FEATURES OF WATER AND LIQUID HYDROCARBONS CLEARING FROM TOXIC ADMIXTURES BY CARBONCONTAINING SORBENTS

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Introduction

In works of the last time it was shown, that the carbon materials on the basis of vegetative raw materials are effective absorbers of petroleum from water surface and soils, that predetermines outlooks of their practical application /1-3/. Despite of high oil-capacity and abnormal nature of behavior of sorbents at occluding petroleum, the behavior of such carbon materials as at clearing water of liquid hydrocarbons, and at clearing liquid hydrocarbons of toxic admixtures is still unclear. Such toxic admixture in fuel as resins, sulphurcontaining compounds, formaldehyde, benzene etc. are the reason of ejection in atmosphere sulfur and nitrogen oxides, formaldehydes, the products of burning of toxic admixtures that causes not only pollution of environment (present contribution of "vehicles" to killing a bionomics compounds almost 99 %), but also, most important, are the reason of “new" diseases.
In this connection the studying of features of sorption of toxic products from water and liquid hydrocarbons by carboncontaining sorbents represents both scientific, and practical interest.

Experimental

Study of sorption properties of carbon materials were conducted with usage of columns by a diameter of 10 mm and height 100 mm, in which one covered 10 g of adsorbent granulated up to the sizes less than 100 microns. Adsorbent carefully stamped, and then in a column toped up water or liquid hydrocarbons containing toxic admixtures. The purified products, flowing on drips, assembled in a measuring graduate up to the moment pass of toxins. Adsorption ability of sorbents evaluated under the formula

$$\mathbf{a_2} = \frac{100\,\mathbf{mn}}{(100 - \mathbf{n})\mathbf{q}}, \text{ ml},$$

where : $\mathbf{a_2}$ - activity of adsorbent (ml) of a retained second component, **m** - amount of the allocated clean maiden component, ml; **n** - contents of the second component in solution of the maiden component in volume percents, **q** - charge of adsorbent. The contents of petroleum in water conducted by a method of a IR-spectroscopy and liquid chromatography. A degree of clearing of liquid hydrocarbons instituted on gauging optical density.

Results and Discussion

From introduced on a fig. 1 sectional it is visible, that capacity of carbon materials most effectively absorbing petroleum in case of clearing of water from petroleum (of petrol, kerosene, diesel fuel) essentially varies. In result the degree of clearing of aqueous mediums from petroleum is reduced, is enlarged (approximately in 2 times) cost of sorbent. At the same time, as was showed us earlier /4,5/ at usage mixed of carbonmineral sorbents during clearing aqueous mediums the synergetic effect is watched, with the help which one can be augmented efficiency of clearing in 10-100 times. Therefore we delivered special experiments on studying an opportunity of usage of carbonmineral sorbents for clearing water of petroleum. From introduced on a fig. 2 sectional it is visible, that carbonmineral sorbents really exhibit synergetic effect at occluding both petroleum, and petroleum. The revealed effect of synergism of carboncontaining sorbents at clearing aqueous mediums of liquid petroleum utilised hereinafter at clearing liquid of carbonmineral mediums from toxic admixtures (bitumen, resin).
The received results are indicated in a fig. 3,4. It is visible, that the degree of clearing of hydrocarbonaceous mediums from toxic impurities at usage of carboncontaining sorbents achieves 96,0-99,5 %, that significantly exceeds parameters of clearing as for clean carbon materials, and natural sorbents.

Conclusions

The sorption properties carbon and carbonmineral sorbents are study on the basis of vegetative raw material and natural minerals during clearing water from petroleum products , and also clearing of liquid hydrocarbons from toxic admixtures. The structures of carbonmineral sorbents permitting to purify water and liquid hydrocarbons up to norms MPC are offered.

References

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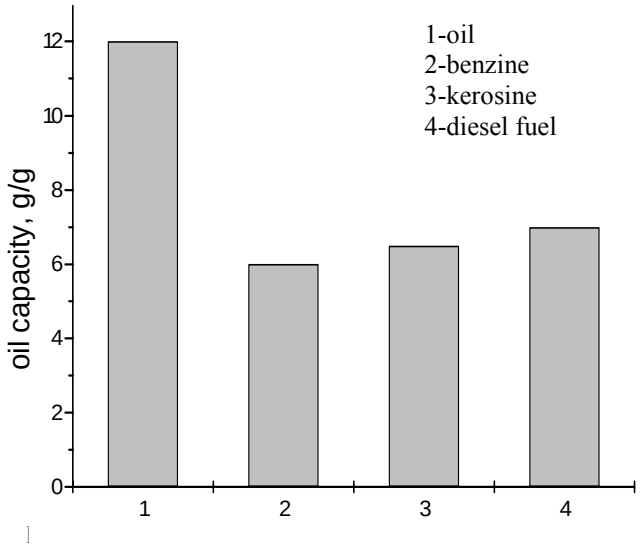

Fig. 1 Capacity of carbon materials on the base of vegetable raw toward to oil and oil products

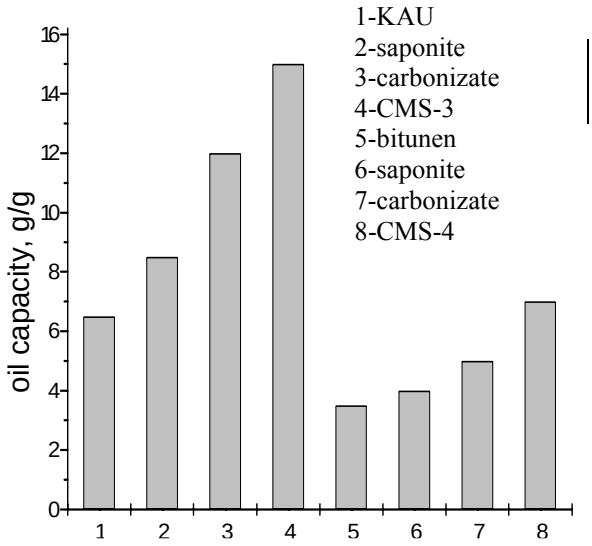

Fig. 2 Capacity of materials of different nature toward to oil (1-4) and oil products (5-8)

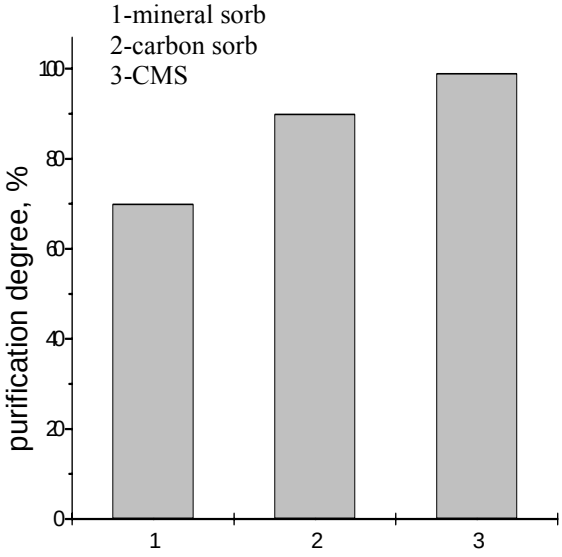

Fig. 3 Efficiency of purification of liquid hydrocarbon medium from toxic impurities

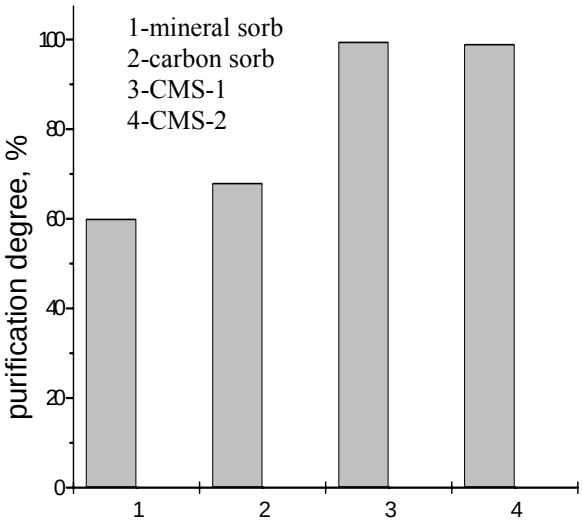

Fig. 4 Efficiency of purification of liquid hydrocarbon medium from hard fractions (bitumen, rosins, sulphur compounds)