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ACTIVATION OF POLYMINERAL CLAY DEPOSITS OF THE REPUBLIC OF UZBEKISTAN, ITS METHODS AND CONDITIONS

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ABSTRACT
Natural mineral sorbents - PMS, which include bentonite, opoka, palygorskite and other clays, diatoms, opokas, zeolites and zeolite-containing rocks with a developed specific surface area and the ability to absorb substances from the environment. Interest in PMS is due to the possibility of using them as adsorbents in the separation of mixtures, gas purification, and as a raw material for the preparation of drilling fluids, and also as fillers in the production of polymer composite materials.
KEYWORDS: *surfactants, polyelectrolytes, polymineral, methocaolinization, thermoacid-alkaline.*

INTRODUCTION

The quality of adsorbents, the scope and efficiency of their application is mainly determined by the porosity and chemical nature of the particles of their depression. Regulation of the size of pores and nature, and the concentration of active centers of natural mineral sorbents are carried out by methods of activation - modification (thermal, - hydro - thermal treatment), chemical (treatment with solutions of acids, bases and salts, surfactants - surfactants, polyelectrolytes - PE) and combined (thermal acid, acidic - alkaline thermal, etc.).

Polymineral clays of the Nurata deposit lie among the coal-bearing deposits and are mined along the way during the development of coal by the open method. Useful strata thickness on average 40m; the total reserves for the areas where the fallow can be mined by the open method is more than 1.5 billion tons.

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MATERIALS AND METHODS

The main component of polymineral clay from the Nurata deposit is the clay mineral kaolinite. Quartz sand, organic matter and iron in the form of oxides are present as impurities. On the deposit, the clays are grayish-green, gray, white, light green in color.

The samples were crushed, sieved through a 0.25 mm feed and served as raw material for the activation.

The methods and conditions for the activation are discussed below.

a) Thermal activation of the samples was carried out by heating them in a muffle furnace at 1023 K for 4 h. The dried samples were stored in a desiccator with calcium chloride. The choice of this temperature is due to the fact that it is the temperature above which the methocaolinization of kaolin and the destruction of the montmorillonite structure occurs.

b) Heat-treated clay samples were subjected to acid activation. Clay samples, preliminarily crushed to a powdery state, were treated with a 20% solution of hydrochloric acid HCl in a flask equipped with a water cooler and an electric mixer with constant stirring in a water bath. Activation temperature 373 K, activation time - 4 hours. Acid consumption per 100 g. was 300 ml.

Then the reaction mixture was cooled and distilled water was added to it for dilution and filtered through a paper filter on a Buchner funnel. The vacuum was created by a water jet pump. The precipitate remaining on the funnel was washed with distilled water until a negative reaction for chlorine ion.

c) Thermal alkaline activation was carried out according to the following method: thermally activated samples, preliminarily ground to a powder state, were activated with a 20% solution of caustic soda NaOH at a temperature of 373 K for 6 hours. Consumption of alkali solution per 100 g. clay was 300 ml. After reaction and cooling, the reaction mixture was diluted with distilled water and then filtered on a Buchner funnel. The precipitate remaining on the filter was washed with distilled water until neutral.

d) Thermoacid-alkaline activation was carried out with Nurata bentonite. After thermoacid activation of Nurata bentonite, the reaction mixture was cooled, washed to remove ions, and filtered. An acid-insoluble residue remained on the filter, which was dried to an air-dry state and weighed (residue yield 51.2 g from 100 g of bentonite) and treated with 20% sodium hydroxide solution. The activation was carried out at a temperature of 373 K for 6 hours until the silica dissolves. The mixture was cooled, the acid extract obtained earlier was added and then filtered. A precipitate of thermoacid-alkaline activated bentonite remained on the filter, which was washed with distilled water.

e) Bentonite of thermoacid-alkaline activation and pregelatinized HCl were obtained by adding thermoacid-alkaline activation to the powdery adsorbent, in small portions of 20% hydrochloric acid until a plastic pasty mass was formed, molded and cut into tablets, which were then dried in a muffle furnace at 773 K for 4 h.

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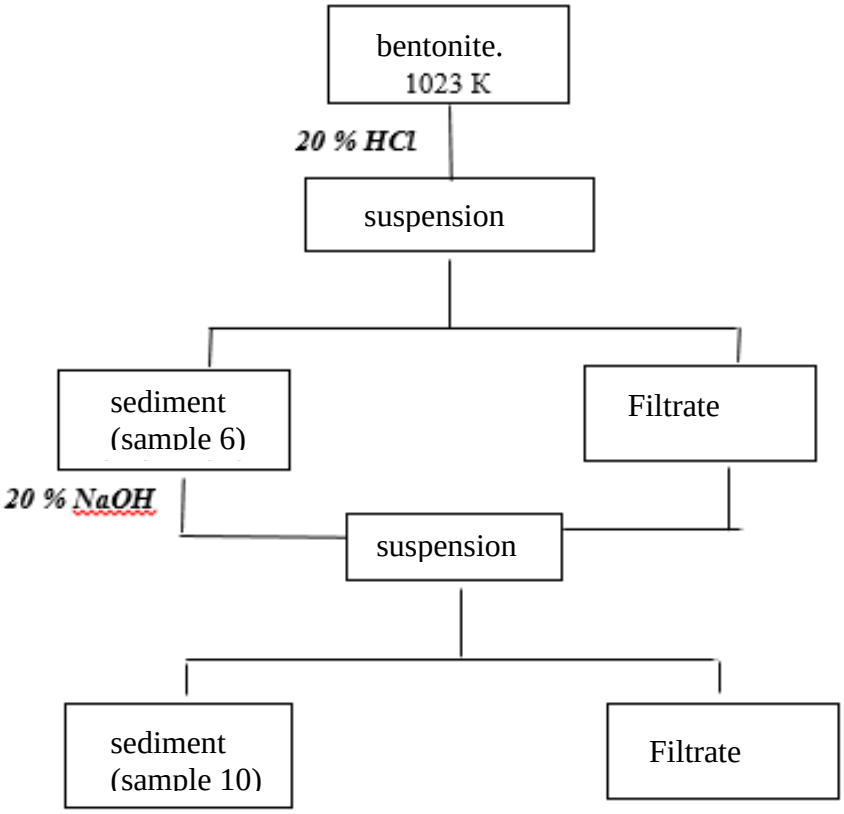
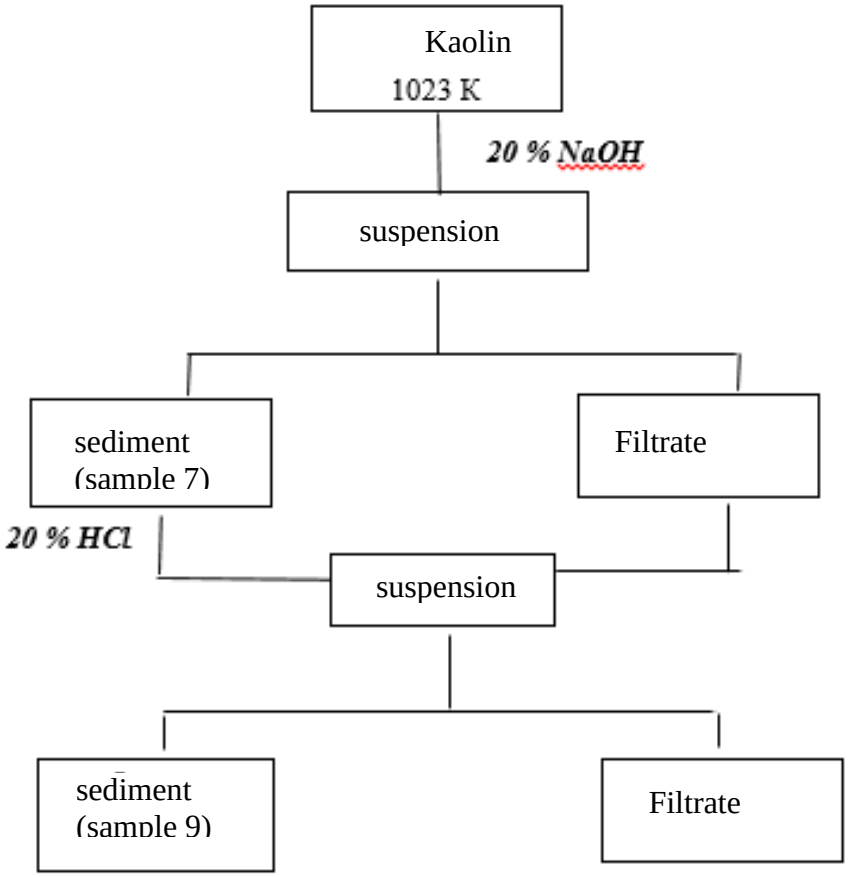


Scheme 1. The process of thermoacid-alkaline activation of Nurata бентонита.



Scheme 2. The process of thermo-alkaline acid activation of Nurata kaolin.

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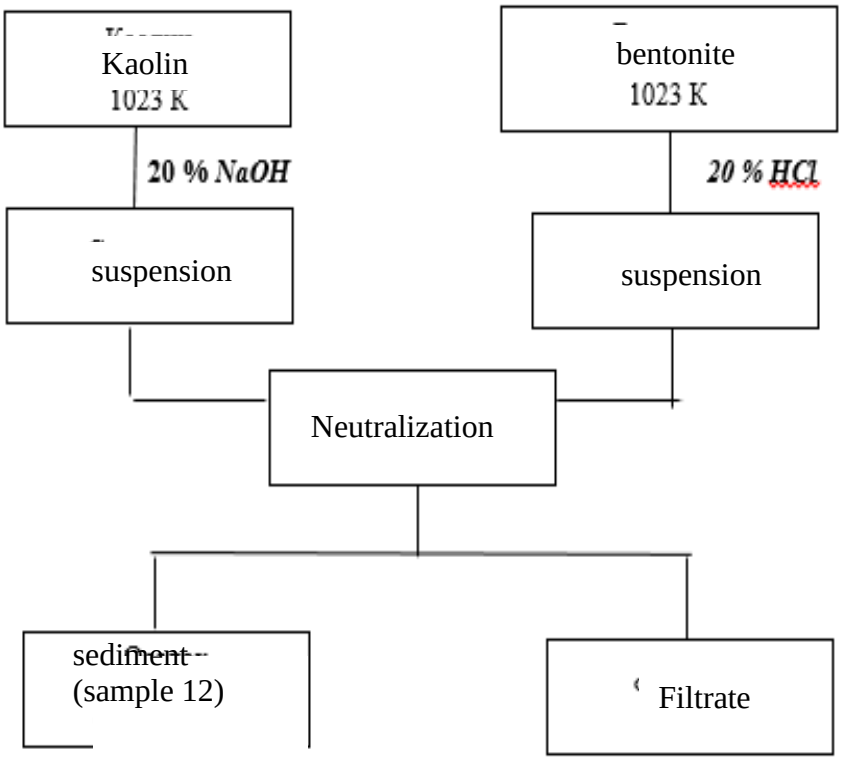
f) Thermo-silicic acid activation was carried out with Nurata kaolin. Kaolin, preliminarily ground to a powdery state, was activated with a 20% sodium hydroxide solution NaOH. The resulting alkaline extract was diluted 2-fold by volume with distilled water and neutralized with a 5% HCl solution. The resulting neutral solution (pH = 6.5 -7.0) was filtered on a Buchner funnel, and the precipitate, after washing with distilled water, was dried at room temperature.



Scheme 3. The process of thermal alkaline activation of kaolin and thermoacid activation of bentonite and their joint neutralization.

g) Adsorbent from the products of kaolin thermo-silica activation and thermoacid activation of bentonite: a) pre-crushed thermo-activated kaolin was activated by 20% NaOH solution for 6 h. at a temperature of 373 K. A solution of thermally alkaline-activated kaolin was obtained; b) pre-crushed thermally activated bentonite was activated with a 20% HCl solution for 4 hours at a temperature of 373 **Discassion.**K. A solution of thermally acid-activated bentonite was obtained; c) the resulting solutions of thermally alkaline-activated kaolin and thermo-acid-activated bentonite were cooled and then poured for joint neutralization (medium of the reaction mixture 7.5), and then filtered. The precipitate remaining on the filter was dried at room temperature.

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Table 1.
Sample numbering, preparation conditions and yield

Sample numbering	Conditions for obtaining samples	Exit, %
1.	aolin clay of Nurata Place of Birth	100
2.	bentonite of Nurata Place of Birth	100
3.	Kaolin heat treated at 1023 K	83
4.	Bentonite heat-treated at 1023 K	79
5.	Kaolin, thermoacid activated	58
6.	Bentonite, thermoacid activated	5I
7.	Kaolin, thermally alkaline activated	65
8.	Bentonite, thermally alkaline activated	69
9.	Kaolin after thermo-alkaline acid activation	71
10.	Bentonite after thermo-alkaline acid activation	107
11.	Product after peptization of thermoacid-alkali-activated bentonite after drying at 973 K	90
12.	Thermal alkaline activation kaolin + thermal acid bentonite activation	109

CONCLUSION

All obtained samples were stored in glassware with a ground-in stopper. Before each test, the samples were crushed and sieved through a 0.25 mm sieve. They were dried at a given temperature (for adsorption studies at 150 ºC for 4 hours, at a residual pressure of ~ 1 • 10 ⁻ ³ Pa).

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