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UNSTEADY BENZENE FRACTION PYROLYSIS SIMULATION

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The main process of olefins production for polymer industry is pyrolysis. However, it is complicated due to formation of coke deposits. This leads to burnout of the coils, as well as a decrease in the yield of target products.

Thus, creation of an unsteady mathematical model seems to be the solution. The model is based on the reaction scheme shown in Figure 1.

At the first stage, the rate constants of all reactions are calculated:

$$K_j = K_{0j} \cdot \frac{P_0}{T^2} \cdot exp\left(\frac{-E_j}{RT}\right), \mathrm{j} \in \{1 \ldots 172\}$$

Then, in order to calculate concentrations changes, the rates of the corresponding reactions are summated, multiplied by component stoichiometric coefficient:

$$\frac{dC_i}{d\tau} = \sum a_{i,j} \cdot K_j \cdot \prod C_j^{a_{i,j}}$$

However, to calculate the concentration of coke, a different formula is used [1]:

$$\frac{dC_{coke}}{d\tau} = K_8 C_{coke} - exp(0{,}023 \cdot C_{coke} - 1) \cdot G^{0.8} \cdot$$

$$\cdot G^{0.8} \cdot (D - 2 \cdot \delta)^{-1.8}$$

The model was used to simulate the pyrolysis of the mixture, the composition of which is presented in Table 1.

Dynamics of target products concentrations during the process was obtained as a result shown on Figure 2.

Decrease in concentration after a peak, is associated with an increase in side processes. This can be seen in Figure 3, where the coke layer thickness increases markedly towards the end.

However, at the moment, the amount of coke expressed in one form or another is the only component that changes over time. In the future, it is planned to create dynamics for the remaining components.

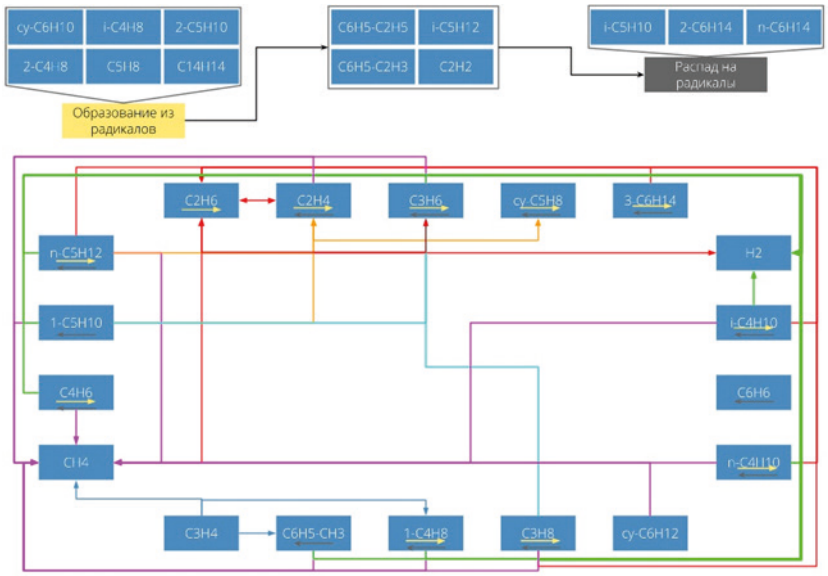

Fig. 1. *Reaction scheme*

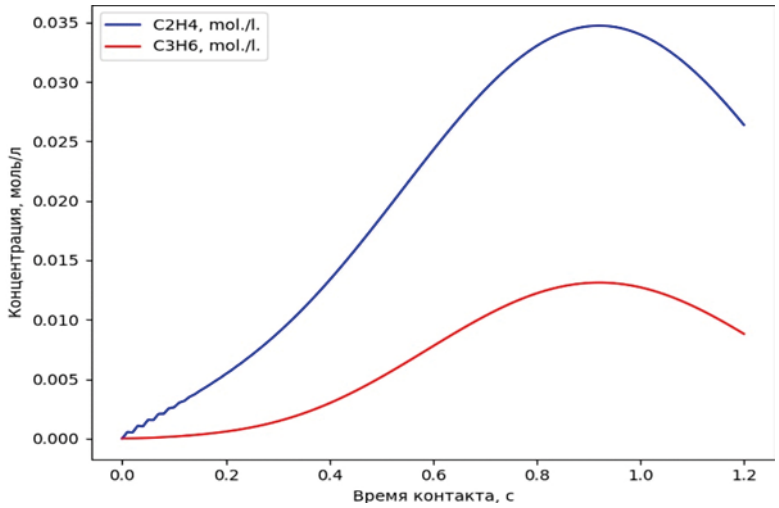

Fig. 2. *Ethylene and propylene concentrations dynamics*

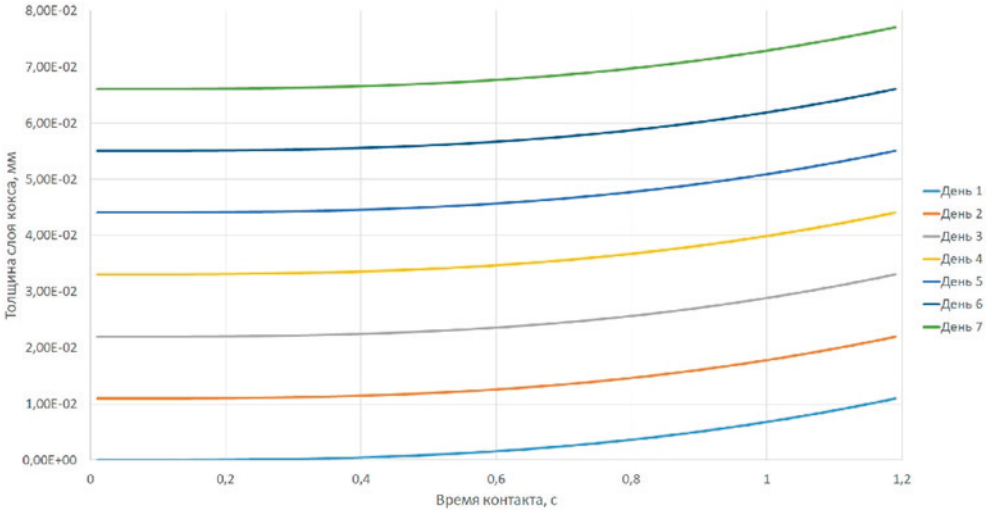

Fig. 3. *Накопление кокса в змеевике пиролиза в течение нескольких дней*

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MATHEMATICAL MODELING OF THE STABLE GAS CONDENSATE PROCESSING ON A ZEOLITE CATALYST

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One of the promising processes for producing high-octane components of gasoline is the process of processing stable gas condensate on zeolite catalysts, this process is called zeoforming. The main positive aspects of this process include high selectivity, stability of the process and high activity of the catalyst [1]. In addition to a number of positive qualities, zeolite catalysts also have negative ones,