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Improving the properties of activated carbons based on organoplastics by chemical activation with potassium hydroxide (KOH)

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Abstract

The possibility of processing wastes based on organoplastics generated at aviation enterprises into activated carbons by chemical activation using potassium hydroxide has been investigated. Powdered and granular activated carbons with a porous structure, characterized by the predominance of micropores or mesopores, are obtained that are superior in many respects to both adsorbents based on organoplastics and most industrial active carbons.

The specific surface area of micropores of the obtained granular activated carbons is 1716 m^2/g, the absorption capacity is 365 mg/g for methylene blue and 1180 mg/g for iodine. The obtained granular activated carbons are characterized by a stable adsorption value of *n*-butanol (about 400 mg/g) during three successive adsorption-regeneration cycles. Desorption at 120±5 °C provides an almost complete restoration of the activity of this absorber, fundamentally allowing its multiple use in this technology.

It is shown in the work that granular activated carbons of very high quality can be obtained by chemical activation with potassium hydroxide based on organoplastics wastes, the only drawback of which is, in essence, the relatively low (at 60%) abrasion resistance. The possibility of improving the quality properties of granular activated carbons by adding a small amount of carbon fiber (1% of the mass) as a reinforcing component in the process of granulation to raw paste was investigated. The specified method can significantly increase the strength of the granules in compression (about 3 times), while the adsorption properties of activated carbon are practically unchanged.

The properties described above allow us to conclude that the obtained granular activated carbon is effective and highly competitive.

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