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REVIEW
on the thesis of Bakytnur Berdenova "Adsorption Characterization of Composite Activated Carbon for Application in Adsorption Cooling Systems" submitted for the degree of Doctor of Philosophy (PhD) in the specialty "6D060300-Mechanics"

The results of the presented dissertation are of great theoretical and practical significance. Although the applicant studied the dynamics of adsorption of carbon dioxide onto consolidated activated carbon, the results of the dissertation are applicable for many other working pairs too. Also, the results can be used for detailed description of the process of adsorption to predict the performance of the material with high accuracy. In the dissertation, the doctoral student carried out the following works:

1. An introduction provides an overview of adsorption cooling systems, the operation principle, advantages and disadvantages. It also enlists the main methods for increasing the cooling capacity of the material, and ways to make adsorption reactors more compact.

2. The second chapter describes the method and an experimental setup for measuring equilibrium uptake for a working pair of composite/carbon dioxide. Other established physical and adsorption characteristics of the composite material are also presented.

3. The third and fourth chapters are devoted to the estimation of the absolute uptake and correlation of the parameters of the isotherm models. In the fifth chapter, heat of adsorption is studied.

4. In the sixth chapter an effective Knudsen diffusion coefficient was calculated The applicant proposes a new mathematical model that takes into account the absorption-related change in porosity and permeability for the mobile phase, the change in the temperature of the sample during absorption and dissipation of energy into the chamber of the sample holder, and the related change in the coefficient of adsorption rate. Thus, the obtained dependence curves show better agreement with the experimental results.

The scientific results of the dissertation are published in a series of scientific articles, one of which is in a peer-reviewed journal. Thesis by B. Berdenova satisfies all the requirements for dissertations for the degree of Doctor of Philosophy, and its author deserves the award of a Doctor of Philosophy (PhD) degree.

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