

Thematic course: Numerical characteristic of the organic molecule structure. Part 18.

## On the issue of the motion of nonelectrolyte molecules

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### Abstract

Certain forms of molecular motion of non-electrolytes, as well as the role of the Earth's gravity forces in the nature of intermolecular interactions have been studied. On the basis of the ideal gas equation and the expression of universal gravitation law, a formula have been obtained for the relationship of linear temperature of the molecular ensemble and the weight of the constituting molecules. The actual dependence of the experimental values of the boiling point of a series of alkanes of normal structure on the molecular weight is given by a smooth convex curve. Based on the analysis of the boiling point of alcohols, cycloalkanes, poly halogen alkanes, including hydrogen atoms in the molecule, and per-halogen alkanes, it has been suggested that the basis of the interaction of molecules in the liquid phase, perceived as the dispersion, is the balance between the force of attraction to the Earth and repulsion of electronic shells of molecules. Based on the above ideas about the manifestation of intermolecular interactions we derived regression equations defining the boiling point of alkanes of normal structure as a function of molar mass and previously introduced by us energy and structural parameter and as a function of molar mass, energy and structural attributes and values  $J_w$ , – a parameter entered by us with the rotational positions of molecular motion in order to describe the physical and chemical properties of fluids. In addition to the rotational motion we considered the motion of the molecules in the liquid along closed trajectories, the limiting case of it being the circle. For a number of normal structure alkanes we defined the values of the circle radius basing on the density data at various temperatures. The presence of the relationship of square radius with the heat capacity of alkanes has been established. The plotted dependence curves include two distinct sections. One is practically parallel to the axis of abscissas indicating the absence of the specific heat dependence on the radius. The other section represents a linear dependence of the specific heat on the square of the radius. The first portion of plots is related to the quasi fluid. The second section is regarded as a gas-like liquid. We have also obtained the dependences of the reverse viscosity of alkanes on the cube of the radius. These dependences are regarded as an indication of the intensification of heat transfer in a liquid with the temperature rise. On the basis of the obtained dependences a supposition has been suggested on the features of the nature of the liquid phase.