EXPERIMENTAL INVESTIGATION OF THE PRESSURE OF THE SYSTEM OF N-HEPTAN-WATER (99:1)

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At present, there is an urgent need for investigating a collection of thermophysical properties of liquids and gases under the conditions of a single experimental cell. During a single experiment, we can obtain data on a broad spectrum of thermophysical properties of substances. The union of measurements of thermophysical and calorimetric properties within the framework of a single experimental setup is a complicated enough problem.

In order to satisfy the condition of simultaneous measurement of isochoric heat capacity and pressure, in the structure of the experimental setup for investigation of isochoric heat capacity and PVT properties of liquids and gases, we decided to use a digital pressure strain-gage sensor.

The sensor should have the following characteristics: high accuracy, small external dimensions, large measurement ranges for pressures and temperatures of the media being investigated, independence of the measurement results from the state of the surrounding medium (temperature, air moisture, etc.). These characteristics were satisfed by the pressure sensor Kurant DI-V.

Data on the pressure of the system under investigation from the sensor are transmitted to a digital measuring instrument (Keithley 2000 multimeter). The data obtained go from the multimeter to a personal computer with software specially developed by the authors, where this information is processed and kept together with other data.

In this way, we studied the n-heptane-water system (99:1). This system is immiscible under normal conditions. Investigations were carried out on 11 isochores in the density range from 150 kg/m^3 to 501 kg/m^3 and a pressure range from 0.1 MPa to 16 MPa. Isochores of pressure and dependences of the first derivative of pressure on temperature on temperature are constructed. They indicate phase transitions corresponding to transitions from the three-phase state to the two-phase state and from the two-phase state to the single-phase state.

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