

Laboratory methods for producing of effective adsorbents on the basis of diatomite for purification of water from impurities of well-soluble organic compounds

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Abstract

Today there is the problem of fine water purification during its consumption and disposal in industry from impurities of water-soluble organic compounds that enter it with pharmaceutical, cosmetic preparations, food waste, waste from the textile and chemical industries. Diatomite is a good raw material for the production of these adsorbents. It is found that diatomite is the mesoporous sorbent. The permeability of diatomite can be increased by granulating of the rock. It is found that heat treatment is necessary to obtain more durable granules from diatomite: when the increasing in the temperature of heat treatment of granules the compressive strength of granules increases too. At the same time, when the temperature of the heat treatment is increasing, the equilibrium adsorption of methylene blue on diatomite granules is decreasing. The optimum temperature for the heat treatment of granules is 550 °C. It is found that the heat treatment and granulation of diatomite do not have a significant impact on the adsorptive-structural properties of the rock: up to 70 % of the pore volume of granules is the volume of mesopores. The powdered adsorbent from diatomite which can be obtained by the developed laboratory method can be used in industrial water purification schemes where static adsorption is used for fine water purification. Using the developed laboratory method for producing granular adsorbent from diatomite, it is possible to produce an adsorbent for water purification under dynamic adsorption conditions, where a high value of the sorbent permeability is important.

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