References

1. *Address of the President of the Republic of Kazakhstan, Nursultan Nazarbayev, to the People of Kazakhstan, January 29, 2010.– (in Russian) http://www.akorda.kz/ru.*

THE IMPACT OF CATALYST TEMPERATURE FROM REGENERATOR ON THE CATALYTIC CRACKING PROCESS PERFORMANCE

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The yield and composition of the catalytic cracking products are determined by a whole set of records of operation for non-stationary adjoint system "riser-regenerator".

The most important parameters of a technological mode determined by the temperature of the catalytic cracking process are the catalyst temperature after regeneration, feedstock temperature, the ratio of catalyst: feedstock and steam flow into the reaction zone of the riser reactor [1]. Catalyst circulation ratio is determined depending on the temperature of the catalyst after regeneration, which in turn depends on the coke content on the catalyst after the riser reactor. Coke content depends from the composition of the feedstock and temperature mode of the riser reactor.

The purpose of this research is to evaluate the effect of catalyst temperature on the vacuum distil-

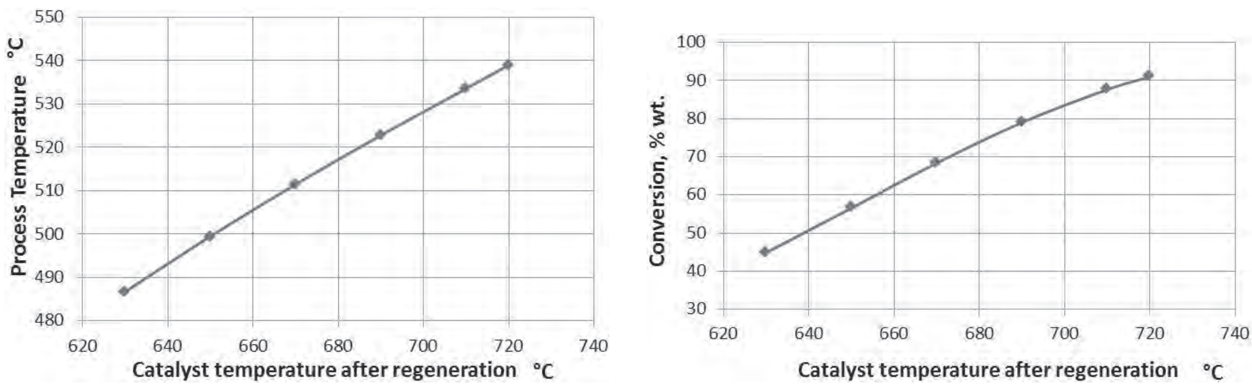

Fig. 1. *The impact of catalyst temperature after regeneration on the process temperature and on the conversion of feedstock*

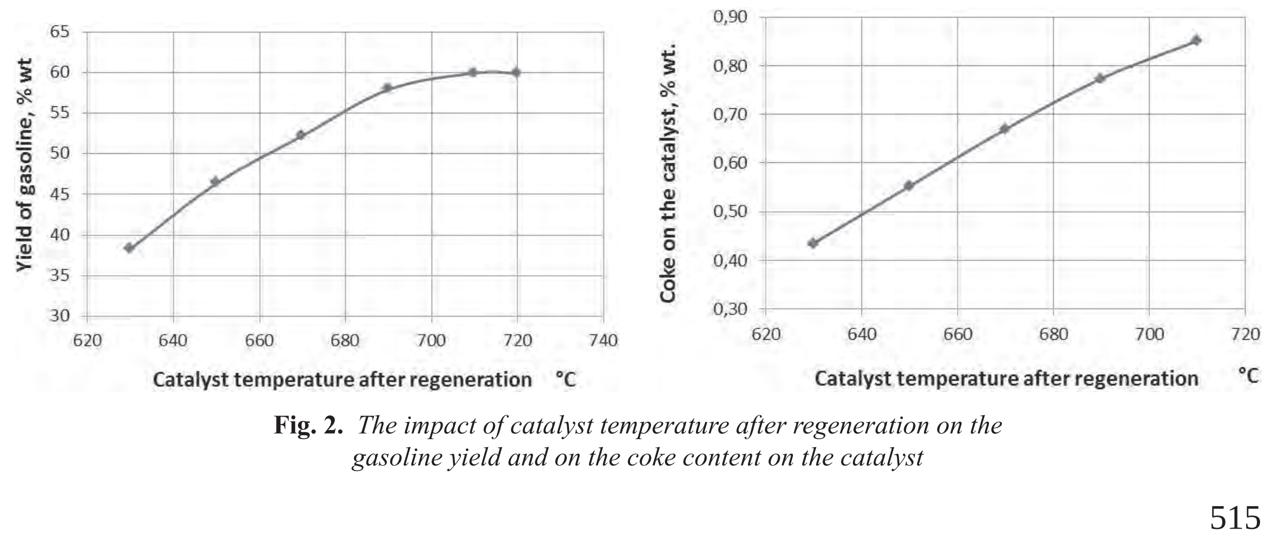

Fig. 2. *The impact of catalyst temperature after regeneration on the gasoline yield and on the coke content on the catalyst*

late conversion and coke content on the catalyst in the catalytic cracking.

Calculations of the temperature effect of regenerated catalyst on the catalytic cracking performance carried out using by mathematical model of the catalytic cracking [2]. Catalyst temperature after regeneration stage varied in the range of (630–720) °C.

The process temperature increases from 486 to 539 °C and the degree of conversion of the catalytic cracking feedstock increases from 44 to 90% wt. (fig. 1) with increasing the temperature of regenerated catalyst in the range of 630–720 °C. In this case initially increases gasoline yield (to the temperature of regenerated catalyst 710 °C), then observed the decrease of gasoline yield (is a "re-cracking" process) and increasing of gas product yield from 4.05 % wt. (process temperature 486 °C) to 25.6 % wt. (at 539 °C). The maximum theoretical yield of gasoline is 59.9 % wt. However, the rate of coke formation reactions and the content of coke on the catalyst increases from 0.44 to 0.88% by weight.

Thus, the products yield from the catalytic cracking unit depends largely on the temperature of regenerated catalyst. Increasing the catalyst temperature after regenerator from 630 to 720 °C at a constant ratio of catalyst:feedstock 5.56 provides the increase of process temperature from 486 to 539 °C, the degree of conversion increase more than 40% and coke content on the catalyst at 0.44% wt. In this case, the gasoline fraction yield passes through a maximum (59.9 % wt.). The optimization of process conditions depending on the temperature of the regenerated catalyst and the feedstock composition is important to obtain the maximum yield of gasoline fraction and a low content of coke on the catalyst.

References

1. *Khadzhiev S.N. Cracking of petroleum fractions on zeolite catalysts.– M.: Chemistry, 1982.– P.276.*
2. *Nazarova G.Y., Ivanchina E.D., Ivashkina E.N. et al. Formalization of hydrocarbon conversion scheme of catalytic cracking for mathematical model development // IOP Conf. Series: Earth and Environmental Science, 2015.– Vol.27.– P.1–6.*

EFFECT OF RADIATION ON CHARACTERISTICS OF EPOXY POLYMER

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Today, many fields of human activity can produce radioactive wastes. Because of the nature of this kind of waste, it needs proper management and treatment methods in order to protect human health and environment, not only for current time, but also in the future generation.

There are many ways to immobilize radioactive wastes, they depends on the nature of the wastes (its radioactivity, forms), final disposal facility conditions, technology and budget available [1]. In general, based on the matrix materials, we can divide radioactive waste mobilization methods to several groups:

- Cementation: cement is an inorganic material that has the ability to react with water at ambient conditions to form a hardened mass. Cement are usually utilized to conditioning large amount of low level radioactive waste because its availability and reasonable cost. However, cementation is poorly incorporated with organic-based liquid wastes.
- Bituminization: bitumen is a thermoplastic material and contains a mixture of high molecular weight, which obtained as a residue in petroleum or coal tar refining. Unlike cement, bitumen could be used to immobilize organic wastes such as waste oil. As a high molecular hydrocarbon, bitumen is expected to withstand well against environmental conditions.
- Vitrification: this method designed to immobilize waste for a long time in compact solid, insoluble form by combining solid waste with glass-forming material like borosilicates, and then heating the mixture under high