Structural research of Uzbekistan basalts

Strukturne raziskave Uzbekistanskih bazaltov

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Abstract: In this article are cited the results of gamma spectrometer research and the structural analysis of basalts Northern Nurata, the West central Kyzylkum, the Tashkent area and Fergana valley of Uzbekistan. Technological parameters and specific features of mineralogical structure of basalt rock are established which define purpose and assortment of output are very important with the development of technology of their processing. Law of change of mineralogical structure with change of a deposit of basalts has been studied by sampling from «Aydarkul», «Asmansay» and «Gavasay» basalt deposits of Uzbekistan. Gamma spectrometry analysis has enabled to define activity of samples of the investigated rocks on unit of the area, and the structural analysis has allowed to estimate and enter criteria of mineralogical structure which determine a degree of suitability of basalts of Uzbekistan for their wider application.

Povzetek: V članku so prikazani rezultati gama spektrometrske raziskave in strukturne analize bazaltov severne Nurate, zahodno-osrednjega Kyzylkuma, taškentskega območja in Ferganske doline v Uzbekistanu. Opredeljeni so tehnološki parametri in lastnosti mineraloške zgradbe, ki določajo namen ter asortiment proizvodnje bazaltne kamnine in so pomembni za razvoj tehnologije njihove predelave. Zakonitosti spreminjanja mineraloške zgradbe v različnih nahajališčih so preučevali na vzorcih kamnine iz nahajališč bazalta Ajdarkul, Asmansaj in Gavasaj v Uzbekistanu. Z gama spektrometrsko analizo so določili aktivnost vzorcev preiskovanih kamnin na enoto površine, s strukturno analizo pa ocenili tiste lastnosti mineraloške zgradbe,

ki opredeljujejo primernost uzbekistanskih bazaltov za njihovo širšo uporabo.

Key words: basalt, mineralogical structure, structural analysis, acid-proof material, rocks specificity
Ključne besede: bazalt, mineraloška zgradba, strukturna analiza, odpornost materiala proti kislinam, posebne lastnosti kamnin

INTRODUCTION

It is considered, that the raw stock of basalts in Uzbekistan makes approximately more than 150 million tons. However, till now stocks of basalt rocks up to the end are not certain, including their structure is insufficiently investigated. According to the State Committee of Uzbekistan on geology the strip propagation of basalts in northern part of the country is stretched along northern a slope of mountains Northern Nurata, from settlement Chimkurgan in the east before the termination of the listed mountains and further proceeds up to Bukantau in the West - in Central Kyzilkum. Basalts of the Tashkent area basically in territory of area Ahangarinsk and Fergana valley basically are located in territory of the Namangan area, and also on frontier areas with the next states - Kirgizstan and Kazakhstan.[1–5] Data cited in the scientific and technical literature show, that purposes of basalt production depend from: chemical compound, physicomechanical properties, mineralogy-petrographic characteristics and structure of basalt rock, and also from the degree of salinity of ground of deposit. In practice, basaltprocessing the enterprises of Uzbekistan, basically special-purpose on release of basalt fibres which are used as heat-insulated material. This circumstance explained weakly investigated of chemical-mineralogical structure and properties of basalt rock, and also absence of effective methods of reception of basalt production. In this question results scale-spectrometer and the structural analysis of basalts in Uzbekistan can play an important role.

The further involving in production of basalt resource raw materials and their development will allow to raise industrial power and to expand assortment of production basaltprocessing enterprises that will promote economic development of our Republic.

On literary data basalts «Aydarkul» deposits on structure answer porphyritic and afirovodolerito to basalts with microdolerit, intersertal structures of basic mass and almonds stone structure.

On the zones most removed from the volcanic device they have glomeroparphyritic structure caused labrador phenocryst and pyroxene. The main mass often hyalopylite without dark-coloured minerals or intersertal. The texture quite often almond-shaped, but the size almonds and their quantity in these basalts noticeably is less 1–2 mm. Micro porphyritic basalts alternate with afiros differences with intersertal or toleyt structures of the main mass in which it is more plagioclase if they among basalts plagioclase , or it is less if among pyroxenes.[4–5]

It is established, that in Northern Nurata basalts are concentrated in reef zone covering Northern foothills - Pistalitau heights, the advanced ridge, Handbandytau, Egarbelitau, Bazaygor and Balyklytau. They are allocated as Chimkurgansk suite D1-D2 about the data established by researches of listed areas. The fullest section vulcanites of considered formation is in Asmansay and in Gavasay where in propagation vulcanites fragments of volcanic crater of the deposits[6] are found out.

Materials and methods

Scale-spectrometer the analysis of basalts

The scale-spectrometer the analysis allows to define activity radionuclids on unit of the area, volume or the sample of ground. For a statistical estimation of results of research have been taken any way on 15 samples rock of «Aydarkul» and «Asmansay» Kyzylkum deposits (basalts of Fergana valley are researched by employees of the center "Composite" of the Tashkent state technical university[7]). As now basalts of Uzbekistan it is extracted by the open cut were researched basically the samples of basalt rocks laying on a surface of the ground, on depth up to three meters. Researches were carried out by means of device Genie-2000, model S500.

In an initial stage definition of active specific efficiency of samples basalt rocks has been made. The analysis was carry out to three stages:

1. Weighing of test in quantity 100 g to Petri dish.
2. Calibration of the device on energy of efficiency with deducing factors, according to the maintenance instruction of the device.
3. Carrying out of the analysis. For this purpose Petri dish with t test establish in lead collimator the detector. After 3 600 s in a panel of the device displayable radionuclid structure rock in the form of spectrum proceeding from which, specific effective activity is defined. Then, start processing the received results.

Table 1. Results scale-spectrometer of basalt rock analysis

№	Place of selection test	Ordinal umbers of samples	K-40 Bq/kg	Ra-226 Bq/ kg	Th-232 Bq/kg	$A_{эфф}$ Bq/kg
1	Aydarkul	1*	2472	93	-	315.48
2	Asmansay	11	2423	28	51	312.91
3	Energy output		1 460.8 keV	609.3 keV	238.6 keV	

*Notice. Sample number 1, "Aydarkul" rocks and sample number 2, "Asmansay" rocks of deposits.

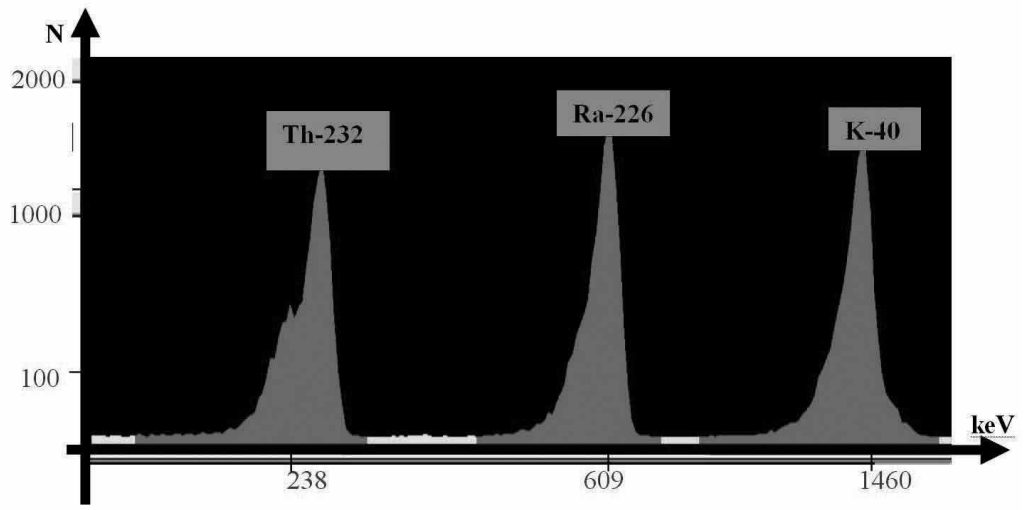

Figure 1. Spectrums natural radioactive nuclides with the image of output energy of nuclides basalts pairs of «Aydarkul» deposits

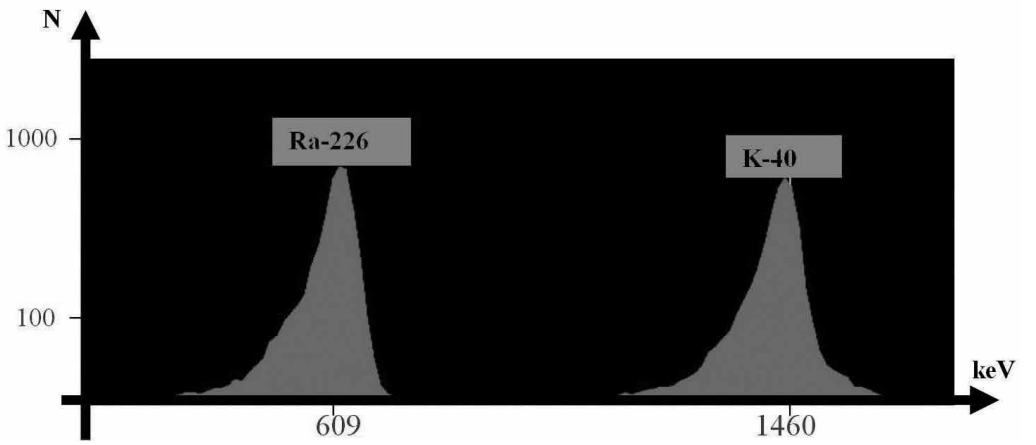

Figure 2. Spectrums natural radioactive nuclides with the image of output energy of nuclides basalts pairs of «Asmansayskoe» deposits

Readout of parameters was made as follows. First each test of rock mass 150 g is exposed to crushing. Then, the received crushed samples are passed through a sieve before reception of fractions in diameter no more than 0.5 mm. For weighing test were used scales VNC-VTI-10. After preparation of 15 tests calibration of device Genie-2000 on energy of efficiency with deducing coefficients, according to the operating instruction. For this purpose the gauge place in the buffer pH, chosen as the first calibrating buffer ***cal 1*** in the menu of the program. The buffer place in a volumetric glass, and after 2 s. displayable ***cal 1*** and procedure of calibration begins.

Results of the received analysis of parameters of test are resulted in table 1.

The result of calibration indications of instrument clearly recognized on corresponding normalized to parameters. The scale-spectrometer was exposed to the analysis each test separately. Activity of test on scale-spectrometry**,** on Bq/kg was defined. Results of research are resulted on Figures 1 and 2.

Results of an experimental research have shown, that the contents of natural radioactive elements in basalt correspond to sanitary norms SAN-PIN-00193-06 according to which the radio-activity of elements not should to exceed 370 Bq/kg. And, in samples of rock «Aydarkul» deposits quantity presence in basalt of element Th-232 was not revealed, that testifies to change of structure of basalts depending on this rock deposit.

Semiquantitative spectral analysis

After end scale-spectrometer analysis samples of basalt rock have undergone to semiquantitative spectral analysis which purpose was research of mineralogical structure of samples of rocks. This method is widely applied to the rock analysis by search and investigation of minerals and allows to study material rocks structure of of deposits.

For carrying out of experiment use special electrodes. The electrodes made from carbon of mark OSCh**-7** in diameter 6 mm, with depth and internal diameter of crater 3 mm, fill test, tineness 0.074 mm. On the working surface of the coal electrode with test dripped solution of a boric acid after that is dried up.[8–9]

Process of the analysis of samples of basalt rock was carry out on spectrograph ISP-30. First before an entrance spectrograph crack install a diaphragm with narrow inclined notch. Then an electrode with test place in an arc support. Evaporation of test and spectrum excitation carries out in an arch of an alternating current as follows.

Establish a diaphragm in position, optimum for allocation volatile elements. Thus, a current of an arch establish on instrument displayable equal 8 A, and the exposition made 30 s. Then a diaphragm move in spectral domain average-volatile elements. Thus constant burning an arch is provided, the size of a current of an arch rises up to 14 A, and the exposition increases up to 60 s. Then, under the same conditions, a diaphragm move in spectral area difficult-volatile elements, and increasing force of current of an arch up to 20 A, spend evaporation of test before its full burning out.

For full identification of spectral lines, after burning test, having established diaphragm in neutral position, photograph spectrum of the arch burning between iron and coal electrodes at force of current 8 A and expositions 10 s. An arc interval between the electrodes, equal 3 mm, support to constants during all experiment then start registration of a spectrum of tests on the photographic plate.

For realization of registration of the tests spectrum of on the photographic plate, last, with spectra of standard samples basalt rock of both deposits photograph separately. The photographic plate, after photographing spectra show, wash out, fix in current 8–10 min, wash out in flowing water 30 min and dry. Then start processing the received data. The given procedure begins with decoding the spectrogram.

Spectrograms were decoded on a spectro-projector. Presence of element in test of basalt rock, establish on the most sensitive lines of the received spectrum. Then it is possible to start an estimation percentage of the element by which it is usually carried out visually. For decoding spectrograms the atlas of spectral lines of making elements of samples basalt rock «Aydarkul» and «Asmansay» deposits was used. Thus the limit of detection of making elements of rock made $(n \times 10^{-4})$–$(n \times 10^{-3})$ %.

It is necessary to note, that comparison of spectral lines was made on intensity of standard lines samples of basalt breed and their tests. Semiquantitative spectra analysis results on revealing mineralogical structure of basalt rock samples are presented in tables 2 and 3. Research of tests was carried out in Central research laboratory of Navoi Mining Metallurgical Combine. For reception full representation about basalts structure of two listed deposits and carrying out of the comparative analysis with basalt rock «Gavasay» deposits have been the analysis of section basalts.

Table 2. Analysis results of basalt rock «Aydarkul» deposit (results × 10^{-3} %)*

№ п/п	Cu	Pb	Zn	Cd	Ag	Bi	Ge	Co	Ni	Tl	Sb	Cr	Mn	V	Ti	Mo	W	Sn	In	As	Yb	P	Ga	J	Sr
1	10	05	n/r	n/r	n/r	n/r	n/r	2	50	n/r	n/r	500	50	20	50	10	n/r	n/r	n/r	n/r	0.1	n/r	<0.2	n/r	20
2	5	05	B	n/r	<0.1	n/r	n/r	1	10	n/r	n/r	20	50	10	10	b	n/r	n/r	n/r	n/r	b	n/r	1	b	20
3	5	<0.5	n/r	n/r	<0.1	n/r	n/r	0.5	20	n/r	n/r	100	20	50	5	10	n/r	n/r	n/r	n/r	0.3	n/r	n/r	1	20
4	20	n/r	n/r	n/r	<0.1	n/r	n/r	5	50	n/r	n/r	10	50	10	20	0.5	n/r	n/r	n/r	n/r	0.1	n/r	5	n/r	20
5	5	b	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	10	20	b	10	b	n/r	b	n/r	n/r	b	n/r	n/r	b	20
6	10	0.5	n/r	n/r	n/r	n/r	n/r	2	10	n/r	n/r	20	50	10	200	1	n/r	n/r	n/r	n/r	0.3	n/r	3	n/r	20
7	10	1	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	10	50	10	200	2	n/r	n/r	n/r	n/r	0.3	n/r	n/r	n/r	20
8	10	0.5	n/r	n/r	n/r	n/r	n/r	1	20	n/r	n/r	50	20	20	5	10	n/r	n/r	n/r	n/r	0.1	n/r	5	<1	20
9	10	1	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	100	20	10	200	2	n/r	n/r	n/r	n/r	0.1	n/r	5	n/r	20
10	10	n/r	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	10	50	10	200	1	n/r	n/r	n/r	n/r	0.3	n/r	5	n/r	20
11	10	n/r	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	20	50	10	200	1	n/r	n/r	n/r	n/r	0.3	n/r	3	1	20
12	10	n/r	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	50	20	10	50	1	n/r	n/r	n/r	n/r	0.3	n/r	3	n/r	20
13	10	n/r	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	20	20	10	100	0.5	n/r	n/r	n/r	n/r	0.3	n/r	3	n/r	20
14	10	0.5	n/r	n/r	n/r	n/r	n/r	5	20	n/r	n/r	20	50	10	100	0.5	n/r	n/r	n/r	n/r	0.3	n/r	3	n/r	20
15	5	1	n/r	n/r	n/r	n/r	n/r	2	10	n/r	n/r	20	50	10	200	5	n/r	n/r	n/r	n/r	0.3	n/r	5	n/r	20

* Notice: n/r – not revealed; b - to definition prevents a continuous background

Table 3. Analysis results of basalt rock «Asmansay» deposit (results × 10^{-3} %)*

№	Cu	Pb	Zn	Cd	Ag	Bi	Ge	Co	Ni	Tl	Sb	Cr	Mn	V	Ti	Mo	W	Sn	In	As	Ib	Li	P	Ga	I	Sr
1	3	0.4	<1	<1	<0.1	n/r	n/r	1	10	<1	<1	20	20	10	10	0.5	<0.1	<0.1	<1	<1	0.2	<1	<1	<0.2	n/r	20
2	5	0.5	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	20	50	10	20	b	n/r	n/r	<0.1	<0.1	<1	<1	<0.2	<0.1	<0.1	50
3	5	0.4	<1	<1	<0.1	n/r	n/r	1	10	<1	<1	20	20	10	10	0.5	<0.1	<0.1	<1	<1	0.2	<1	<1	<0.2	n/r	20
4	4	0.5	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	20	50	10	20	b	n/r	n/r	<0.1	<0.1	<1	<1	<0.2	<0.1	<0.1	50
5	3	0.4	<1	<1	<0.1	n/r	n/r	1	10	<1	<1	20	20	10	10	0.5	<0.1	<0.1	<1	<1	0.2	<1	<1	<0.2	n/r	20
6	10	1.0	<0.2	<1	<0.1	0.2	<0.1	<0.1	50	<1	<1	20	20	10	20	0.5	<0.1	<0.1	<1	<0.1	0.2	<1	<1	<0.2	n/r	50
7	5	0.5	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	20	20	20	50	b	n/r	n/r	<0.1	<0.1	<1	<1	0.2	<0.1	<0.1	20
8	3	0.4	<1	<1	<0.1	n/r	n/r	1	10	<1	<1	20	20	10	10	0.5	<0.1	<0.1	<1	<1	0.2	<1	<1	<0.2	n/r	20
9	10	1.0	<0.2	<1	<0.1	0.2	<0.1	<0.1	50	<1	<1	20	20	10	20	0.5	<0.1	<0.1	<1	<0.1	0.2	<1	<1	<0.2	n/r	50
10	5	0.5	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	20	20	20	50	b	n/r	n/r	<0.1	<0.1	<1	<1	0.2	<0.1	<0.1	20
11	3	0.4	<1	<1	<0.1	n/r	n/r	1	10	<1	<1	20	20	10	10	0.5	<0.1	<0.1	<1	<1	0.2	<1	<1	<0.2	n/r	20
12	10	1.0	<0.2	<1	<0.1	0.2	<0.1	<0.1	50	<1	<1	20	20	10	20	0.5	<0.1	<0.1	<1	<0.1	0.2	<1	<1	<0.2	n/r	50
13	5	0.5	B	n/r	<0.1	n/r	n/r	1	20	n/r	n/r	20	20	20	50	b	n/r	n/r	<0.1	<0.1	<1	<1	0.2	<0.1	<0.1	20
14	6	0.6	н/о	0.2	<1	<1	<0.2	n/r	50	n/r	n/r	10	10	20	50	0.5	<0.1	<0.1	<1	<0.1	0.5	n/r	n/r	3	n/r	10
15	5	1	<1	<1	<1	0.2	<0.1	<0.1	20	n/r	n/r	10	20	10	100	5	<0.1	<0.1	<1	<1	0.1	n/r	n/r	5	n/r	10

* Notice: n/r – not revealed; b - to definition prevents a continuous background

The structural analysis

As all rocks, basalts can be investigated by mineral-petrographic methods which basis make macro and macroscopical researches. To macroscopical studying of basalts of Uzbekistan enough quantity scientific of proceedings[1, 6, 7, 10, 11] literature practically there are no data about microscopic studying structure of section basalt rocks which will enable to receive a tentative estimation about a direction of processing and area of purpose basalts of this or that deposit of republic. In this connection, in this work microscopic studying basalt rocks has been carried out. In this case microscopic studying of section basalt rock includes:

- The description of mineralogical structure and its quantitative definition;
- The description of texture and structure;
- Definition of crystal constants;
- Quantitative definition rockforming minerals;
- The description impregnation and thin-scattered alloted.

Microscopic studying of basalts was carry out in accordance with GOST 30629-99 p.2, on transparent sections rock by the methods accepted in petrography. Thus the area investigated section should be not less than 400 mm^2, thickness - no more than 0.03 mm. The number sectionы should be sufficient for definition of mineralogical structure to within 1 %.

For carrying out of research from basalts rock (according to normative documents of GOST 16115, GOST 10110 and GOST 896) «Aydarkul» and «Asmansay» deposits have been cut out in three mutually perpendicular directions, six samples of the rectangular form (on two samples in each direction) by length 400 mm, width 250 mm and thickness 10 mm. In the beginning of research check of ability of basalts to polishing (with application milling-bound machine SMR-015 and glare-measurer type FB-2) has been carry out. Results of research were checked visually through a mineralogical magnifier.

Samples grind on grinding-and-polishing machine and lead up their surface up to glazed - smooth matte surface, without traces of processing at full revealing figure of the stone. Glazed surface of samples subject to the further polishing. Through everyone 10 mines of polishing measure reflective ability of a surface of the sample, preliminary having dried up and having cleared its dry flannel. Preliminary include glare-measurer type FB-2 in power circuit and warm up it during 30 min. On a measuring window impose the sample - the inorganic polished glass with reflective ability not less than 200 units. Manual updating bring an arrow of the microammeter in the position corresponding “200” and remove the sample, establish a measuring head on the

polished surface of the sample in nine points: through equal distances along four edges of the sample and one in the center of the sample. Polishing of the sample carried out until the measured value of limiting shine will differ from previous no more than on 1–2 %.

By results of measurements arithmetic-mean value of parameters was defined. Final results were compared to help data[12] and has been established, that basalt rocks «Aydarkul» and «Asmansay» deposits as well as basalts «Gavasay» deposits concern to IV category of polishing.

By results of microscopic research of basalt rock «Aydarkul» and «Asmansay» deposits the following is revealed.

On basalts «Aydarkul» *deposits***.** Seldom and small-porphyry rock with afiro, allotriomorphic granular structure. Consists approximately of equal quantity of absolutely wrong grains plagioclase and pyroxene on optical properties close to diopside - to augite C : Ng = 36–43 sizes of grains plagioclase do not exceed 0.01 mm in the bulk and 0.5–0.7 mm very rare porphyryarea.

Shape of crystals extended with not clear cutting, forming twisting gear, effuse-like borders. Crystals are braided, forming felt-like structures together with same xeromorphous grains of augite which sizes of grains in the bulk it is less, than plate of plagioclase. The contents anorthite a component to define it is impossible in view of bend of polysynthetic doubles. On width of individuals of doubles this plagioclases labrador structure is probable places going down up to andesine and rising up to bytownite. Crystals of augite more isometric in comparison with the extended grains plagioclase. They form fine tableting crystals, which sizes of the majority in the basic mass rock do not exceed 0.01 mm. But separate places in rock are borrowed by more integrated crystals of the augite forming fine porphyritic allocation in the size up to 0.5–0.7 mm. There are cases of formation such porphyritic allocation glomeroblastes, consisting of 3–5 individuals. The sizes of this glomeroblastes reach 1.0–1.5 mm. In them augite has precise prismatic cleavage, seldom meeting sections having 2 systems of cleavage cracks, crossed almost under a right angle (87°). Their structural features are shown on Figure 1.

The high relief, enough the big parameter of refraction to comparison with adjoining crystals plagioclase, bright enough light-yellow-brownish interference painting together with a big angle extinction, vacillating within the limits of 36–43° allow to consider structure pyroxene corresponding to

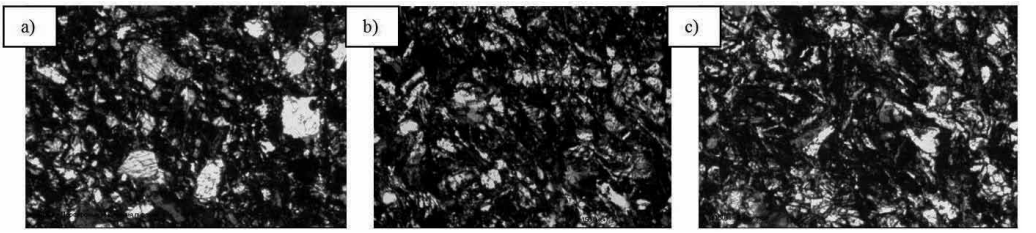

Figure 1. A microstructure of basalt Aydarkul deposit: a) small porphyry; b) afiros; c) braided structures (nicolies are crossed, increase 150-times)

transitive differences from diopside to augite. In crossed niccolies owing to interference painting easily diagnosed. Except for these two mineral phases in rock is available about 30 % of volume of glassy substance microgranular and implicational structures.

Described rock probably has undergone current of the grown lazy magma on a slope of volcano. About this testifies streak expansion of glassy substance focused in one direction. Rounding by glass separate crystals augite and crystals plagioclase creates figure ocellar structures of basic mass. The structure of glass on painting dark grey and almost black testifies about it's enough the big basicity.

Torsion crystals plagioclase and felt-like orientation of crystals of basic mass can specify on formation of rock in conditions of lava movement. Such rock also has the certain quantity of interstice. Interstice here are focused along a direction of current or the strips differing from each other by a parity of glass and crystal phases. Some strips contain glasses more than strips, witch adding prevail crystal grains. Everywhere interstices oblong, their length in a direction streakiness reaches 2.0 mm, at width 2–3 times smaller, than width of streakiness Sometimes streakiness are mutually informed narrow cord-like by cracks. Almost all large interstices here hollow, filled by the Canadian balsam. However in separate sites of rock there are fineer, rather isometric interstices filled chalcedony-like by quartz. Together with quartz in them there are pseudo-rocks not aggregated amorphous chlorite in very fine allotments which development on what minerals to define difficultly. Such finely afiro-porphyritic basalts to the north of mountains Severonuratinskiy have been studied by L. V. Shpotovoj and V. N. Ushakov. They consider as their product outpouring basalts Beltau-Kuramin structurally-formation zone.[1, 4]

On basalts «Amansay» deposits according to the results of research of

basalt samples «Amansay» deposits it is revealed that the structure of the rock is as follows: plagioclase (60 %), augite (40 %), secondary minerals: tiff, epidote, zoisite, sphen, chlorite, ore: magnetite, leucoxene; structure - gealopelit, places poikiloophite, intersertal. Rock fine-grained, finely and seldom porphyritic. Prevail leicestes and microlits plagioclase in which intervals meet fine crystal augite, conceding on a degree idiomorphic to plagioclase. The sizes plagioclase microlits up to 0.05–0.1 mm. The structure plagioclase in the basic mass sour, than in rare fine porphyritic allotment, on an angle of symmetric fading corresponds andesine. Is exposed partial albitization on edges of grains. Porphyritic allocation plagioclase do not exceed 1 mm. They usually represent prism, wafer formations slightly extended on ($\perp$001). The length of grains porphyritic allotment seldom exceeds width in 2–2.5-times. Their sizes, being gradually reduced, reach the sizes of microlits plagioclase from the basic mass. Only in separate places meet extended prismatic crystals which sizes are within the limits of 0.2–0.5 mm on length.

Microlits are focused randomly, mutually being crossed, and make intersertal structure. In intervals between microlits plagioclase are placed fine briefly prismatic allocation multiple-wedge pyroxene with an angle extinction on C : Ng = 38–41.

Together with pyroxene in intervals plagioclase microlits places keep glass microgranular aphanite structures, differing from crystals plagioclase by a low parameter of refraction and clear dispersive effect which is expressed by a weak golden shade of the surrounding weight combined by microlits plagioclase.

Because of insignificant quantity of glass and its distribution in the fragmentation intervals of crystals plagioclase microlits to notice dispersive effect are required careful crystal optics supervision. Character feature of the glass meeting in investments plagioclase of microlits, in this rock its saturapition ore minerals - magnetit which being allocated in common with glass in a significant part is in structure of glass in the form of solution microparticles firm. Microparticles dust mixed with glass, gives to the last dark grey painting with the spongy structure caused by non-uniform distribution of microparticles of ore mineral among glass. With it, connected change of intensity of black painting within the limits of microallotment the wrong form is with twisting edges.

However, among such mass are allocated black, dense, it is usual four and the triangular form the ore minerals representing fine grains of magnetit , allocated due to collective recristallisation in last stages of hardening of

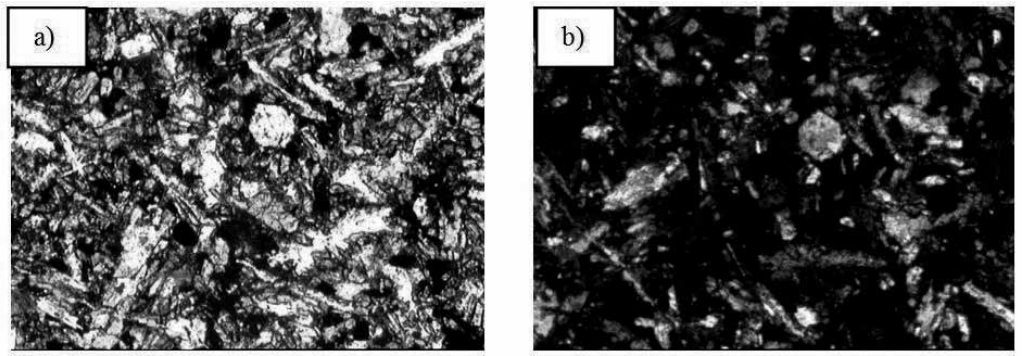

Figure 2. Microstructure of basalt «Asmansay» deposits: a) polarized; b) passing light (nicoles are crossed, increase 150-times)

basalt lava. Possibly, in structure of an ore mineral an appreciable role impurity of oxides of the titan, giving in the subsequent stages pigenetic changes of cloudy structure separation leucosen. In the rock in association with glass often meet wrong lenticular shape separation of epidote mixed with minerals of zoisite group. Among these minerals contain as well fine high-refractor, shapeless, sometimes rounded ellipse isometric grains of epidote, described with non-uniform distribution interference painting. Their structural features are shown on Figure 2.

The brightest feature of this basalt that it has almond-shaped structure. Almonds represent the various size the interstice filled by hysterogenic minerals among which overwhelming value has tiff, possible to note, that all times are completely filled tiff, forming well enough the developed crystals with polysynthetic doubles. They form in interstice glomer-blastes, consisting of several individuals which epitaxial growth from walls of interstice. Thus orientation of the crystal mineral lattice not monotonous, therefore crystals cause occurrence sectoral blackout. Together with tiff among them meet poikilit growth sour plagioclase - albite, sometimes forming nimbuses along contact tiff grains on wall border interstice. As inclusions among tiff, filling almonds meet also inclusions of epidote grain ,zoisiteand minerals of this group. Some inclusions among tiff form homo- axial pseudomorpus chlorite, developed, apparently, on relicts plagioclas**e**, remaining among tiff grains, i.e. grasped during their growth. Intensive filling interstice with carbonate accompanied by isolation tiff crystals with formation of proveins and socket among basalt matrix.

In this rock meets fragmental xenolith angular forms of wrong outline.

Around of these xenolith develops selvedge from ore substance of iron close to hydrooxides. On the entire area of fragments developed light green color afiros mass of chlorite. Places among xenolith meet the rests of glassy black-brown substance without the certain forms of allocation. The described rock can be named afiroleukobasalt.

Obviously, xenogeneic fragments have tufagenic the nature. Fragments of basalts of the previous impulse of eruption probably got in a fresh basalt lava. Thus the glassy material, having tested began thermal influence of a fresh lava distransition glass, allocating plagioclase growth which actually are observed among xenolithes, described above. Except for plagioclase growth among these xenolithes meet also micro allocation epidote, zoisite and sphenos. Being among heated melt these xenolithes, have been subjected devitrify with allocation specified growth, remaining as restitdevitrifiedti material. And the ore substance is migrated to edges xenolithes, forming similarity kelyphitic borders observed around of crystals of garnet, meeting in lamproits and diamondiferous kimberlite.

Conclusion

The analysis has shown, that specific effective activity of natural radioactive elements in basalt «Aydarkul» deposits 251 Bq/kg «Asmansay» 312 Bq/kg and «Gavasay» 202 Bq/kg, that corresponds to sanitary norms SanPIN-0193-06, according to which specific effective activity of natural elements not should to exceed 370 Bq/kg.

It is revealed, that mineralogical structure of basalt rock «Aydarkul» and «Asmansay» deposits have distinctive attributes. For example, in structure of basalt «Aydarkul» deposit are not found out such chemical elements as: Ib, Li, I and on the contrary in basalt «Asmansay» deposits contents Yb иJ has not been revealed.

In all investigated samples of basalt rock «Aydarkul» deposits have not been found out such chemical elements as: Zn, Cd, Ag, Bi, Ge, Ti, Sb, W, Sn, In, As and P. At that time, in basalt «Asmansay» deposits it is possible to notice the certain contents of the listed elements. Occurrence of similar elements in basalts «Gavasay» and «Asmansay» deposits are noticed. Thus, basalt rocks «Aydarkul» and «Asmansay» deposits on mineralogical structure noticeably differ from basalt rocks of other deposits.

In structure of basalt «Aydarkul» deposits it is found out: peridot within the limits of 13.7–18.7 %, pyroxene within the limits of 19.3–28 % and plagioclase within the limits of 346–53.3

%. Mmineralogical structure of basalt «Aydarkul» contains deposits: peridot within the limits of 11.7–18.7 %, pyroxene within the limits of 17.3–31 % and plagioclase within the limits of 31.6–50.1 %.

In turn by employees of the center "Composite" it is revealed, that in structure of «Gavasay» deposits is available: peridot 14.3–27.1 %, pyroxene 18.3–18.1 % and plagioclase 30.6–54.8 %. The basic part plagioclase borrows Si_2O (from 44 up to 67 %), and the smallest share makes Na_2O. According to experts high contents Si_2O in plagioclase just as at pyroxene promotes rise in temperature of basalt fusion.

It is revealed, that in basalts of our country the special place is borrowed with connections between Al, Fe, Mg, K, N, Ti and Si with oxygen. oxygen connection, with chemical elements of metals, forming oxides, makes a basis of silicate basalt as a whole. In such integral structure a lot of place is allocated flinty-oxygen connections as the basic part of basalt consists from SiO_2.

It is established, that the increase in the contents pyroxene in structure of basalts becomes one of the reasons of rise in temperature of basalts fusion. The temperature of peridot fusion is within the limits of 1 200–1 250 °C. Therefore producers for production basalt-fibrous materials often use basalt in structure which the basic place is allocated peridot. To date fusion temperature of basalts «Gavasay» deposits reaches 1 250–1 300 °C, that, «Asmansay» 1 350–1 450 °C and «Aydarkul»1 450–1 500 °C.

It is established, that on all beginnings described rock was generated as a product underwater (vend-paleozoic basalts of Paleo-Asian ocean from folded areas mountain Altai and east Kazakhstan and Central Asia, existed approximately 500–600 one million years ago) outpourings of the basic magma with characteristic almond-shaped texture, intersertal, in separate sites with poikilofit structure. From this follows, that on mineralogical structure basalt rocks «Aydarkul», «Asmansay» and «Gavasay» deposits noticeably differ from each other.

Thus, studying of basalt deposits of Uzbekistan has shown appreciable difference of this rocks in various deposits on mineralogical structure. In many cases the mineralogical structure of basalt promotes change temperature of fusion basalts. That, basalt-processing enterprises by selection of basalt rock can reduce the charge of power and fuel resources that will allow these enterprises to reconstruct the operative equipment and to carry out economy of financial assets.

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