

THERMOPHYSICAL PROPERTIES OF NANOFLUIDS. EXPECTATIONS AND REALITY

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Interest in nanofluids, borned a quarter of a century ago, continues to grow steadily. It is connected, on the one hand, with the existing applications of nanofluids (in perfumery and cosmetic industry, in bio- and medical technologies, at creating new materials, etc.) [1]. On the other hand, the boom of nanofluid researches was initiated by the expectations of various thermophysical applications (as coolants, refrigerants, etc.). All these expectations stimulated the active studying the thermophysical properties of nanofluids. Unexpectedly, the results obtained were extremely contradictory and gave rise to a lot of speculation. Only today certain clarity has been achieved regarding the features of the thermophysical characteristics of nanofluids.

In the present paper these properties are systematically discussed. Both experimental data and molecular dynamics data obtained directly by the author and his group are presented and analyzed. It was shown that the thermophysical properties of the nanofluids are not described by the classical theories. The reasons of such behavior are explained. The structure of nanofluid has been studied. The mechanisms determining the viscosity and thermal conductivity of nanofluids are formulated.

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1. Rudyak V.Ya., Minakov A.V. Modern problems of micro- and nanofluidics. Novosibirsk: Nauka, 2016.