An analysis of the microporous structure of KOH/boron modified activated carbons

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Recent years have seen a substantial emphasis on the development of hydrogen storage methods, where high hopes have been pinned on the use of modified activated carbons1–3. Still, the selection of the methods and conditions of producing such activated carbons requires a thorough and accurate analysis of their structure. The work presents the results of microporous structure analysis carried out by means of the LBET method4–5 on activated carbons obtained by chemical activation using a mixed combination of KOH and borax decahydrate (BDH) as a source of boron; the activated carbons in question were described in the paper. The results of analyses of the porous structure of activated carbons carried out on the basis of nitrogen adsorption isotherms with the use of the LBET method are presented in Figure 1 and in Table 1. As can be concluded from the results, the material obtained at the BDH concentration of 0.025 M is characterized by the highest value of the parameter of the volume of the first adsorbed layer VhA in parallel to the lowest value of the parameter of adsorbate particle cluster height, which testifies to the adsorption of individual particles on the surface of the analysed activated carbon. The number of the best-fitted LBET model points to the occurrence of geometrical restrictions on nitrogen cluster growth in the sample, which results from the blocking of pores by BDH particles. The optimum porous structure parameters obtained for the activated carbon modified with 0.025 M BDH. The results obtained with the LBET method correlate with those produced earlier by means of the BET and the DR methods.

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