THERMOCHEMICAL PROCESSING OF A MIXTURE OF TAR AND PRIMARY COAL RESIN IN THE ATMOSPHERE OF COKE OVEN GAS

Kokkozov D.N., Baikenov M.I., Karimova A.B., Tusipkhan A.

Academician Ye.A. Buketov Karaganda State University,
Karaganda, Kazakhstan
dias_krg.kz@mail.ru

One of the promising directions of thermochemical processing of tar containing additions of primary coal resin (PCR) is an increase in the ratio of hydrogen in hydrogenate. The literature presents various publications using different catalytic additives at high temperatures and hydrogen pressures [1]. However, the proposed methods for processing heavy petroleum residues have one common drawback: high hydrogen pressure, high catalyst consumption, use of ammonium heptamolybdate as a catalyst, etc.

As a result of preliminary studies of anthracene and phenanthrene carried out by us at model sites in autoclave conditions, it was shown that binary nanocatalysts deposited on the ferrosphere possess high activity and selectivity for the yield of hydrogenation products. Selection of the optimum mode of thermochemical processing of tar and PCR mixture was carried out in the temperature range 390-4300 °C, initial pressure of coke oven gas 3,0-7,0 MPa, the amount of added catalyst additive 0,5-1,1%, the amount of PCR added to the tar of 5- 30% by weight and a duration of 20-120 minutes. The particle size of the catalyst additive was 0,1 mm. The criterion for estimating the experiments was the yield of the gasoline, diesel fraction, gas and coke.

The two nanocatalytic additives NiO/SiO_2 and Fe_2O_3/SiO_2 deposited on the ferrosphere exert a synergistic effect on the destruction of the mixture, although NiO/SiO_2 shows a more active and selective effect on the thermochemical processing of tar and PCR. Preliminary cavitation treatment does not lead to a significant change in the qualitative composition of the sum of light ends. However, preliminary cavitation treatment reduces the boiling point by 20-25 ° C, and the yield of light and medium fractions increases by 8-10%. Cavitation treatment leads to a decrease in the number of alkanes, olefins and an increase in naphthenes and aromatic hydrocarbons in the light fraction; in both fractions there was an increase in the number of oxygen-containing organic compounds and a decrease in organosulfur compounds.

References:

1. SUVOROV, Y.P. 2006 Hydrogenation of Remains of Oil Refining under Various Conditions. *Chemistry of Solid Fuel,* **4**, pp.52-60.