

Experimental Study of the Thermodynamic Properties of Microemulsions

N.G. Polikhronidi,¹ G.V. Stepanov,¹ I.M. Abdulagatov,^{2,C,S} and R.G. Batyrova¹

¹*Institute of Physics of the Dagestan Scientific Center of the Russian Academy of Sciences, Makhachkala, Dagestan, Russia*

²*Institute for Geothermal Problems of the Dagestan Scientific Center of the Russian Academy of Sciences, Makhachkala, Dagestan, Russia
ilmutdin@boulder.nist.gov*

Thermodynamic properties (PVT_x , C_vVT_x , and dP/dT) of three microemulsions (water n-octane sodium dodecylsulfate 1-pentanol, 0.0777 : 0.0777 : 0.1449 : 0.6997; 0.6220 : 0.0777 : 0.1448 : 0.1555; and 0.2720 : 0.0777 : 0.1449 : 0.5054) were studied. Sodium dodecylsulfate was used as surface-active agent, and 1-pentanol as stabilizer. A high-temperature, high-pressure, adiabatic, and nearly constant-volume calorimeter was used for the measurements. The direct measured values of the derivative and pressure, P , were used to calculate the internal pressure. Measurements were made at 12 densities between 476 and 756 kg·m⁻³. The temperature range was from 283 to 525 K. Uncertainty in the heat capacity measurements is estimated to be 2 %. The temperature on the liquid-gas phase transition curve (isochore), T_s , for each measured density was determined using a quasi-static thermogram technique. The uncertainty in the phase transition temperature measurements is about 0.02 K. The effect of temperature, density, and concentration on the heat capacity of microemulsions of C(C₁₂H₂₅NaSO₄) will be discussed.