RESEARCH OF THE PROPERTIES OF SOLUTIONS OF THE PROCESS OF BRINE DESULPHATION OF THE KARAUMBET AND BARSAKELMES LAKES

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The rapidly developing economy of the Republic consumes more and more mineral resources, including magnesium compounds. Their main consumers are the production of defoliants, refractory products, construction and metallurgical industries.

Uzbekistan has significant reserves of mineral raw materials for the production of magnesium compounds found in the Ustyurt reservoir of Karakalpakstan, such as the Karaumbet, Barsakelmes, Khojalkon deposits, as well as the Dengiz-kul and Hajkab deposits of the Bukhara region. Despite this, there is no production of magnesium compounds in Uzbekistan and they are imported from abroad [1-3]. One of such demanded magnesium compounds is bischofite. It is used in the chemical industry, in construction, medicine, used as a finishing agent in the textile industry and for impregnating wooden structures with the aim of imparting fire resistance to them, as a raw material for obtaining metallic magnesium. Therefore, the development of raw materials sources of magnesium salts and their involvement in industrial production is the most urgent problem facing the scientists of the Republic and production workers [4].

The total reserves of water-soluble magnesium salts of lakes Karaumbet and Barsakelmes are estimated at 1296 thousand tons in terms of MgO. The main components of the brine of the Barsakelmes and Karaumbet salt mines are sodium and magnesium cations, chlorine and sulfate anions. Calcium, iron are practically absent. The salt content in the brine is 30-40%.

In the brine of lake Karaumbet, the content of sodium chloride ranges from 16.8 to 22.7%, magnesium sulfate from 5.2 to 8.3%, magnesium chloride from 6.2 to 8.3%, sodium chloride from 1.8 to 4, 7%, magnesium sulfate from 1.2 to 7.1% magnesium chloride.

To substantiate the possible use of brine from lakes Karaumbet and Barsakelmes without winter cage, studies were carried out on desulfurization of the original brine and brine after summer cage with solutions of distilled liquid - waste of soda production. Composition of the distilled liquid

of the Kungrad soda plant, wt. %: $CaCl_2$ - 10.82, NaCl - 5.54, $CaSO_4$ - 0.08, $Ca(OH)_2$ - 0.11; density 1.134 g/sm³.

In the experiments, the rate of calcium ions in the distilled liquid for sulfate ions of brine from lakes Barsakelmes and Karaumbet varied from 90 to 200%. This made it possible to achieve the degree of desulfurization at the level of 90-95 ratio. %. The optimal conditions for the desulfurization of brine from lakes Karaumbet and Barsakelmes with a distilled liquid are as follows: the rate of the distilled liquid is 100-102%, the process temperature is 20-30 ° C. In this case, the degree of desulfurization of brine and the residual content of calcium ions in the liquid phase are, respectively, 88-91% and 0.14-0.21%.

The gypsum sediment thickens quickly enough, after 30 minutes. the degree of brine clarification reaches 93-95%, and the clarification rate depends on temperature and time and ranges from 0.02-1.44 m/h (table 1).

Table 2 shows data on the effect of temperature and process duration on the ratio of L:S in the thickened part. With an increase in the temperature and duration of the process, the ratio of L:S in the thickened part decreases.

Table 1

Influence of temperature and duration of the process on the degree and rate of clarification of desulfurized brine

Temperature, ° C	Time, min			
	10	15	20	30
Brightening degree, %				
20	59,17	82,49	91,69	92,88
40	78,77	90,58	92,88	93,97
60	89,22	93,87	94,07	94,76
Clarification speed, m/hour				
20	0,62	0,58	0,47	0,09
40	0,97	0,65	0,24	0,02
60	1,44	0,41	0,10	0,00

Table 2

Influence of temperature and duration of the process on L:S in the thickened part

Temperature, ° C	L:S					
	0 min	5 min	10 min	15 min	20 min	30 min
20	27,67	19,70	11,30	4,85	2,30	1,97
40	28,62	15,08	6,08	2,69	2,04	1,73
60	29,24	8,89	3,15	1,79	1,73	1,53

Thus, the conducted studies show the possibility of desulfurization of brine from lakes Karaumbet and Barsakelmes with solutions of distilled liquid. The rate of clarification of the resulting suspension after 30 minutes reaches 93-95%, which indicates the high adaptability of the desulfurization process.

References

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