NUMERICAL ESTIMATION OF THERMAL CONDUCTIVITY OF EXFOLIATED VERMICULITE

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An effective method of reducing the volumetric weight and thermal conductivity of thermal insulation materials (TIM) can be using of natural porous fillers, such as exfoliated vermiculite, which is obtained by firing vermiculite concentrate. This material has a number of unique properties: low density, low thermal conductivity, relatively high melting point, chemically inert, durable, environmentally safe [1, 2]. Such properties provide the prospect of its use as a filler in the manufacture of TIM and other materials used in construction, agriculture, chemical industry and energy. Recently the most popular method of prediction of properties of novel composite materials by taking into account a structure, matrix and constituent characteristics is numerical simulation. In this paper we propose a model to describe a structure of exfoliated vermiculite, present the results of calculating the problem of determining heat flux, temperature field and temperature gradient inside its grain using [3, 4] techniques and computing a thermal conductivity and comparing it on the base of data from literature sources.

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