

Efficiency of «reactor-regenerator» system joint work in synthetic detergents manufacturing enhancing use of mathematical modeling methods

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The work carried out to enhance the efficiency of «reactor-regenerator» system joint work in linear alkylbenzenes manufacturing. Dependence of HF-catalyst activity on reactor and column regimes was studied. The ways of benzene alkylation reactor and catalyst regenerator column joint work optimization were determined. They can be in HF-catalyst optimal activity achievement with further system to the steady state transfer, as well as in date of probable failure predicting with possibility of column drainage to prevent it.

Over the last years there has been a huge success in production of synthetic detergents on the base of linear alkylbenzenes (LAB) as environmentally friendly technologies.

One of the ways of process efficiency enhancing without reconstruction of existing equipment can be a organization of technology-related blocks smooth operation, in this case, joint work of benzene with olefins alkylation reactor and HF- catalyst regeneration column.

Therefore the aim of this research is to find out the ways of LAB yield enhancing and «reactor-regenerator» system joint work stabilization.

It was found out, that

- value of optimum HF-catalyst activity, at which equilibrium of heavy aromatics (HAR) formation reaction and maximum selectivity for the desired product is reached, depends on alkylation reactor feedstock composition. It is increased from 0.44 to 0.6 rel. u while ratio of hydrocarbons $(C_{10} + C_{11}) / (C_{12} + C_{13})$ in alkylation reactor feed is increased from 0,676 to 1,033;
- Optimum flow quantity of HF from alkylation reactor to regenerator varies in the range from 3.6 to 4.7 m³/hr while flow rate of diolefines into the alkylation reactor increasing from 56.25 to 73.9 kg / hr.
- The effect of optimal mode of «reactor-regenerator» system joint work maintaining consists in increasing the revenue of the 36 million rubles. per year. It is provided by LAB yield and period of regenerator column stable operation increasing and also by ability to forecast a possible abnormality with use of developed computer modeling system.

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