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NEW CATALYSTS OF «SYNTHETIC OIL» AND ITS DISTILLATES ENNOBLEMENT

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The process of coal distillates hydrotreatment on Mo-Hu/Ni-Re and So-Hu/Ni-Re catalysts has been studied in the given work. As research results show the maximum exit of liquid products - 51,0-56,0 mass.% is observed on the 5% Mo-Hu, 7% Co-Hu/Ni-Re catalysts. Besides, there is an increase in a portion of gasoline fraction in a liquid product up to 29,5% on the 5% Mo-Hu/Ni-Re catalyst, and up to 21,7 mass.% on the 7% So-Hu/Ni-Re. The exit of liquid products increases up to 60,8 mass.% and exit of gasoline fraction increases up to 32,8 mass.% at simultaneous depositing of these catalysts. The content of paraffin hydrocarbons has decreased from 35,8 to 28,3%. The quantity of isoparaffin hydrocarbons in the synthetic oil hydrogenized on deposited 5%Mo-Humate Ni-Re has increased up to 36,2%. To all appearance, during the hydrogenation there is a process of isomerizing. The olefinic, cyclo-olefinic and diene hydrocarbons are present also at the hydrotreated benzene.

Keywords: coal, hydrotreating, catalyst, coal distillate, gasoline fraction

Along with a continual growth in production of oil and gas all over the world, an interest towards coal, as an alternative source of motor fuels, oil-chemical material and chemical substances arises. Therefore, one of the important directions in modern biochemistry is the development of industrial means to receive practically important oil-chemical, chemical products from natural organic materials that allow us to avoid usage of ecologically-dangerous substances.

A development of new technologies of processing solid fuel in order to receive fluids, and also a selection of new types of catalysts that possess a high activity and selectivity level and work in mild conditions is a significant problem of modern days [1].

During the recent years, in accordance to the European standards, the following requirements are placed towards motor fuels: benzol content must not exceed 1% of mass, sulphur - 0,05% of mass, olefines - 20% of mass, polycyclic aromatic hydrocarbons - 11% of mass. The composition of coal distillate preserves unstable nitrogen, oxygen-full compounds, and also desaturated hydrocarbons that are able to polymerize, so a selec-

tion of new types of catalyst, on which processes of hydric cleaning (hydroprocessing) in mild conditions can take place, becomes urgent.

Bibliographic data [2-3] on hydrocleaning and hydrocracking of coal distillates state that that world practice uses sulphured catalysts that are based on Mo-Co-Ni-W, placed on Al_2O_3 , SiO_2 and other carriers.

Catalysts with pore radius of more than 100 nm are more active and stable in ennoblement of hydrocarbon materials.

Based on a rich experience of work with skeleton catalysts, we have suggested to use them in hydric cleaning of hydrocarbon materials. Modified skeleton catalysts, based on alloys of Ni-Al are widely used on enterprises of chemical and oil-processing industry.

This work presents the results of studying process of hydroprocessing coal distillates on Mo, Co-Fy/Ni-Re catalysts. The process of hydration and hydro-cleaning of «synthetic oil-1» that is received after liquefaction of coal on placed Mo-Humate and Co-Humate/Ni-Re catalysts was carried out in the catalyst «duck». The results are provided in Table 1.

Table 1

Hydration of «synthetic oil-1» on Mo-Hu and Co-Nu/Ni-Re catalyst
($T = 293\text{ K}$, $m_{\text{kat}} = 1\text{r}$, P_{H_2} - atmosphere)

| Catalyst | Output of fluids, mass, % | | | | Remains, mass, % | Losses, mass, % |
|-------------------------|---------------------------|----------|----------|----------|------------------|-----------------|
| | under 453K | 453-523K | 523-593K | Σ | | |
| Ni-Re | 20 | 17,7 | 2,9 | 40,6 | 53,0 | 6,4 |
| 3% Mo-Hu/Ni-Re | 17,5 | 10,0 | 17,0 | 44,5 | 46,1 | 9,4 |
| 5% Mo-Hu/Ni-Re | 29,5 | 10,2 | 11,3 | 51,0 | 45,7 | 3,3 |
| 7% Mo-Hu/Ni-Re | 25,1 | 10,7 | 14,3 | 50,1 | 45,0 | 4,9 |
| 3% Co-Hu/Ni-Re | 16,3 | 7,2 | 21,0 | 44,5 | 46,1 | |
| 5% Co-Hu/Ni-Re | 18,8 | 12,3 | 12,2 | 43,3 | 48,0 | 8,7 |
| 7% Co-Hu/Ni-Re | 21,7 | 12,6 | 21,7 | 56,0 | 37,3 | 6,7 |
| 5%Mo-Hu + 7%Co-Hu/Ni-Re | 32,8 | 13,8 | 14,2 | 60,8 | 34,2 | 5,0 |