generation (from COD data) is 1163.9 mg O₂; during the second, 951.4; and during the third, 752.3 mg O₂.

After a few filtration cycles, the absorption exchange capacity of the resin and degree of purification of the solution from zinc do not change. Thus, the content of organic substances in the precipitation bath does not exert an important effect on the sorptive properties of the resin. Regeneration of the resin with precipitation bath is more efficient than regeneration with sulfuric acid (Fig. 3), which makes it possible to use an appreciably smaller volume of regenerant.

The process of regenerating the resin with precipitation bath has been adopted in the Kiev "Khimvolokno" PO, and is in the stage of adoption at the Ryazanskii plant. The eluates formed in regeneration of the resin are routed into the precipitation bath loop for use in manufacturing.

CONCLUSIONS

The process of regenerating KU-2-8 resin with precipitation baths from viscose manufacturing has been investigated as compared with regeneration with sulfuric acid.

It has been found that desorption of zinc from the resin by precipitation baths is rather efficient, which makes it possible to use precipitation bath in the regeneration process instead of 10% sulfuric acid solution.

It has been shown that a high content of organic contaminants in the precipitation baths (COD of 2000-5661 mg O₂/liter) does not affect the sorptive properties of KU-2-8 resin.

LITERATURE CITED


SELF-IGNITION OF ACTIVATED CARBONS IN THE RECOVERY OF CARBON DISULFIDE FROM EXHAUST AIR FROM VISCOSE MANUFACTURING

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In choosing activated carbons for freeing gases from various contaminants, together with adsorptive capacity, the tendency of the carbons to self-ignite also has much importance; sometimes this is basic [1]. In the course of industrial operation of adsorption units for the recovery of carbon disulfide from viscose plant exhaust air, the development of a fire-hazard situation has been observed, especially after performance of the extracting operation.

Considerable attention has been paid in the literature to the problem of the self-ignition of carbons [2-5]. It has been noted thereupon that the ignition temperature of carbons depends both on the method of determination and also on a number of factors, primarily the state of the surface, preliminary activation, the catalytic action of mineral additives, and the degree of pulverization of the carbon.

In the present article we have made an attempt to ascertain the reasons for the self-ignition of the activated carbons which are widely used in gas-purification processes. The tendency to self-ignite has been characterized by the self-ignition temperature [6]. Thermal and chemical methods [2] were selected for determining the self-ignition temperature. Since the self-ignition temperature depends on the velocity of the heat-transfer agent (the amount of it), this temperature was determined at a filtration rate of 0.35 m/sec, which is

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is very widely used in practice. The temperature was recorded by use of a chromel-alumel thermocouple connected to an EPP-09 potentiometer. As the self-ignition temperature of the activated carbon we took the temperature at which a sharp temperature rise in the carbon layer began. Analysis of the gas past the carbon layer was performed on a "Gazokhrin 3101" chromatograph. Specimens weighing about 1 g were charged into a reactor having an internal diameter of 15.7 mm. The specimens had been preliminarily dried to constant weight at 120°C. The sample heating rate did not exceed 10°C/min. Impregnation of the activated carbon specimens with various compounds was effected by evaporating water from solutions of these compounds at 90°C.

In Table 1 we give the results of determining the self-ignition temperatures of specimens of activated carbons having identical grain sizes and identical compositions of the mineral portion. From the data given in this table, it follows that each type of carbon has its own self-ignition temperature. The quantitative composition of the elements in the mineral portion of the investigated specimens was quite different in all cases. Data on iron and alkali metal content present very great interest, since iron compounds catalyze the formation of sulfuric acid in purification of exhaust air from carbon disulfide and hydrogen sulfide, and an examination of the dependence between the self-ignition temperature of activated carbons and the alkali metal content will, in our view, give a direct answer for the difference in self-ignition temperature values for the investigated carbon specimens.

In Fig. 1 we show the dependence of the self-ignition temperature of activated carbons on their alkali metal content (ENa2O and K2O). From the data obtained, it follows that in selecting adsorbents for freeing gases from contaminants, together with a study of structural characteristics, mechanical strength, and activity with respect to the adsorbate, it is necessary to determine the alkali metal content and thereby predict the tendency of the carbons to self-ignite.

When alkali is artificially applied onto activated carbons, a sharp decrease in the self-ignition temperature takes place (curve II). Comparison of the self-ignition temperature of activated carbons which have been impregnated with alkali with those of the starting samples shows that, at an identical alkali metal content, the self-ignition temperature is considerably lower on artificial impregnation with alkali than it is in the starting specimens. In our view, this is explained by nonuniformity in impregnation, that is, by the possibility of existence of local regions having an elevated alkali content, and also by a possible disruption of the structural features of the activated carbons upon impregnation. On further increase in alkali content of the carbons, the difference between the self-ignition temperatures decreases, which indicates a catalytic character for the action of alkali metals on the ability of carbons to self-ignite.

On impregnation of activated carbons with salts of alkali metals, the self-ignition temperature essentially does not depend on the character of the anion. It also depends only slightly on the content of the catalysts which are used in preliminary clean-up of the exhaust air from hydrogen sulfide.

Investigation of the composition of the air past the bed of activated carbon showed that the heating of the carbon grain takes place basically because of the heat evolved as a result