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RESEARCH OF BENTONITE DRYING PROCESS IN EXTREMELY HIGH FREQUENCY ELECTROMAGNETIC FIELD (UYUCH EMM)

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Annotation

Abstract. In this study, the study of drying process using convektiv-UYuCh EMC energy in obtaining nanocatalyser from" Navahor " bentonite was covered. Also, the relevance of the topic, the experimental device of the laboratory used in the study, the research techniques and the analysis of the results obtained are presented. On the basis of the purpose of the work, the study of the drying process in the technology of obtaining a nanocatalizer and the acceleration of the process and technology by carrying it out in UYuCh EMC, the quality of texturized descriptions of loyi samples of "Navakhor" bentonite (catalyst)has been achieved..

Keywords: Zol –gel " technology, bentonite, UYuCh EMC, chemical composition, texture, adsorption method , porosity, modification

INTRODUCTION

In recent years," Zol –gel " technology has been conducting large scientific practical research on the basis of low temperature, inorganic and Organo –inorganic materials synthesis kilish. It differs from other technologies by its advantages in a number of features, such as the simplicity of equipment used in technology, energy efficiency, environmental safety, cost effectiveness, flexibility of the coinage, etc. [1-5]. The reason is that nanocatalysts exhibit high catalytic activity, selectivity, stability, etc. The high efficiency of nanocatalysts is due to the processes of migration and transfer (transport) of charge, energy, mass and informations in them, these processes occur both in nanotubes and in chemical reactions in nanotubes. The practical application of such catalysts leads to an unprecedented improvement in the environmental characteristics of many processes and technologies in the industry, a decrease in harmful emissions emitted into the atmosphere, the creation of environmentally friendly types of alternative energoressors, new products and materials.

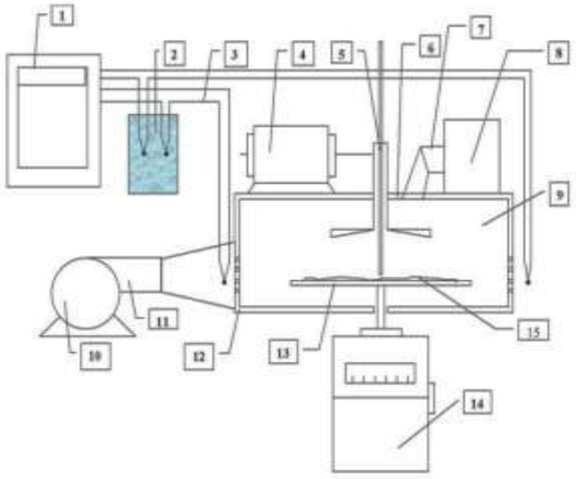
Based on the analysis of the conducted literature [6,7], the prospect of using a nanosarticle catalyst in catalysis was found to be related to the following two scientific aspects. First, as the particle size decreases, a large percentage of atoms settle on the surface, so the catalyst consisting of nanosarticles will have a large surface-surface, geterogen will be very active in reactions. Secondly, many properties of NanoSystems depend on their size (size effect). Therefore , change the size of the nanosarticles, it is possible to control not only their activity, but also their selectivity. When the size of the catalyst membrane decreases, the reaction rate increases sharply. At present, high energy consumption and raw materials to existing technologies with geterogen catalysts are forcing the implementation of the recorded processes, the search for new methods.

From the above, it seems. One of the main processes in the" Zol-gel " technology is the thermal treatment , drying and burning of this material. Currently, these processes are carried out with the usual heat mass transfer, in the material formed in such a method, the quality of the porosity will not be high, and the porosity is one of the main waiters of the catalyst sorbents. Therefore, the study of the drying process in the technology of obtaining a nanocatalizer from the retaining substance bentonite and its conduct in UYuCh EMM is extremely relevant.

II.THE MAIN PART

Research Metods

The search for bentonite inoculation was carried out on the experimental experimental apparatus, the scheme of the kurilma is presented in Figure 1



1-Self-author KSP-4M; 2 - Dyuar capacity;
3 - temperature sensor (thermopar-XK); 4 - electrodvigatel; 5-thermometer; 6-dissector; 7-wave transmitter 8-engraving-generator - magnetron; 9-resonator drying camera; 10-ventilator; 11-calorie; 12-air inlet way; 13-scales base 14-electronic scales Vlk-500; 14-research product.
Picture. 1. Carving-convex drying experimental device scheme.

The experiment device for drying in the resonator the microwave oven, assembled on the basis of an electronic microwave oven, is a single block, which includes: a control panel, a drying chamber, an air duct and drying, a system for measuring the mass of the product you need, and a microwave energy generator. The operating frequency of the microwave oven is 2450 MHz and uses a magnetron microwave energy generator with a capacity of 2,0 kW. The device was considered a rectangular resonator with a drying chamber dimensions 400 x 350 x 250 mm. Inside the drying chamber there is a rotating fixture - dissector, which ensures the same distribution of the microwave area in the chamber. To control the incoming power in the working chamber, the anode conductor of the microwave generator is connected by means of a laboratory autotransformator (LATR) magnetron power 0,4 - 0,2 kW. can change.

In order to measure the mass of the drying product directly during the drying process, it is carried out with a measuring accuracy of 500 with the help of vlk-0,01 type scales installed on the bottom of the drying chamber. Scales performed the scale and the base on the camera through the ebonite-dielectric axis. Quenching is carried out on a grid frame made of material zolite.

The air in the drying chamber is supplied directly to the product by the side. Heating the air is carried out in a calorimeter heated by electricity. The air velocity is performed by an air compressor in the range of 0,2-0,6 m / s and the temperature in the range of 293-3830 K - by an autotransformator. The inlet and outlet of the air to the drying chamber is carried out through a metal net. The air temperature is measured by a temperature sensor-a thermocouple (a chrome-kopel with a diameter of 0,2 mm) KSP-4M recorder and a Dyar container filled with water.

When drying in the microwave, the temperature of the bentonite and the chamber directly J.M.Invented by Kurbanov, measured with a special temperature sensor. [8,9].

For drying after primary processing of bentonite of the navahor field 200 gr. the mass is placed on the bottom of the cell. Then, the temperature sensor was set and the oven turned on, where the air parameter is kept constant: v _w = 0,1-0,3 M/ s; t_= 85 - 90 0 C and heated in the microwave energy. A certain power supply of microwave energy is carried out in the vibration mode every 2-1 minutes until the temperature inside the material is reached for 2-4 seconds, and thus every 1-2 minutes. Thus, the material is dried until the humidity reaches 2,8. The experiment was conducted at different capacities of microwave energy: 0,14; 0,25; 0,5 kW.

The chemical composition of the Navbahor deposit bentonite was determined by methods in accordance with the standards of the International Union of theoretical and Applied Chemistry.

The elemental composition of the materials obtained was determined using JEOL JSM6390A scanning electron microscope with the addition of JEOL JED-2200 EDS X-ray spectrum microanalysis (RSMAThe study of the porous structure of the sample was carried out on the device ASAP-2010 of the firm Micromeritics, using the method of temperature adsorption of nitrogen.The quality and quantity composition of reaction products were analyzed in chromatography "Crystal 5000" with Capillary colonic and flame-ionization.

The determination of the porous structure and comparable Surface Surface of catalysts was carried out in the automatic gasoadsorbtion Analyzer by the method of Brunauer, Emmet, wires (bet) and Wahuska Vaporil. The comparative surface surface was calculated at 77 K by the adsorption isoterm of nitrogen. 2-the figure shows the drying curve lines in different mode methods in the form of crushed bentonite plate with a thickness of 5mm plate.

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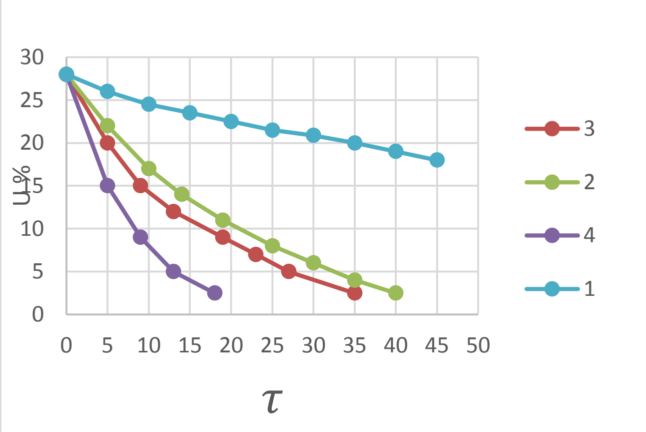
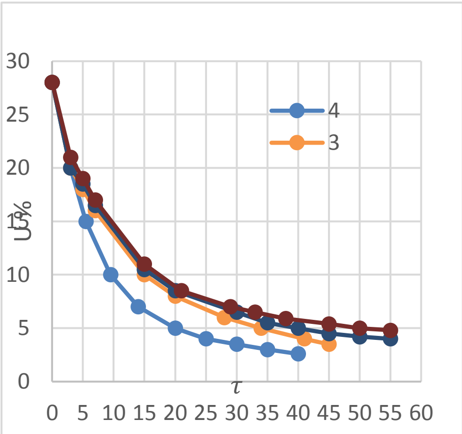
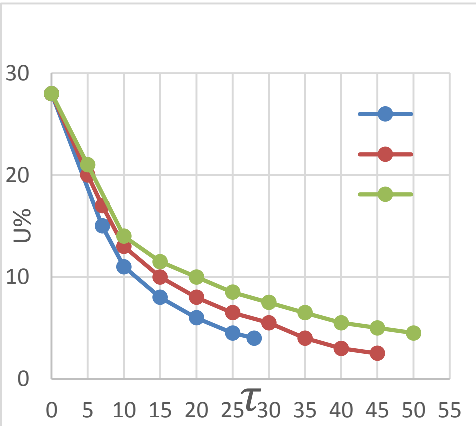


1 - convective $T_в$=85° C, $\bar{v}_в$ = 2-3 м/с, φ = 70% ; 2 - UYUCH EMM energy P =0,4 кВт; 3 - UYUCH EMM - convectiv P=0,36 кВт, $T_δ$=75°C, $\bar{v}_в$ = 0,3 м/с; 4 - UYUCH EMM - convectiv P=0,4 кВт, $T_δ$ =90°C, $\bar{v}_в$ = 3 м/с.

2-picture. Drying curve lines of dried bentonite (δ =5 mm) in different energy transfer techniques





3,4-the pictures show the drying temperature and the curve of the connection to the engraving generator capacity.

1 - $T_в$ =75°C; 2 - $T_в$ =80°C; 3 - $T_в$ =90° C.

3-picture. The dependence of the drying curve on temperature.

1-$P_{ўю}$=0,28 кВт, 2-$P_{ўюч}$=0,30кВт, 3-$P_{ўюч}$=0,36кВт, 4-$P_{ўюч}$=0,4 кВт.

4-picture. Connection of the drying curve to the surface - generator capacity.

Conducted full-fledged experiment showed that the drying mode for bentonite weighing 0,2 kg is reasonable at 0,52 kW microwave power, air velocity v_ = 0,2 M⁄s and air temperature 82℃, the total drying time in this mode is 18 -22 min. makes up ni. The total time of energy supply of the microwave oven is 12-14 minutes, the frequency of burning the microwave oven in the first period of drying is activated every 2 minutes, in the second - after 1 minute, the maximum temperature of bentonite is 82 ℃.

The tradision where different modified bentonite clay is currently being used in practice and the tekstur description which is being formed in the konvektiv – UYuCh drying offered by us are presented in Table 1.

1-table. Textur description of" Navbahor " bentonite loyi samples

Example	S_{BET} m^2/g		$V_{мп}$ sm^3/g		$V_{мзп}$ sm^3/g		$\Sigma V_{пор}$ sm^3/g		$C_{ср}$ nm	
	Трад	UYuCh	Трад	UYuCh	Трад	UYuCh	Трад	UYuCh	Трад	UYuCh
MM	96	104	0,010	0,016	0,160	0,137	0,170	0,176	7,00	4,08
Al_{13} - PMM	108	116	0,029	0,034	0,137	0,124	0,166	0,171	8,42	6,13
Al_{30}- PMM	125	131	0,035	0,039	0,138	0,131	0,173	0,178	8,04	6,21

As can be seen, when drying alternately modified bentonite clay from primary traditionality drying (temperature 120 – 1500S) and convektiv-UYuCh method at low temperature (80-850S), the volume of their specific surface and porous is reduced by the traditionalization method of samples , that is, at high temperature. Heat treatment of bentonite clay at a temperature above 100°C leads to the irreversible convergence of the layers together with the release of water from the layerlararo and the deterioration of the textur parameters. Konvektiv-UYuCh their starter "carcasses" at relatively low temperatures mainly on account of dividing dressing from the thermal effects of microwaves, the number and surface of their surface increases, the number of smaller shovels, and the description of tekstur by dividing the mid magnifier 4-6 nm is improved by about 20-25%. This is due to the fact that UYuCh Energy initially occurs not from the surface, but in the case of sneezing of the entire volume of the balcony,as in the case of tradisin usudagi.
Regardless of the composition and modification conditions of natural bentonites, the average mesogamous diameter of all samples remains constant and varies in the range of 4,0-4,1 nm. It should be noted that as a result ofetetkash, the size of the mesogast can be slightly reduced .

IV.CONCLUSION

Drying mode using bentonite convektiv-UYuCh EMC energy is reasonable at 0.52 kW microwave power, air speed v_ = 0.2 M⁄s and air temperature 82 ℃, the total drying time in this mode is 18 -22 min. makes up ni. The total time of energy supply of the microwave oven is 12-14 minutes, the frequency of burning the microwave oven in the first period of drying is activated every 2 minutes, in the second - 1 minute, the maximum temperature of bentonite 82 ℃.

Konvektiv-UYuCh due to the fact that at relatively low temperatures are fried whole volume, on account of dividing their starter "carcass" dressing, the number and surface of their surface increases, and on account of dividing medium magnifier 4-6 nm, tekstur description is improved by about 20-25%.

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