Valorization of biomass waste into high efficient materials for CBRN protection

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Nowadays, the cleaning of aspiration and ventilation emissions from harmful substances is one of the main air protection measures for most of the industrial enterprises. The specific feature of most of the industrial emissions refers to the content of a large number of harmful gaseous components in addition to solid and liquid particles (dusts, gases, mists) [1]. The cleaning of the gas flows from such contaminants requires corresponding knowledge of the theory to develop gas purification methods. The adsorption method becomes more and more valuable among other known methods of industrial emissions cleaning as it allows almost complete removal of the contaminations of the gas flows.

Many countries (Russia, USA, China, etc.) study intensively the problem of air cleaning. The scientists from the Institute on Combustion Problems perform studies [2-3] connected with the manufacture of modified carbon adsorbents for medical applications, waste waters cleaning from heavy metals ions, biomolecules division, etc. But the elaboration of carbon sorbents for toxic gases sorption has not been studied so far. This omission is treated in the present communication.

This work is dedicated to the development of a method for the manufacture of modified carbon sorbents made for absorption of organic and inorganic vapors. The microstructure analysis of the samples reveals that the activation promotes the formation of a higher number of small pores and the development of a spongy texture of the sorbents leading to carbon content increase when compared to that of the initial sample. The final samples have apparent mesoporous confirmed by the form of the isotherms referring to the low-temperature adsorption of nitrogen and the results of pore size distribution using the DFT method.

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References

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