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Ultrasonic and photoacoustic investigations of water mixtures
with dioxanes 1-3 & 1-4

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Ultrasonic velocities, densities and thermal effusivity dependence on concentration were measured in the mixtures of water with dioxanes 1-3 and 1-4. in the temperature range from 291.15 to 303.15 K. Adiabatic compressibilities were calculated from Laplace's equation based on the experimental results obtained. Variations of these values with concentration and temperature were studied. Structural interactions and the formation of a compact pseudo-stable structure at very low concentrations of these liquids were observed. The plots of the adiabatic compressibility versus the mole fraction of these molecules display two characteristic points at low concentrations: the intersection of the isotherms and their minimum. Such relations between adiabatic compressibility, concentration and temperature are usually attributed to the formation of pseudo-stable molecular structures. To formulate a model of local structures present in the investigated molecular systems it is indispensable to get an insight into hydration of molecules and the formation of hydrogen bonds. Therefore, the attention was focused particularly on these problems.