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IJIEMR Transactions, online available on 27th Dec2020. Link :http://www.ijiemr.org/downloads.php?vol=Volume-09&issue=ISSUE-12

DOI: 10.48047/IJIEMR/V09/I12/119

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Volume 09, Issue 12, Pages: 714-716

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STUDY OF CHARACTERISTICS, COMPOSITION AND PROPERTIES OF ANGRENSK KAOLIN OF AKF-78

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ABSTRAKT A method for producing aluminum sulphate from fortifled kaolin was developed, chemical compositions of kaolin of the AKS-78 brand were determined, and a technological scheme for the process of producing coagulant from kaolin was developed. Such a coagulant in terms of physical, chemical and technological parameters will not be inferior to purified aluminum sulfate, such a coagulant is not hygroscopic, does not cake and does not dust

KEYWORDS coagulation, dehydration, polyacrylamide, leaching

INTRODUCTION Of all natural resources used by man, water is unmatched in terms of consumption. The greater the technical progress of all sectors of the national economy, the larger the urban population, the more acute is the issue of meeting the need for clean water. Satisfying her is a big problem of national importance. One of the most important operations in modern water treatment technology is coagulation treatment. In recent years, the consumption of coagulants for neutralizing and neutralizing wastewater at enterprises of the chemical, aviation, automotive, oil refining, textile, leather and other industries has increased. [1].

Usually used for this purpose, aluminum sulfate is obtained mainly from aluminum hydroxide, which is a scarce and expensive product.

In this regard, an urgent need arose to develop new methods for obtaining coagulants from non-scarce types of natural raw materials, in particular from enriched kaolin of the Angren deposit, the reserves of which are enormous.

Until now, the kaolins of Uzbekistan are used as raw materials in various sectors of the national economy. [2].

It's time to reorient some of the kaolins to use as raw materials for the production of coagulants for water and wastewater treatment.

We needed to bring a detailed study of the main technological processes.

In this regard, the main directions of our research were the following: physicochemical research on the leaching of high-silica AKF - 78 with sulfuric acid, as

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well as the separation of aluminum oxide from sulfuric acid solutions in the form of basic salts in the process of hydrothermal hydrolysis.

We have developed a method for producing aluminum sulfate from kaolin, in which enriched kaolins of the Angren deposit, grade AKF-78, are used as raw materials.

The chemical composition of AKF-78 kaolin, which was used in the work in the form of raw materials, is as follows (table 1):

Table 1

Chemical composition of kaolin brand AKF-78

AKF-78	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	п.п.п.
	46,8	0,36	36,9	0,51	0,18	0,24	0,02	0,38	13,2

We also carried out a chemical analysis of AKF-78 kaolin, which is shown in

table 2

Table 2

Chemical analysis of AKF-78 brand kaolin

№	Indicator name	Parameter value
1	Weight loss on ignition, %	11,86
2	Mass fraction of aluminum oxide, (Al_2O_3), %	30,79
3	Mass fraction of iron oxide (Fe_2O_3), %	0,73
4	Mass fraction of titanium oxide (TiO_2)	0,45
5	Mass fraction of silicon oxide (SiO_2)	53,02
6	Mass fraction of calcium oxide (CaO)	1,10
7	Mass fraction of magnesium oxide (MgO)	0,98
8	Mass fraction of sodium oxide (Na_2O)	0,21
9	Mass fraction of potassium oxide (K_2O)	0,58
	sum	99,72

We carried out X-ray studies of AKF-78 kaolin, which is shown in Fig. 1.

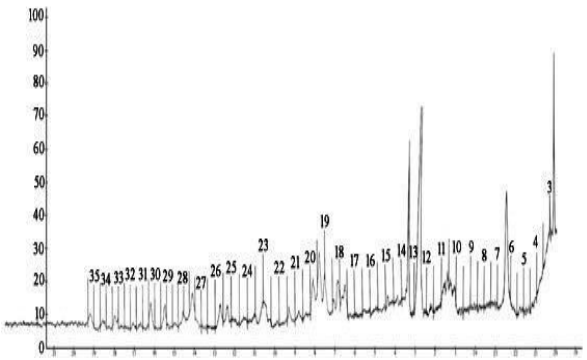

Fig. 1 X-ray diffraction pattern of AKF-78 kaolin.

Investigation of the processes of dehydration of kaolin, sulfuric acid leaching of fired material, separation of the resulting pulp made it possible to develop a technological scheme for the process of obtaining a coagulant from kaolin.

The scheme includes the following basic operations - preliminary degradation of kaolin in a muffle furnace, grinding of the fired material and subsequent sulfuric acid leaching with 25% (mass fraction) sulfuric acid in a laboratory reactor, separation of the resulting pulp using polyacrylamide, stripping and granulation of aluminum sulfate in a laboratory drum granulator - dryer, in the future it is planned to carry out drying in a drum granulator - dryer (BGS) at the AMMOFOS-MAXSAM enterprise in the city of Almalyk, Tashkent region.

The burning of kaolin in our case was carried out in a muffle furnace, where the removal of hygroscopic moisture and destruction of the crystal lattice of kaolin with the removal of hygroscopic moisture and destruction of the crystal lattice of kaolin with the removal of released moisture. At a temperature of 750 ° C and a

firing time of 30 minutes, the conversion of Al_2O_3 into an acid-soluble form by 95-96% is ensured.

Dehydrated kaolin cooled in an air cooler is sent to a laboratory porcelain mill for grinding. Kaolin crushed in a mill was sieved in a sieve. The production material had the following fractional composition, in mm:

- 1 + 0.5, composition% (mass); - 15-20, - 0.5 + 0.25 - 40% (mass); -0.25 + 0.15 mm, composition,% (mass) 20, - 0.15 composition 15-20% (mass).

We treated crushed dehydrated kaolin with a sulfuric acid solution in an apparatus equipped with a stirrer and heating. A 25% sulfuric acid solution was added here, for the preparation of which 93% H_2SO_4 and wash water were used. The acid consumption rate is 0.9 of the stoichiometrically required amount, based on the content of acid-soluble oxides Al, Fe and Ti in kaolin. The total acid processing time was 90 minutes, the temperature in the vessel was 102 ° C, then it was filtered, a 1.8% polyacrylamide solution was added to it, the liquid was evaporated at 500-600 ° C, the temperature of the product was 80-85 ° C.

Granules of the finished product had a size of 0.25-10.0 mm, contain 23% (mass) of Al_2SO_3 + Fe_2O_3 and 2% (mass) of insoluble residue, sulfuric acid is absent.

Such a coagulant in terms of the totality of physicochemical and technological indicators will not be inferior to purified aluminum sulfate, such a coagulant is not hygroscopic, does not cake or dust.

Currently, research is underway to develop a technological scheme for the process of obtaining a coagulant from enriched kaolin.

The scheme includes the following basic operations - preliminary degradation of kaolin in a rotary drum kiln, grinding of the fired material and subsequent sulfuric acid leaching with 25%, 50% (mass fraction) sulfuric acid and separation of the resulting pulp using polyacrylamide in reactors arranged in series, stripping and granulation of aluminum sulfate in a drum granulator-dryer (BGS)

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