МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА
Researchbib Impact factor: 11.79/2023
SJIF 2024 = 5.444
Том 2, Выпуск 9, 30 Сентябрь

ASSESSMENT OF THE GEOLOGICAL STRUCTURE AND SUITABILITY FOR PRODUCTION OF BASALT FIBER OF VOLCANIC EFFUSIVE ROCKS FOUND IN THE DUSHEBULAK SECTION OF THE NORTH SULTANUVAYS MOUNTAIN.

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ANNOTATION

This article presents the formation, geological structure and chemical analysis of the main effusive volcanic rocks in the Dushebulak area. In addition, the requirements of leading enterprises in the production of continuous basalt fiber were cited. Based on the data provided by the laboratory of MEGA INVEST INDUSTRIAL LLC, chemical resistance analysis of samples taken from the promising fields of Podgornyanskiy, Marneulsk, Georgia, compared with acid resistance, viscosity and clay-soil level, which determines the suitability for fiber production.

Keywords: *Sultunuvays, Karakuduk, andezibazalt, plagioriodatsit, gabbro, continuous basalt fiber, acidity modulus. viscosity level, clay-soil level.*

SHIMOLIY SULTONUVAYS TOG'INING DUSHEBULOQ UCHASTKASIDA UCHRAYDIGAN ASOS VULKANOGEN EFFUZIV JINSLARNING GYeEOLOGIK TUZULISHI VA BAZALT TOLASI ISHLAB CHIQARISHGA YAROQLILIGINI BAHOLASH.

ANNOTATSIYA

Ushbu maqolada Dushebuloq uchastkasidagi asos effuziv vulkanogen tog' jinslarining xosil bulishi, geologik tuzilishi va uchastkadan olingan namunalarning kimyoviy tahlili keltirilgan. Bundan tashqari uzluksiz bazalt tolasi ishlab chiqarishda yetakchi korxonalar talablari keltirildi. “MEGA INVEST INDUSTRIAL» MChJ laboratoriyasi taqdim qilgan ma'lumotlar asosida Ukrainaning “Podgornyanskiy” Gruziyaning “Marneulsk” istiqbolli maydonlaridan olingan namunalarining kimyoviy tahlillari orqali tola ishlab chiqarishga yaroqliligini belgilovchi kislotaga chidamliligi, qovushqoqlik darajasi va gil-tuproqlilik darajasi o'zaro taqqoslandi.

Kalit so'zlar: *Sultonuvays, Karakuduk, andezibazalt, plagioriodatsit, gabbro, uzluksiz bazalt tolasi, kislotalilik moduli. qovushqoqlik darajasi, gil-tuproqlilik darajasi.*

ОЦЕНКА ГЕОЛОГИЧЕСКОГО СТРОЕНИЯ И ПРИГОДНОСТИ ДЛЯ ПРОИЗВОДСТВА БАЗАЛЬТОВОЙ ФИБРЫ ВУЛКАНИЧЕСКИХ ЭФФУЗИВОВ, ОБНАРУЖЕННЫХ НА УЧАСТКЕ ДУШЕБУЛАК ГОРЫ СЕВЕРНЫЙ СУЛТАНУВАЙС.

АННОТАЦИЯ

В статье представлены формирование, геологическое строение и химический анализ основных эффузивных вулканических пород Душебулакского района. Кроме того, были приведены требования ведущих предприятий по производству непрерывного базальтового волокна. На основе данных лаборатории ООО «МЕГА ИНДУСТРИАЛ ИНДУСТРИАЛ» проведен анализ химической стойкости образцов, взятых с перспективных месторождений Подгорнянского, Марнеульска, Украина, в сравнении с кислотостойкостью, вязкостью и уровнем глинистости, определяющим пригодность для производства волокна.

Ключевые слова: *Султанувайс, Каракудук, андезибазальт, плагиориодацит, габбро, непрерывное базальтовое волокно, модуль кислотности. уровень вязкости, уровень глинистый грунт.*

The area is located in the NW part of the Karakuduk ophiolite strip - an extended zone of fractured underwater outpourings of basalts and andesites, forming with tuffs and limestones the lower part of the Karakuduk formation D_{2-3}(?) kk.

Previously, under the name Aschebutaktial Square, it was recommended to study raw materials for the production of continuous basalt fibers by R.A. Khamidov.

According to his data, the metabasites of the Karakuduk formation form a homogeneous section and in all parameters they meet the technical conditions of the industry. The boundaries of the area were adjusted during reconnaissance work, and the area decreased, due to the exclusion from its boundaries of the watershed part, blocked by tuffs of medium and acid compositions (the upper part of the section of the Karakuduk formation).

During reconnaissance work in the northern part of the area, andesibasalt pelite and psammite tuffs were tested at an outlet of 0,4x2,0 km, between the submeridional intrusions of gabbro. Pure, impurity-free tuffs form sections of 60x100x20 m .

In terms of the plot has the shape of a pentagon, elongated in a submeridional-northwest direction. The length of the area is 5,5 km, the width is more than 2,1 km, the area is 11,7 sq^2.

The natural boundaries of the Duschebulak area are: from the north – a plume of quaternary proluvial deposits of the foothill plain, limiting the root outcrops of rocks; from the north and south - zones of deep submeridional faults accompanying the fractured zones of underwater volcanic outpourings, from the south the border is drawn along the right watershed of the Ashchebulak.

Geologically, the Duschebulak site is a linear fractured outcrop of rocks of the basalt-andesite-dacite formation forming the Karakuduk suite. Basalts and olivine basalts, andesibasalts lie at the base of the section, andesites above, andesite dacite tuffs above them. The section increases from the north to the southeast. Basalts are deposited on the marbled limestones of the Kazansai formation. The relationship of basalts with terrigenous shales is poorly studied, the contacts are mostly tecton.

In the plan, the basaltoid rocks of the Karakuduk formation form a frame with the SW and SW, in the middle part of the ruptured gabbroids of the Sultanuizdag complex $\upsilon_2D_{2\text{-}3}$(?)s, in which 3 lenticular bodies of serpentinites (antigorite composition) are marked: - the northern one with a capacity of up to 200 m and a length of 1700 m; - the middle one with a capacity of 5 to 300 m in the blow-up, with a length of more than 3700 m; -the western one with a capacity of 50 to 350 m, with a length of up to 3000 m within the site, which, increasing in capacity to 500 m, goes south beyond the boundaries of the Duschebulak site. Contacts are usually tectonized.

The Karakuduk formation $D_{2\text{-}3}$(?)kk -is traced from northwest to southeast for more than 40 km, forming a greenstone belt of the Sultunuvais Mountains. It is composed of green-stone metabasalts, metadiabases, metaandesites, metariodacites, garnet and non-garnet amphibolites, quartzite and quartz-feldspar-micaceous shales, micaceous quartzites and marbles. The suite has a three-membered structure.

The lower part is composed of metabasalts, the middle part is metaandesites, the upper part is metariodacites and metariolites. Capacity 450 m.

The rocks are moderately alumina in chemistry with a high-sodium alkali slope. The formation type of sodium basalts. The facies of metamorphism is epidote-amphibolite.

The formation is broken by dikes and dike-like bodies of diabases of plagioriodacites and rhyolites of the Karakuduk subvolcanic complex.

No organic residues have been identified. The relationship with the host strata is unclear. Within the Duschebulak site, formations of the formation can be traced for 8 km from the northern end of the cr. Sultanuvais reaches the upper reaches of Beshmazarsai in two bands separated by terrigenous formations of the Kazansai formation, serpentinites and gabbro massifs. The southern continuation of the bands outside the site is blocked by Cretaceous-quaternary, the northern one under the Cretaceous cover, overlapping the rocks of the Karakuduk subvolcanic complex and the ophiolite band in the middle part of the Sultanuvais ridge.

The rocks recommended for study as raw materials for the production of basalt fibers form the lower part of the Karakuduk formation. They are represented by metabasalts of green and dark green color, finely and cryptocrystalline, lying hollow on the marbled limestone of the Devonian.

The capacity of the productive strata increases from the northwest to the southeast from 50m to 500m. The chemical composition is shown in the table below.

Results of chemical analysis of basalts for the Dushebulak

№ ampl es	Content in%											
	iO_2	l_2O_3	iO_2	e_2O_3	eO	gO	nO	aO	a_2O	K $_2O$	O_2	пп
0/94	9,5	4,80	,85	,28	,50	,60	,19	,83	,31	0 ,62	0,10	,50
0/95	0,25	4,30	,10	,04	,05	,40	,24	,55	,0	0 ,50	0,10	,50
0/97	0,20	3,70	,15	,09	,26	,10	,21	,25	,92	0 ,20	0,10	,44
0/10 0	8,30	4,54	,70	,90	,47	0,15	,17	,95	,42	0 ,15	0.10	,00
0/10	1,80	4,89	,72	,83	,18	,50	,15	,25	,51	0 ,10	0.10	,40

2												
0/10 3	9,50	3,80	,16	,69	,15	,30	,21	,13	,76	0 ,10	0.10	,80
he aver age	9,92	4,34	,94	,64	,26	,34	,20	,99	,15	0 ,27	0.10	,44

The metabasites retained traces of the primary ophite structure, but for the most part they were transformed into amphibolites – plagioclase, epidote-amphibole, chlorite-actinolite shales with a nematogranoblast structure. The metatufs of medium-basic composition, common in the northern part of the area, are also amphibolized, but they have preserved traces of psamite pyroclastic structure.

The primary rocks of the base of the section were basalts of the sodium series, they are moderate and low-alkaline, moderate and low-alumina. At the level of the valley talvegs, the metabasalts are dissected by dikes with small subvolcanic bodies of plagioriodacites. The abundance of acidic inclusions affects the composition of basalts, enriching them with silica. In the near-contact zones of influence of ultrabasic and major intrusions, basalts are albitized, actinolitized and enriched with iron. Accumulations of magnetite and musketovite in contact-altered rocks are visible to the naked eye. Modified rocks are not suitable as raw materials for the production of basalt fibers.

Within the area, the section of the Karakuduk formation increases from north to south-east, so the search for purer subvolcanic basalts should be concentrated in its northern part.

The middle part of the section of the Karakuduk formation is formed by metaandesites. They are hollow on basalts in the form of a deposit with a capacity of 140 m .

They are represented by green-stone modified plagioclase porphyrites of greenish-gray color. Porphyroclasts of albitized plagioclase make up 25-30%, the bulk is 70-75%. Chemical analysis of the sample determines the rock as high-alumina andesites of the sodium series. Due to the high SiO_2 content of more than 60%, andesites are not suitable for fiber production.

The upper part of the section of the Karakuduk formation is exposed on the right watershed of the Achikuduksai and further south. It is composed of andesite and dacite pelitic tuffs, forming thin-plate gravelly fragments on the surface. The capacity is about 290 m. These rocks are not suitable for peturgical production.

The retinue is accompanied by dikes and columnar volcanic bodies of metabasalts, metaandesites, metariodacites, metariolites, metadacites of the Karakuduk subvolcanic complex.

The total thickness of the deposits of the Karakuduk formation exceeds 450 m .

Subvolcanic formations tearing the Karakuduk suite form small, sometimes numerous bodies, confined to the talvegs of the valleys. They are represented by plagioriodacites of the Karakuduk complex $\rho\lambda\xi D_{2-3}$(?)k. Plagioriodacites have gray, greenish - and pinkish-gray coloration, contains porphyry inclusions of albitized plagioclase and transparent quartz with a size of 8-10 mm. The bulk is fine-crystalline, represented by a microgranoblastic aggregate of quartz, albite and kalishpat, partially preserves relict micropoikilospherolite and granophyre structures.

Intrusive formations of the Duschebulak area tend to its northern part, are represented by gabbro and serpentinized ultrabasic rocks of the Sultanuizdag hyperbasite-gabbro-plagiogranite complex $\upsilon_2 D_{2-3}$(?)s.

The rocks perform two arc-shaped kulisovidny fracture zones of the left shift. In the center there are outcrops of serpentinized ultrabasic rocks, along the edges of the gabbro intrusion. In a large gabbro outlet, serpentinites form megaxenolites with tectonized contacts.

Serpentinized ultrabasic rocks form steeply falling bodies 50-550 m wide, 1,7-9,0 km long; one of the bodies (200x600 m in size) lies hollow. Serpentinite outcrops are dissected with uneven wavy contact and effusions of the Karakuduk formation, and terrigenous shales of the Kazansai formation, all contacts are tectonized.

Serpentine is represented by antigorite with rare streaks of fibrous chrysotile. In dark-colored peridotite relics, olivine secretions are completely replaced by serpentine, to a lesser extent by tremolite, chlorite, talc and ore, porphyritic secretions of rhombic pyroxene are replaced by bastite. Rocks contain inclusions of magnetite (musketovite), chromite, microinclusions of CO-Ni, sulfides. Single grains of chromespinelides were found in individual protoloch samples.

Chromites are replaced by magnetite, the contents of Fe_2O_3 are 47,39-65,56%, FeO – 18,29-22,55%, Cr_2O_3 – 5,75-12,0%. Large accumulations of ore minerals were not found on the area. Serpentinites contain increased amounts of Cu, Zn, Mn and V, in rare samples the presence of gold up to 0,03 g/t was noted. Along the western tectonized contacts, leaf-like talc-carbonate and talc-quartz-carbonate rocks are developed in serpentinites. Lenticular bodies of garnet-pyroxene rocks - rodingites are noted in large serpentinite bodies, pyroxene is partially replaced by chlorite and epidote.

Amphibolitized gabbro forms both small (50-100 m wide) and large (up to 1,5 km wide) intrusions, cutting through both volcanites of the Karakuduk formation and terrigenous shales. The length of gabbro bodies ranges from 300-500 to 5,5 km. Gabbro has intrusive and tectonized contacts with serpentinites.

Gabbroids have the appearance of light-colored horn-shaped gabbro, multi-grained, often contain xenoliths of diabases. The rocks have preserved the relict gabbro structure. The composition contains an equal amount of amphibole and plagioclase (labrador) or its replacement products - zoisite, clinocoisite, chlorite). Pyroxene has been preserved in single relic grains. Accessory minerals are rarely present in gabbro. These are single grains of ore, apatite or sphene.

The rocks of the Sultanuizdag complex are metamorphosed to amphibolite facies. As raw materials for the production of basalt fiber are not suitable, due to fragility.

Near the work area from the west there are shallow outcrops of peridotites and pyroxenites of the Tebinbulak peridotite-pyroxenite-gabbro complex. These rocks tear the deposits of the Jamansai formation, forming significant fields of contact changes in the form of quartzites and quartzite-like rocks with rhodonite lenses. As a raw material for the production of fibers, the rocks of the complex are unsuitable due to the high content of magnesium, titanium and iron.

The tectonic structure of the Duschebulak- The area is located in an extended steeply falling rift zone between two deep faults: the south-western Ascheninintau and the north-eastern - Central.

The Ashenintau fault falls steeply to the NE, the width of the dislocated rocks (shales, meta-effusions, serpentinites) is up to 1 km: from the break along the NE contact of the Jamansai formation to the break along the SOUTH contact of the main outlet of the Karakuduk formation. Terrigenous shales in the fault zone form crumpled folds.

The central fault also falls steeply to the north, the Karakuduk formation, sandwiched between the faults, forms a gentle syncline with the hinge rising in a northerly direction. The occurrence of layers is inclined, the occurrence of shale is steep SW and SW at angles of 50-750.

Despite the saturation with intrusive intrusions, significant manifestations of contact and contact-metasomatic changes and dislocation stress transformations among the metabasites of the Duschebulak area there are significant areas of homogeneous rocks suitable for the production of basalt fibers.

Industrial requirements of leading enterprises in the production of continuous Basalt Fiber.

Component name %	"Mega invest industrial" *LLC*	РСТ УССР 5020-80 for the production of staple fibers from raw materials	ТУ 21 УССР 410-86 for the production of supernosic fiber from raw materials	ТУ 21 ГССР 137-84 for continuous fiber production from raw materials	SATBIC (KHD) for the production of continuous fiber from raw materials
SiO_2	47,5-53,0	43,0-51,0	46,0-52,0	47,5-52,5	52,0-54,5
Al_2O_3	14,0-20,0	11,0-17,0	13,0-18,0	14,0-18,0	14,0-16,3
FeO	6,0-13,5	10,0-18,0	8,0-15,0	7,0-13,5	4,5-5,5
Fe_2O_3					3,5-4,5
CaO	7,0-11,0	8,0-13,0	6,5-11,0	8,0-11,0	8,0-9,0
MgO	1,0-8,5	4,0-12,0	3,5-10,0	3,5-8,5	6,5-7,5

K_2O	1,5-7,5	2,0-5,0	2,0-6,0	2,5-6,0	0,7-1,6
Na_2O					3,0-3,5
TiO_2	0,2-2,0	0,2-1,6	0,5-2,5	0,2-2,0	1,3-1,6
MnO	0,25	≥0,40	≥0,50	≥0,2	
SO_3	0,2	≥1,0	≥0,50	≥0,2	
п.п.п.	-	≥3,0	≥5,0	≥4,0	

Requirements of "Mega INVEST INDUSTRIAL" LLC for fibers of different sizes from basalt raw materials

Component name %	Mass fraction			
	Rough fiber	Continuous fiber	Thin fiber	Super thin
SiO2	48,0-53,0	47,5-55,0	43,0-51,0	46,0-52,0
Al2O3	13,0-18,0	14,0-20,0	10,0-17,0	13,0-18,0
FeO+Fe2O3	8,0-15,0	7,0-13,5	10,0-18,0	8,0-15,0
TiO2	0,5-2,0	0,2-2,0	0,2-3,0	0,5-2,5
CaO	6,5-11,0	7,0-11,0	8,0-13,0	6,05-11,0
MgO	3,0-10,0	3,0-8,5	4,0-15,0	3,5-10,0
Na2O+K2O	2,0-7,5	2,5-7,5	2,0-5,0	2,0-7,5
Mn2O3	≥0,5	≥0,25	≥0,4	≥0,5
SO3	≥1,0	≥0,2	≥1,0	≥0,5
Loss of mass when heated	≥5,0	≥5,0	≥5,0	≥5,0
Reference module	1,9-2,5	2,2-3,0	1,7-2,0	1,8-2,4

- *Tough crowd***-** fibers from 15 to 25 microns in diameter and from 5 to 1500 mm in length;

-*Continuous fiber*-insulating materials for thermal insulation, thermal equipment, communications, filters for tailoring of exhaust gases from dust in pipes, mining and metallurgical plants, filters for tailoring of flowing water.

At present, there is a great interest in continuous fibers from basalt rocks. This interest depends on several factors:

• basalt fibers have high properties of many extruded glass fibers;

• the raw material base for the production of basalt fibers is unlimited in practice;

• in recent years, technological advances have made it possible to significantly reduce the CBF production cost to the level of glass fiber production;

- *Fine fiber*- a layer of randomly placed fibers with a diameter of 9 to 15 microns and a length of 3 to 1500 mm;

- *Super thin* - a layer of randomly placed fibers with a diameter from 0.5 to 3 microns and a length from 10 to 50 mm;

it is used in the production of sound-proof mats and heat-proof materials, multilayer woven materials, heat-insulating knitted and sewing materials, soft heat-proof kidrofob plates, filters and other materials.

According to the Ukrainian laboratory, the industrial requirements for basalt raw materials for fiber production in 1990 were as follows:

- raw materials must be structurally and structurally homogeneous;

- stable in material composition;

- almost does not contain silicon minerals, iron and magnesium minerals, as well as minerals rich in phosphorus and sulfur.

The analysis of the quality of the tested raw materials showed that:

- the best - ancient weakly crystallized basalts with basic plagioclase (albitization is not removed);

- hydrothermally modified rocks are not suitable because quartz, carbonates are not allowed in the raw material, because the presence of loose quartz slows down the melting process and carbonates, such as secondary chlorite, cause strong gas evolution in the production of epidote fibers;

- MgO content should not exceed 7.5%, as its increase affects the crystallization properties of the solution due to the increase in the upper crystallization limit;

- High losses, i.e. the rock must be relatively new, which affects its melting rate.

In addition, according to Mega Invest Industrial LLC, which is the only basalt fiber producer in Uzbekistan

- The amount of Al2O3 should be in the range of 14-20%. The reason is that Al2O3 has a positive effect on the viscosity level of the rock.

If the amount of Al2O3 is low, it is noted that crystallization is observed in the furnace during the melting of basalt mineral rock.

-If the titanium content exceeds 2%, microscopic examination of the fiber content revealed the crystallization of the elemental fiber.

- It should be noted that one of the main indicators of the suitability of basalt fiber is the modulus of acidity, along with physicochemical, mineralogical, geochemical, petrographic and other properties:

$$M_K = \frac{XSiO2+XAl2O3}{XCaO+XMgO}$$

Where: Mass fraction of XRmOn-containing oxides.

In addition, the higher the acidity modulus, the more resistant the fiber is to water and moisture and therefore the more durable it is. However, an increase in the acidity modulus due to an increase in SiO2 + Al2O3 leads to an increase in the melting point, an increase in the viscosity of the solution, and a decrease in the melting efficiency of the final product. It has been experimentally determined that the modulus of acidity should be at least 1.5–1.8, for single-component basalt mixtures up to 4.0, and sometimes up to 5.5–7.0.

Acid modulus of samples from Dushebulak area, Podgornyansky and Marneulsk deposits (laboratory of Mega Invest Industrial LLC)

Object, №№ sample	$(SiO_2+ Al_2O_3) / (CaO+ MgO)$
Dushebuloq (Uzbekistan)	3,71

Podgornyanskiy (Ukraine)	6,8
Marneulsk (Georgia)	4,69

The degree of viscosity (2.2-3.0) should be considered in the process of obtaining fiber from basalt raw materials.

The modulus of viscosity is determined using the following formula:

$$M_к = \frac{MSiO_2+2MAl_2O_3}{2MFe_2O_3+MFeO+MCaO+MMgO+MK_2O+Na_2O}$$

Here: Quantitative fraction of oxides in MRmOn-Composition

Molar masses of elements that play an important role in the composition of raw materials in the production of continuous basalt fiber.

Elements	Mol. mas.	Minerals		Mol. mas.
O	16	SiO_2	28+(2*16)	60
Si	28	Al_2O_3	(27*2)+(3*16)	102
Al	27	Fe_2O_3	(56*2)+(3*16)	160
Fe	56	FeO	56+16	72
Ca	40	CaO	40+16	56
Mg	24	MgO	24+16	40
K	39	K_2O	(39*2)+16	94
Na	23	Na_2O	(23*2)+16	62
Ti	48	-	-	-
Mn	55	-	-	-
S	32	-	-	-

The degree of viscosity of samples from the Dushebulak area, Podgornyansky and Marneulsk deposits (laboratory of Mega Invest Industrial LLC)

Object, №№ sample	$M_к$
Dushebuloq (Uzbekistan)	2,28
Podgornyanskiy (Ukraine)	3,1

Marneulsk (Georgia)	2,6

The clay-soil level has a large effect on the viscosity in the production of continuous basalt fibers and is calculated by the following formula:

$$al^1 = \frac{Al_2O_3}{Fe_2O_3+FeO+MgO}$$

Thus, the clay-soil content of basaltoids should be $al^1 > 1$.

The following table shows the clay-soil content of the samples taken from the prospective areas.

Object, №№ sample	al^1
Dushebuloq (Uzbekistan)	0,75
Podgornyanskiy (Ukraine)	1,25
Marneulsk (Georgia)	1,15

In conclusion, it should be noted that in the main volcanic rocks in the Dushebulak area, chromites are replaced by magnetites, content Fe_2O_3 -47,39-65,56%, FeO – 118,29-22,55%, Cr_2O_3 – 5,75-12,0%. No large accumulations of ore minerals were found in the area. Serpentinites contain increased amounts of Cu, Zn, Mn and V; rare samples contain gold up to 0.03 g / t. Listvenite-like talc-carbonate and talc-quartz-carbonate rocks are developed along the western tectonized contacts in serpentinite. Large bodies of serpentinites contain lenticular bodies of garnet-pyroxene, pyroxene is partially replaced by chlorite and epidote.

Within the area, the section of the Kurakuduk Formation grows from north to southeast, therefore, searches for subvolcanic basalts of purer composition should be concentrated in its northern part.

The middle part of the section of the Karakuduk Formation is formed by metaandesites. They lie gently on the basalts in the form of a deposit with a thickness of 140 m.

They are represented by green-stone altered plagioclase porphyrites of greenish-gray color. Porphyroclasts of albitized plagioclase account for 25-30%, the bulk of 70-75%. Chemical analysis of the sample identifies the rock as high-alumina soda series andesites. Due to the high SiO2 content of more than 60%, andesites are not suitable for the production of fibers.

As an example, the world's leading, modern plants and factories (Mega Invest Industrial LLC, TU 21 USSR 410-86, TU 21 GSSR 137-84, SATBIC (KHD)) produce continuous basalt fiber. it can be seen that the oxides of the chemical composition of the raw materials used in the extraction are limited in a precise range. In addition, the different proportions of oxides in the production of fiber from basalt solution determine their viscosity, acidity modulus and clay-soil content. The viscosity of the basalt solution has a large effect on the diameter of the fiber produced. The viscosity of the samples taken from the Dushebulak plot was shown to be within the norm (2,2–3,0).

The higher the acidity modulus, the more resistant the fiber is to water and moisture. However, an increase in the acidity modulus due to an increase in $SiO_2 + Al_2O_3$ leads to an increase in the melting point, an increase in the viscosity of the solution, and a decrease in the melting efficiency of the final product. Showed that the acidity modulus was normal in all samples taken from the Dushebulak plot.

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