

The Experimental Investigation of the Isochoric Heat Capacity of the Binary n-Hexane – Water System in the Vicinity of the Azeotrope Line

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Experimental investigation of the isochoric heat capacity in the binary n-hexane – water system with three different compositions 0.118, 0.200 and 0.256 molar fraction (m.f.) of water were made with a high-temperature adiabatic calorimeter. The mixtures were studied along isochores over the range of specific volumes from 2.3 to 4.0 cm³/g.

Research has shown that two jumps of the heat capacity take place caused by the liquid-liquid and liquid-vapor phase transitions. In the region of the liquid phase at the liquid - vapor transition a sharp jump in heat capacity is observed, whereas at the liquid - liquid transition the jump of the heat capacity is stretched out over temperature.

For identification of phase transitions the special optical cell, volume 205.198 cm³, is designed, on which the dependences of curves of liquid - liquid and liquid – vapor phase equilibria for the investigated n-hexane - water mixtures are determined in a visual way.

Depending on specific volume, the temperature distance on isochores between points of the liquid - liquid and liquid - vapor transitions continuously changes and disappears in the region of a liquid phase. Two jumps of the isochoric heat capacity merge in one large jump and the mixture behaves as an individual substance, characterizing the occurrence of an azeotropic state. The azeotrope for composition 0.118 m.f. of water takes place on isochore 2.315 cm³/g, for composition 0.200 m.f. on isochore 2.970 cm³/g, and for composition 0.256 m.f. on isochore 3.857 cm³/g. The azeotrope line is in the region of a heterogeneous state and ends by the upper critical end point (UCEP).