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РЕСУРСЫ ГЛАУКОНИТОСОДЕРЖАЩИХ ПЕСЧАНИКОВ УЗБЕКИСТАНА: МЕСТОРОЖДЕНИЯ «ЧАНГИ»

RESOURCES OF GLAUKONITE-CONTAINING ROCKS OF UZBEKISTAN: THE «CHANGI» DEPOSIT

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Аннотация. В работе приводится глауконитосодержащие месторождения Республики Узбекистана. Анализируется месторождения глауконитосодержащие пески месторождения Чанги.

Ключевые слова: глауконитовые месторождения, глауконитовые песчаники, химический состав, микрофотография, глауконитовый концентрат, обогащение, флотация, пигмент.

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Annotation. The paper presents glauconite-bearing deposits in Uzbekistan. Deposits of glauconite-bearing sands of the Changi deposit are analyzed. The issues of enrichment by flotation method are considered. Analyzes of micrographs are presented.

Keywords: glauconite deposits, glauconite sandstones, chemical composition, micrograph, glauconite concentrate, beneficiation, flotation, pigment.

Introductions. The special properties of glauconites attract many entrepreneurs and specialists in the industrial sphere of Uzbekistan. At present, many deposits and manifestations of glauconite-bearing rocks have been explored in Uzbekistan [1, 2]. The peculiarity of these deposits is that they are located in the eastern, western, central and other territorial parts of Uzbekistan. This allows us to consider resources at the regional level.

The main deposits are divided into conventional geological regions: «Pritashkent», «Gissar», «Sultan-Uvaysy», «Ziatdin-North-Fergana», as well as «Kyzylkum sands». At the same time, in different periods,

some of the following deposits were discovered and studied: «Changi», «Garm-Chashmasay», «Bolgali», «Kofrun», «Tagarasay», «Khuzhakul», «Krantau», «Kyzylzhar».

Projected reserves and content of glauconite in the rock by deposits are shown in table 1.

Table 1 – Projected reserves and content of glauconite in the rock by deposits

№	Field	Reserves, million tons	Glauconite content, %	Average glauconite content, %
1	Changi	14	13 ÷ 16	14,5
2	Garm-Chashmasoy	10	10 ÷ 15	12,5
3	Bolgali	1,5	10 ÷ 16	13
4	Kofrun	15	6 ÷ 12	9
5	Togarasoy	–	8 ÷ 24	16
6	Khujakul	10	10 ÷ 14	12
7	Krantau	10	10 ÷ 20	15
8	Kyzylzhar	–	15 ÷ 18	16,5
	Total	60,5		

Research methods and objects. It can be said that the «Changi», «Garm-Chashmasoy», «Kofrun», «Krantau» deposits can be referred to the most promising deposits [1]. The resource potential of the listed deposits is more than 60 million tons. The average content of glauconite for the deposits as a whole is more than 14.1%.

At present, in addition to the Krantau deposit [3], the «Changi» deposit has also been studied, but the authors of [2] in the conclusion attributed it to unpromising deposits for a number of reasons.

In this regard, the question arises whether the «Changi» deposits of glauconite-bearing sandstones can be used in the national economy after appropriate processing.

Glauconite sandstones of the «Changi» deposit (fig. 1) are located in the Parkent district of the eastern part of the Tashkent region. The occurrence is represented by glauconite sandstones. The productive stratum is overlain by a small thickness of opoka-like clays, quartz-feldspar sands and limestones. The total thickness of the rocks is 40 m. In some places, part of the relief, glauconite sandstones come to the surface and extend up to 3 km, with a variable thickness from 0.75 meters to 4 meters.

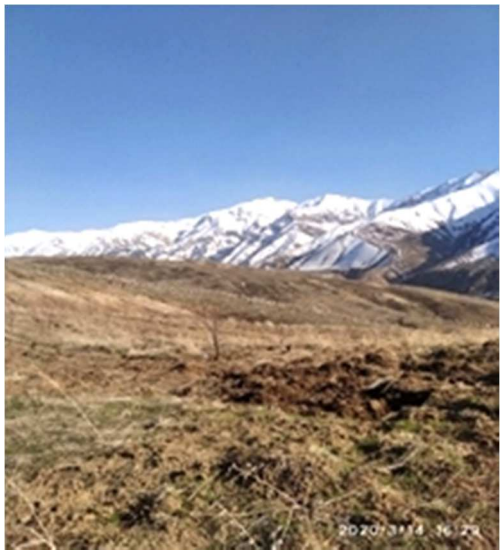

Figure 1 – Glauconite deposit «Changi»

In recent years, glauconite-bearing rocks have attracted great attention in the Republic. The reason for the increased attention to glauconite-containing rocks in Uzbekistan is their use as a potassium-containing mineral fertilizer. Since they contain potassium oxide K_2O, one of the main components of mineral fertilizers in agricultural production. In addition, they have long been used for softening drinking water.

The Chatkal geological expedition «Khimgeolnerud» of the «Tashkentgeologiya» trust in 1963–1966 carried out geological exploration and discovered large reserves of glauconite sandstones of the «Changi» deposit [4]. Since this period, studies of glauconite sandstones in various directions have intensified. At present, samples have been taken for research to determine the possibility of obtaining a green mineral pigment (fig. 2).

Figure 2 – Glauconite-bearing sandstone from the «Changi»

Table 2 shows the main chemical composition of the glauconite sandstone of the Changi deposit.

Table 2 – Chemical composition of glauconite sandstones of the «Changi» deposit

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	MnO	CaO	Na_2O	K_2O	P_2O_5	loss on ignition
69,51	0,33	5,41	11,58	0,51	2,04	0,02	1,00	0.07	4,25	0,44	5,58

One of the main directions is the use as argotechnical ores for cotton, depending on the content of potassium oxide. In addition, the ability of glauconite to selectively absorb oil and oil products, phenols, pesticides and surfactants allows it to be used as a filtering and armor cushion to protect groundwater from pollution [5].

The most interesting is the use of glauconites as mineral raw materials for the production of natural pigments.

The selected glauconite samples were visually inspected and sorted manually. The sorted samples are thermally processed and ground in a mill.

Figure 3 shows a micrograph of a glauconite sandstone at 100 fold. Where it can be seen that the sandstone is mainly composed of quartz sand, glauconite particles and other impurities. A micrograph of a sandstone particle was examined at 100x magnification using a «Leica DM 2500» microscope, made in Germany. The studies were carried out on unenriched and enriched glauconite samples. Micrographs were examined at 40 and 100 times magnifications. Moreover, various filters are also used.

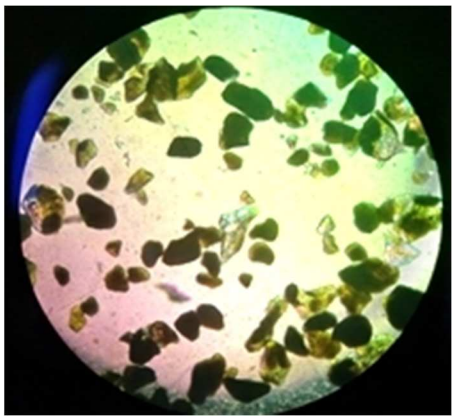

Figure 3 – Micrograph of non-enniched glauconite sandstone from the Changi deposit at 100 times

Crushed glauconite sandstones were mixed with ordinary water and left to settle. After the deposition of quartz sands and other impurities, then the liquid phase was passed through filter paper, the residue was subjected to drying. The yield of glauconite concentrate was 62,2 %.

Thus, the enrichment of glauconites from the «Changi» deposit has been established. Further, to reduce the time for enrichment processes, the flotation enrichment method was used on a laboratory flotation machine FML (fig. 4). The main criterion was the use of the new «UGK» foaming agent. Typically, flotation uses frothers, frothers in combination with collectors, and, if necessary, stimulants. We used «UGK» is universal and allows the process of flotation of glauconite sandstones of the «Changi» field with one reagent.

After loading the screened glauconite sandstone, ready for enrichment, into the flotation tank, the mixer is switched on and moves with water to a homogeneous state. The «UGK» foaming agent is poured into the flotation tank and the foam layer is removed with glauconite concentrate. The process lasted 10–12 minutes. After the completion of the first stage of flotation, a small portion of «UGK» was added to the tailings and a control flotation was performed. Thus, several more control flotation was carried out further. As a result, the resulting glauconite concentrate reached 64,5 % within 30–40 minutes (fig. 5.).

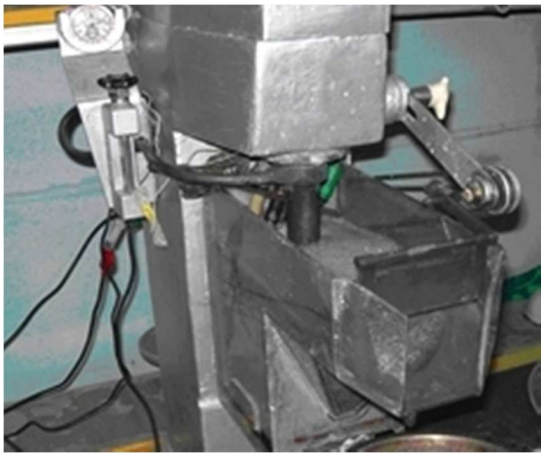

Figure 4 – Laboratiry flotation machine FML

Figure 5 – Flotation-enriched glaconite concentrate of «Changi» deposit

Conclusions. In conclusion, it can be noted that the glauconite sandstones of the «Changi» deposit are easily beneficiaries and allow the use of the flotation beneficiation method. The enrichment scheme is simple and the obtained glauconite concentrates with a content of 64,5 % are fully suitable for use as local green pigments.

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