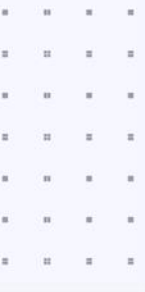


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REGENERATION OF USED INDUSTRIAL OILS USING COKE

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Abstract. Solving the problems of reducing the level of pollution by environmental waste and industrial waste is one of the most important environmental protection tasks and requires an early solution in modern conditions. This is possible both by improving certain cleaning and regeneration technologies, and by developing new effective and economical sorbents. Waste lubricants belong to the vital products of society and are characterized by unsatisfactory environmental characteristics, namely toxicity, fire and explosion hazard v.h.lar. Therefore, their environmentally safe disposal is necessary, which involves processing to obtain products that meet consumer quality requirements. At the same time, the tasks of both reducing the consumption of Natural Resources, and the disposal of waste materials, and providing enterprises with cheap scarce oils are being solved.

Keywords: industrial oils, coke, regeneration,

Introduction. Under the influence of high temperatures, oxidation, decomposition, polymerization and condensation reactions of hydrocarbons occur in oils with the participation of air [1-8]. In addition, they are products of wear of metal friction surfaces, contaminated with road dust and water. As a result, oil accumulates tar and asphalt clots (clay), colloidal Coke and soot, various salts, acids and other acidic compounds, fuel, metal dust and chips, mineral dust, fibrous substances, water.

When working on machines and devices, during storage and transportation in warehouses - everywhere oils come into contact with atmospheric oxygen. Contact with oxygen is the main cause of chemical changes in oil (oxidation).

N.I. Chernozhukov and S.E. Crane [4] found that aromatic hydrocarbons from petroleum-containing hydrocarbons are the most resistant to oxidation, naphthenic hydrocarbons occupy an intermediate place, while paraffin hydrocarbons are the most sensitive to the effects of oxygen at high temperatures. When processing oils, a small amount of resin remains, they are natural antioxidants. As a result of the oxidation of tar substances in oil, insoluble compaction products such as asphalt and carbene are obtained. 20-30At temperatures up to °C and normal pressure, the oxidation process of oil in the air is slow. With an increase in temperature, its speed increases significantly [5-12]. At temperatures of 270-300° C and above, along with rapidly

occurring oxidation processes, thermal decomposition of hydrocarbons is observed with the formation of SO₂, water and carbonaceous substances.

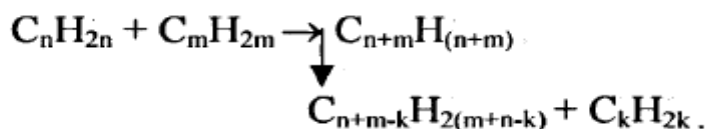
Research methods and materials.

The rate of decomposition of hydrocarbons increases with an increase in temperature, and in a certain temperature range (400-450°C) is subject to the law of Van Goff, according to which the rate of decomposition increases 2 times with an increase in temperature for every 10 0C.

At temperatures up to 4250c, the paraffin molecule, as a rule, is divided into approximately equal parts. At high temperatures (6000c and above), the decomposition reaction goes to the formation of high molecular weight unsaturated alicyclic hydrocarbons and lower kerosene.

Isoparaffine hydrocarbons are more prone to decay than conventional kerosene content. In this case, first of all, lateral branches are distinguished.

Saturated aliphatic hydrocarbons have resistance to decay. These hydrocarbons undergo polymerization, their products decompose again and form unsaturated according to the following scheme:



The thermal decomposition of aromatic hydrocarbons mainly consists of the splitting of the side chains, which in turn are broken down in the same way as the kerosene hydrocarbons.

The usual decomposition of peroxide separated from the oxidized product occurs with the formation of alcohols and carbonyl compounds under the influence of pure heat. In this case, primary hydroperoxides give aldehydes, secondary and tertiary ketones and alcohols:

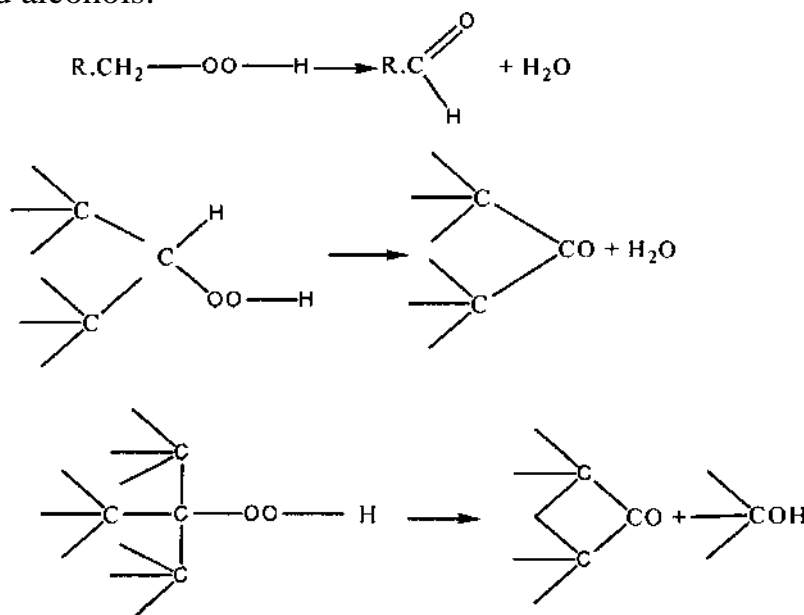


Figure 1. primary hydroperoxides are aldehydes, secondary and tertiary ketones and alcohols

Alcohol and aldehydes are formed with one unit less carbon atoms than the original hydrocarbon, while ketones are formed with the same amount of carbon atoms as the original hydrocarbon.

When oils come into contact with heated parts of machines, thermal decomposition (cracking) occurs, as a result of which light volatile and heavy products are formed.

The tendency of Mineral oils to thermal decomposition depends, first of all, on their hydrocarbon composition. The longer and more complex the oil hydrocarbon molecules are, the easier they decompose under the influence of temperature.

These include substances from which only mechanical impurities are removed, namely dust, sand, metal particles, water, resin, asphalt, Coke and coal, without affecting the chemical base of the refined oils.

The following physical methods of recovery are most common: suction, centrifugation, filtration and washing with water.

Protection is the first and mandatory operation of the regeneration process. Mechanical impurities and water in the oil precipitate in a calm state of the oils over time. This method is based on the principle of deposition of particles under the influence of gravity..

The greater the rate of deposition of particles, the greater their volume and density, and the smaller the viscosity of the liquid. Since the viscosity of the oil decreases with an increase in temperature, sedimentation should be carried out at a high temperature.

An increase in temperature of more than 800s does not lead to a significant acceleration of the deposition of particles, since with subsequent heating the viscosity changes slightly. If we take into account the fact that at a temperature of 100 °C, the water contained in the oils can be boiled and the oils can be foamed, then a temperature of 80-90 °C is clearly considered optimal for settling.

Analyzing the ratio of the content of micro, meso and macropores, it should be noted that the sorbent contains 73.4% macropores, micropores - 3.9% and mesopores - 22.7%.

Activation increases the adsorption properties of sorbents. With acid modification, the specific surface of the sorbent rises to 462.3 m²/g, that is, 1.5 fold, with thermochemical - up to 416.1 m²/g, increases by 1.35 times. At the same time, the adsorption capacity for natural and modified (K₂O and TX, respectively) sorbents increases from 0.129 g/g to 0.229 g/g and 0.219 g/g.

According to the results of the derivatographic analysis, the thermogram of the natural Coke sorbent is shown in Fig. Figure 2.

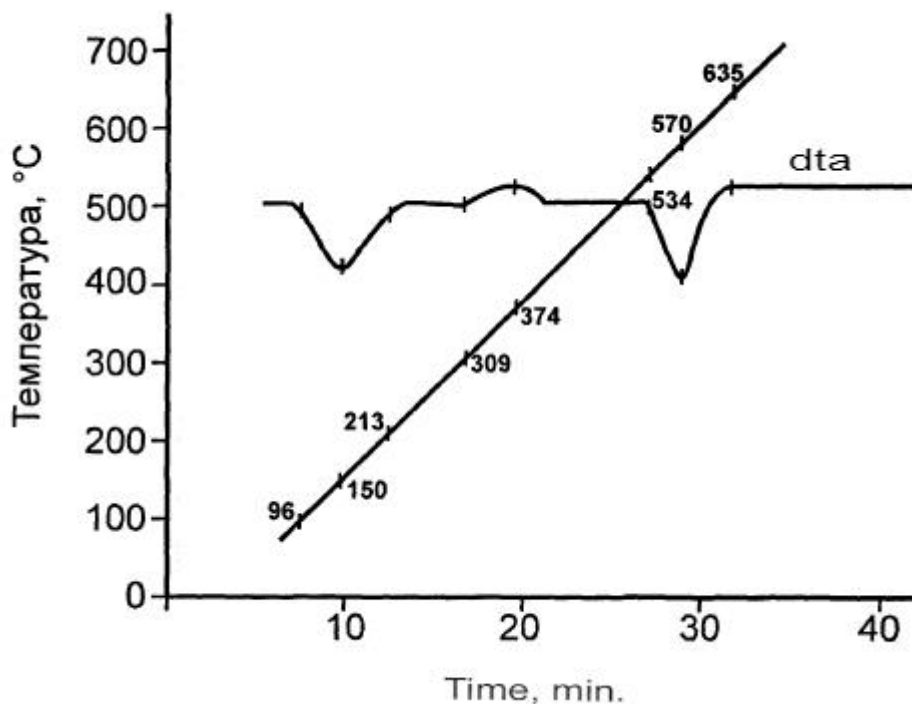


Figure 2. Sorbent thermogram in the local position

According to the results of the analysis, the thermogram contains:

- endothermic effect in a temperature range of 100-150 °C as a result of the removal of adsorbed moisture;

- Endothermic effect in the range of 530-620 °C as a result of removal of crystalline hydrated moisture.

That is, when natural Coke is heated, processes occur associated with the physical removal of moisture and the destruction of crystalline hydrates. This determines different ways of obtaining and activating sorbents. Table 1 lists the indicators of the porous structure of sorbents obtained from oil Coke. Oil Coke is obtained by heating to 200 °C and holding for 1 hour ("soft" thermal activation). Oil Coke sorbents are obtained as a result of acidic and thermochemical activation of sorbent.

Table 1 sorbents properties

№	Rename	Kaks	K ₂₀	TX
1	Density, g / cm ³			
	authenticity	2,38	2,30	2,42
	accuracy	1,15	1,01	1,14
2	Porosity,%	51,68	56,61	52,89
3	Relative density, g/cm ³	0,88	0,79	0,86
4	Static activity on water, g H ₂ O/g as	0,129	0,229	0,219

When activated, the porosity of the sorbent increases. In particular, with acid modification, porosity increases by 10.9%, with thermochemical-by 2.3%, which corresponds to the literature. Balance static activity on N₂O is also growing.

Activated sorbent enters reactor 2 for regeneration, where oil also enters. Temperature 80°C. after recovery, the suspension is divided into a filter press. The oil is sent to the consumer, and the adsorbent is sent for regeneration or destruction.

Conclusion. The share of macro, micro and mesopores is 73.4, 3.9 and 22.7%, respectively. With acid and thermochemical activation, the specific surface increases by 1.35 and 1.5 fold, respectively, and the adsorption capacity by 1.7 and 1.78 times. The composition of micro and mesopores is also growing. Activation oil Coke significantly increases the adsorption properties of the sorbent and allows you to obtain activated charcoal with high adsorption structural properties. Фойдаланилган адабиётлар.

1. Kovalenko V.P. Pollution and purification of petroleum oils. - M.: Chemistry, 1978.-345 p.
2. Tarasevich Yu.I., Ovcharenko F.D. Adsorption on clay minerals. Kiev: Naukova dumka, 1975. - 350 p.
3. Shashkin P.I., Bry I.V. Regeneration of used petroleum oils. M.: Chemistry, 1970. - 270 p.
4. Chernozhukov N.I., Crane S.E. Oxidizability of mineral oils. - M.GTTI, 1955.-368 p.
5. Wardley - Smith T. Oil and Petrochemical Pollution. - 1955. - V. 2. - № 4.- P . 302-311.
6. Chemistry of oil and gas: A textbook for universities / A.I. Bogomolov, A.A. Gayle, V.V. Gromova, etc. / Edited by V.A. Proskuryakova and A.E. Drabkin. - 2nd ed., reprint - L.: Chemistry, 1989. - 424 p.
7. Chernozhukov N.I. Technology of oil and gas processing. Part 3. - M.: Chemistry, 1978.-233 p.
8. Bhan O.K., Win — Ping Tai, Brinkman D.W. Fuel science and technology Intern. - 1986. - V. 4. - № 3. - P. 303-325.
9. Lebedev N.I. Chemistry and technology of basic organic and petrochemical synthesis: Textbook for universities. - 4th ed., reprint. and additional - M.: Chemistry, 1988.-592 with.
10. Berezkin B.D., Berezin D.B. Course of modern organic chemistry. - M.: Higher School, 2001. - 768 p.
11. Artemenko A.I. Organic chemistry. — M.: Higher School, 2002. — 559p.
12. Patyunin N.I. Fuel and lubricants. - M.: Chemistry, 1953. -227 p.
13. Bryan I.V. Regeneration of transformer oils. - M.: Chemistry, 1972.-276 p.131
14. Adsorption-active materials for industrial ecology / Edited by A.P. Zorin, T.I. Priymak, L.B. Koshkin, Martynov G.F. - Apatity: KNC of the USSR Academy of Sciences, 1990. - 114 s, ill.