

Repelewicz, M., Jedynek, K., Choma, J. Porous Structure and Surface Chemistry of Active Carbons Modified with Inorganic Acids. *Ochrona Srodowiska* 2009, Vol. 31, No. 3, pp. 45–50.

Abstract: The effect of inorganic acids on the porous structure and chemical properties of the surface of the commercial active carbon WG-12 (Gryfskand, Hajnowka) was examined. Modification was carried out at the boiling point by the use of the following acids: HCl, HNO₃, HCl+HF, HCl+HNO₃, and HCl+HF+HNO₃. The standard parameters of the porous structure were calculated using low-temperature nitrogen adsorption isotherms and the measured values of apparent and effective density. The chemical properties of the surface were estimated by Boehm's method and thermogravimetry. It has been demonstrated that the modification of the active carbon WG-12 with acids exerted a strong influence on the chemical character of its surface. The modifying substances applied accounted for an increase in the concentration of the acid functional groups. The increase was particularly distinct when use was made of nitric acid at the boiling point. The same pattern was observed during modification of the carbon with HCl and HCl+HF followed by modification with HNO₃. The use of HCl or the mixture of HCl and HF had the poorest effect on the acid properties of WG-12. The modification with inorganic acids also impacted on the pore structure of the carbon, which manifested in the reduction of the specific surface area (S_{BET}) and total pore volume. Making use of the nitrogen adsorption isotherms, the carbons examined were ordered according to their adsorptive properties. The largest deterioration of the adsorptive properties was observed when the carbons were modified with HNO₃ after previous modification with non-oxidant acids. This is attributable to the considerable reduction in porosity resulting from the partial oxidation of the carbon.

Keywords: Active carbon, modification, porous structure, inorganic acids, oxidation.