STUDY OF THE PROCESS OF DECOMPOSITION KINETICS DOLOMITE MESTOBIRTH "SHORESU"

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Currently, all over the world, with intensive population growth, a reduction in suitable land resources and water reserves, the role of the production of new types of fertilizers is increasing to fully meet the needs of the population for quality products.

One of the effective ways to produce mineral fertilizers is to obtain them in liquid form. The production of such fertilizers leads to a reduction in a number of processes and, compared to solid fertilizers, to a noticeable reduction in costs.
To date, one of the important tasks is the development and improvement of technologies for obtaining new fertilizers of complex action based on local raw materials.

To solve this problem, it is relevant to use as a raw material the products of nitric acid decomposition of dolomite (a solution of calcium and magnesium nitrates) with its subsequent enrichment with components of nitrogen fertilizers, a physiologically active substance and trace elements.
For the physicochemical substantiation of the process of obtaining a liquid fertilizer of complex action, containing in its composition simultaneously nitrogen, calcium, magnesium, potassium, copper and a physiologically active substance, studies were conducted to study the process of decomposition of dolomite with nitric acid with a solution of calcium and magnesium nitrates, followed by enrichment of its fertilizer components and trace elements with compounds containing compounds.
In order to obtain calcium and magnesium nitrates based on the dolomite of the Shorsu deposit, the process of its decomposition by nitric acid was studied depending on the concentration of acid (30÷57%), temperature (30÷50 ° C), the duration of the process and the rate of acid supply [1,2].
According to the chemical analysis of dolomite m.r. "Shoresu" has the following chemical composition (Table 1.)
Table-1.
Chemical composition of the dolomite sample (wt.%)

Name dolomite deposits	% content per air dry matter												
	Tall	MgO	Al2O3	Fe2O3+Ugly	Ugly	SiO2	Too	TiO2	Na2O	K2O	P2O5	SO_3 o 066.	CO2
m.r."Shorsu"	31,48	19,17	0,32	0,29	0,25	2,87	0,01	0,02	0,05	0,15	0,03	0,3	45,0

X-ray phase and thermal methods of analysis of dolomite m.r. "Shoresu" confirmed the results of chemical analyses on the high content of calcium and magnesium carbonates in cheese [3].

The process of decomposition of dolomite with nitric acid as well as hydrochloric acid is accompanied by strong foaming, so this process should be carried out in two stages. That is, at the first stage, the 35÷40% norm of nitric acid, and at the second stage of the process with the rest of the 60÷65% rate of acid.

Nitric acid concentrations were used at 30, 40 and 57%. The process temperature is 30.40 and 50° C.

According to the results of the study of the process of decomposition of dolomite by nitric acid, it was established that the optimal concentration of acid is -40%, at which a solution containing 41÷42% of the sum of calcium and magnesium nitrates is formed. saturated nitric acid pulp and crystallization of calcium and magnesium nitrates occurs. This phenomenon is undesirable, as the process of separating the insoluble residue from the crystals of calcium and magnesium nitrates is complicated.

Therefore, foaming during nitric acid decomposition of dolomite m.r. "Shoresu" in two stages was studied depending on the time and rate of acid supply with a concentration of 40.0%, at a temperature of 30÷400C.

From the data given in Table 2, it follows that during the decomposition of dolomite "Shoresu" with 40% nitric acid with a feed rate of V = 7.0 g / min at the first stage of decomposition, i.e. with a 40% acid norm, the maximum multiplicity of foam is Kn = 4.50. In the second stage (when dolomite was further decomposed with the remaining 60% acid norm), the multiplicity value was Kn = 7.13.

The results of the studies are shown in Table 2.

Table-2

Change in the multiplicity of foam depending on the time and rate of nitric acid supply during 2-stage decomposition of dolomite

Norm 31% nitric acid, %	Length of time, min.														
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
acid feed rate V = 7.0 g/min															
I ступень 40,0	2,25	3,13	4,50	1,18	4,38	1,0	0,88	0,75	0,63	0,50	0,38	0,25	0,12	0	0
II ступень 60,0	3,25	4,00	4,88	5,50	6,25	7,13	6,13	4,0	2,38	1,25	0,88	0,75	0,50	0,37	0,13
acid feed rate V = 5,0 g/min															
I ступень 40,0	0	0,91	1,68	3,51	2,32	1,36	1,24	0,92	0,94	0,89	0,75	0,63	0,48	0,36	0,25
II ступе	2,	2,8	3,4	4,3	4,	5,	5,7	4,	3,3	2,3	1,4	1,2	0,	0,7	0,

нь 60,0	6	4	5	0	85	6	5	82	4	5	6	4	96	3	46
acid feed rate V = 2,5 g/min															
I ступень 40,0	0	0,75	1,0	1,38	1,75	2,0	1,38	1,25	1,13	1,0	0,88	0,75	0,62	0,38	0,25
II ступень 60,0	1,26	1,38	1,38	1,40	1,62	1,74	1,74	1,86	1,99	1,99	1,48	1,36	1,24	0,98	0,75

In the process of decomposition of dolomite with nitric acid supplied at a rate of V = 5.0 g / min. in the first stage, the maximum multiplicity of the foam was Kn = 3.51, and in the second Kn = 5.75.

When the acid was supplied at a rate of V = 2.5 g / min. the maximum value of the foam multiplicity at the 1st stage was Kn = 1.56, at the 2nd stage Kn = 1.99.

Thus, studies to reduce foaming in the process of two-stage nitric acid decomposition of Dolomite "Shoresu" have established that by reducing the rate of supply of hydrochloric acid to V = 7.0÷5.5 g / min. it is possible to reduce the value of the multiplicity of foam, i.e. to eliminate abundant foaming in the process of decomposition of dolomites.

References:

1. Khamrakulov Z.A., Askarova M.K., Tukhtaev S. Obtaining a solution
2. calcium and magnesium chlorides from dolomite // Chemical industry. – 2013. -№2. -P.70-78
3. G. A. Saydullayeva, M. K. Askarova, M. B. Eshpulatova, B. Kh. Kucharov.
4. Kinetics of dolomite decomposition of the shorsu deposit by nitric acid //CALAXY International Interdisciplinary Research Journal (GIIRJ, India). August 2021. Cjif Impact Factor: 7.472. pp 59-63.
5. Lazarenko E.K. Course of Mineralogy M.:1971 g.