

HOW SUBSTANTIAL IS THE ROLE OF THE H-BOND NETWORK IN WATER?

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S u m m a r y

Analyzing the behavior of the shear viscosity and the average number of H-bonds per molecule, a similarity of molecular thermal motions in water and argon is discussed. It is shown that the shear viscosity of water demonstrates the argon-like temperature dependence on the coexistence line at $T > T_\nu$, $T_\nu \approx 320$ K. Since the average number of H-bonds per molecule is less than two in the same region, it is concluded that the contribution to the shear viscosity caused by the H-bond network is noticeably different from zero only at $T < T_\nu$. The temperature dependence of this contribution is exponential with good accuracy, and the corresponding activation energy is equal to the energy of formation or disruption of an H-bond. These and other facts allows us to conclude that the crystal-like type of the thermal motion in water takes place only at $T < T_\nu$.