

P-39: Ultrasonic intensification of the process of extraction of organic acids

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There is a known method of complex processing of cyclohexane oxidation products. According to this method, obtained acid washed with water from organic mixture expose to esterification to additional commodity products (ed. by V.I. Ovchinnikova and V.R. Ruchynskyy, 1977). It is very difficult to completely separate the acid from the organic mixture. Some acid remains in mixture of organic products to be further neutralized and burned. This leads to an increase in expenditure coefficients for raw materials. The usage of ultrasonic processing of oxidation products during washing acids allows to increase the degree of separation of organic and acid-water solutions.

To investigate the influence of ultrasonic cavitation in the process of extraction of acids from the organic phase was taken a mixture of organic products obtained in the process of cyclohexane oxidation. Analysis and comparison composition of water and organic phases after separation under the influence of ultrasonic processing and without it was conducted. Ultrasonic processing was carried out during 5 minutes with a frequency of $\nu = 22$ kHz.

Acid extraction coefficients was calculated on the basis of experimental data. The results are shown in Table 1.

Table 1

The composition of water and organic phase of cyclohexane oxidation products after their separation under the ultrasonic processing and without it.

	C_P , mole/l	C_A , mole/l	C_E , mole/l	C_{COL} , mole/l	C_{CON} , mole/l
The composition of the solution before separation	0,026	0,433	0,090	0,177	0,225
Composition of water-acid phase after separation without ultrasound process	0,001	0,327	0,023	0,009	0,014
Composition of water-acid phase after separation under the ultrasonic processing	0,002	0,401	0,022	0,010	0,013

Notes: C_P - concentration of peroxide compounds, mole/l; C_A - concentration of acids, mole/l; C_E - concentration of ethers, mole/l; C_{COL} - concentration of cyclohexanol, mole/l; C_{CON} - concentration of cyclohexanon, mole/l.

Established efficiency of application of ultrasonic cavitation on the process of separating the organic and water phase products of cyclohexane oxidation is based on experimental data. Degree of extraction acids from water and organic phase under the influence of ultrasonic processing increases to ~ 26%. This reduces the loss of acid at the stage of extraction, and also reduces the costs associated with the neutralization of acid in the organic phase.

References

Production of caprolactam / [Ed. V.I. Ovchinnikova and V.R. Ruchynskyy]. - M.: Chemistry, 1977. - P.264.