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INVESTIGATION OF THE CHEMICAL COMPOSITION AND PROPERTIES OF LOW-GRADE PHOSPHORITES OF TASHKUR

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ABSTRACT
This work presents a study on the technology of obtaining phosphorus-containing fertilizers with a reduced consumption of mineral acids and with the involvement of low-grade phosphorites in the processing.

Keywords: technology, phosphorite, acid, suferphosphate, properties, unfortified phosphorite flour, poor phosphorites, unfortified phosphate rock.

Introduction
In the decree of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev on the strategy of actions for the further development of the Republic of Uzbekistan provides for measures to increase the competitiveness of the national economy by deepening structural transformations, modernization and diversification of a number of leading industries, including modernization and intensive development of agriculture, implementation of investment projects for the construction of new, reconstruction and modernization of existing processing enterprises equipped with the most modern high-tech equipment for deeper processing of agricultural products, production of semi-finished and finished food products, as well as packaging products" [1].
The development of intensive, rapidly implemented technologies for the production of phosphorus-containing fertilizers with a reduced consumption of mineral acids and involving low-grade phosphorites in the processing with the existing shortage of mineral resources is an urgent task today.

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For the physico-chemical substantiation of the technology for obtaining new types of complex fertilizers such as simple superphosphate from phosphorites of Central Kyzylkums, the development of regulatory and technical documentation, as well as for the purpose of assessing the possibilities of transportation using existing equipment at phosphorus plants, the chemical and granulometric compositions and physico-mechanical properties of unenforced phosphorite flour and poor phosphorites of the site of the Tashkent Jeroy-Syrdarya deposit were studied. Table 1 shows the results of the chemical analysis of phosphorites [2-9].

Table 1. Chemical composition of phosphorites of Tashkur

Phosphorites	The content of the main components, wt. %								
	P_2O_5	CaO	MgO	CO_2	R_2O_3	SO_3	F	H_2O	н.о.
Unenforced phosphorous flour	18,79	45,04	1,79	14,41	2,51	2,90	2,29	1,12	7,59
Poor phosphorites	12,38	44,06	1,96	19,73	3,01	2,56	1,45	1,78	8,82

The content of all forms of phosphorus (total, digestible and water-soluble) in phosphate raw materials and finished products was determined by the photocolorimetric method in the form of a yellow phosphor-vanadium-molybdenum complex on a KKK-3 photocolorimeter. The complexometric method with fluorexone indicators and dark blue chromium titration with a solution of trilon B was used to determine calcium and magnesium, and the content of one and a half iron and aluminum oxides was determined by the method. Determination of sulfates in phosphorite was carried out by the weight method, precipitation in the form of barium sulfate. Carbon dioxide was determined by treating the sample sample with hydrochloric acid, followed by absorption of CO_2 with an alkali solution. Moisture was determined by drying to a constant mass at a temperature of 80-105 ℃. The granulometric composition of phosphorites was determined by the standard method of dry sieving on sieves.

For the organization of new production facilities for the production of phosphorus-containing fertilizers from low-grade phosphorites, data on the properties of raw materials and the finished product are needed, since these characteristics are used in the design of outlet sizes, wall angles, the location of guide trays, etc [10-17]. It is

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known that in many pulverized and powdery materials, the physical and mechanical properties change significantly with increasing humidity and density. This circumstance causes a number of difficulties in the design and operation of delivery systems for intra-factory transport, silage facilities, dosing units. Therefore, the main parameters of phosphate raw materials were determined at different humidity [18-21].

Among the parameters that allow us to assess the mobility of particles of bulk material are the angles of the natural slope of its free surface. The smaller the slope angle, the greater the mobility of the particles of the bulk medium. In addition, the slope values allow you to choose the right storage sizes, determine the contour of free bulk material on the carrier element of the transport installation. Table 2 shows the properties of phosphorites depending on the moisture content. The determination of the angle of the natural slope of phosphorites showed that the value of this indicator in unenforced phosphorite is about 1.5 times less than in poor phosphorites. With an increase in moisture content, the angle of natural slope for phosphorites increases, and the flowability of raw materials deteriorates. Bulk weight characterizes the mobility of phosphorous.

Table 2. Properties of phosphorites of Tashkur depending on moisture content

Phosphorites	Humidity,%	Density, g/cm3	Bulk weight, g/cm^3	Corner natural slope, hail	Fluidity, c
Unenforced fosmuka	1,12 2,14 2,50	2,34 2,41 2,45	1,05 1,12 1,23	36 40 41	16 21 Does not leak
Poor phosphorites	1,23 2,26 2,61	2,11 2,23 2,38	1,35 1,46 1,49	58 56 60	Does not leak

It was found that with an increase in the moisture content of raw materials, the value of the bulk weight of phosphorites increases. Determination of the fluidity of phosphorites through funnels with a diameter of 4 mm shows that unenriched phosphorite to its moisture content of 2.14% has satisfactory properties. Phosphorous with a moisture content above 2.14% and poor phosphorites in all studied moisture contents practically does not flow. Based on the performed definitions, it was found

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that with an increase in the moisture content in phosphorites, regardless of the granulometric composition, the value of physical properties increases.

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