THE NATURE OF MOLECULAR SELF-DIFFUSION IN ARGON AND WATER

N.P. Malomuzh[1], A.V. Oleynik[1], K.N. Pankratov[2]

[1]I.I. Mechnikov Odesa National University
(2, Dvoryanska Str., Odesa 65026, Ukraine;
e-mail: mnp@normaplus.com),
[2]Odesa National Polytechnical University
(1, Shevchenko Ave., Odesa 65044, Ukraine;
e-mail: betelgeyse@bk.ru)

S u m m a r y

The nature of the self-diffusion of argon and water molecules, which are typical representatives of simple liquids and liquids with developed hydrogen bonds, respectively, has been examined. The self-diffusion coefficient of liquids is assumed to be a sum of collective and one-particle contributions. The estimation of the collective contribution is made on the basis of the Lagrange theory of thermal hydrodynamic fluctuations and has been demonstrated to completely agree with the data of neutron experiments. The proposed estimate of the one-particle contribution to the self-diffusion coefficient has correctly reproduced experimental data.