/1]. 236-239

Panchenko A.Y (2021). Criteria for predicting hidden gold mineralization in the example of the main mining zone of the Mejdureche field (Kizilolmasoy mining field): Doctor of Philosophy (PhD) thesis on geological and mineralogical sciences. T. 48.

Saitov S.S., Tsoi V.D., Khalikov O.A., Pechersky R.D., Bulin S.E., Rasulov Sh.M (2022). Material composition of ores at the Severo-Zapadny site of the Kyzylalmasai ore field. *Geology and Mineral Resources*, 3. 27-32.

Suleimanov M.O. and Beloplotova O.V (1994). Mineral complex of the Kyzyl-Almasai ore field and some features of their location. *Geology, Mineralogy and Geochemistry of Ore Deposits of Uzbekistan*. T., Fan, 114-121.