NUMERICAL STUDY OF NANOPORE PERMEABILITY FOR GASES AND LIQUIDS USING A SIMPLE LIQUID MODEL

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In the production of porous nanomaterials for more accurate formation of filtering structures used for fine purification and separation of multicomponent mixtures, it is necessary to have as detailed information as possible on the physical and chemical characteristics of the nanopore — filtered substance system. In this regard, it is relevant to study the dependence of the permeability of a porous material for a filtered substance in a liquid or gaseous phase on the geometric characteristics of individual nanopores, the physical and chemical properties of the filtered substance, and the nature of the interaction of the filtered substance with the nanopore material [1]. The nanopore permeability is significantly affected, in particular, by thermodynamic parameters such as pressure, temperature, and others. One of the critical mechanisms affecting the permeability of nanopores is the condensation (vaporization) mechanism in the gas (liquid) -pore system.

The aim of this work is a numerical study of the mechanisms of condensation (vaporization) in a gas (liquid) nanopore system within the framework of a simple liquid model. The results of the study will allow us to determine the processes and mechanisms leading to the deceleration and even complete cessation of filtration through the nanopore of the filtered substance in the framework of the simple liquid model, as well as the physical conditions under which this deceleration can occur.

References.

1. Nikonov E.G., Popovičová M., Mathematical study of surface vapor permeability for homoge-neous porous media // J. Surf. Invest.: X-Ray, Synchrotron Neutron Tech., 2019 (to be pub-lished).