PHASE TRANSITIONS AND CRITICAL PROPERTIES OF 1-PROPANOL —N-HEXANE SYSTEM

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By the method of isochore fracture using experimental data on p, ρ, T -dependences of 1-propanol+n-hexane system (0.2, 0.5, 0.8 and 0.9 mol. fractions of n-hexane (x)) in two-phase, one-phase (gaseous and liquid) regions parameters of liquid—vapor phase transitions p_s, ρ_s, T_s [1, 2] are obtained. Using power function including scaling behavior parameters of critical points p_k, ρ_k, T_k are also obtained.

The dependence of pressure on density, temperature and composition of mixtures along the curve of phase coexistence is described by three parameters polynomial equation of state, represented by expansion of the compressibility factor $Z = p/RT\rho$ into a power series of reduced density $\omega = \rho/\rho_k$, and reduced temperature $\tau = T/T_k$ and composition x:

$$Z = \frac{p}{RT\rho_m} = 1 + \sum_{i=1}^{m}\sum_{j=0}^{n}\sum_{k=0}^{s} a_{ijk}\omega^i x^k/\tau^j,$$

and $p = RT\rho_m\left[1 + \sum_{i=1}^{m}\sum_{j=0}^{n}\sum_{k=0}^{s} a_{ijk}\omega^i x^k/\tau^i\right]$.

The average relative deviation of calculated values of pressure from experimental ones does not exceed 1%.

The dependence of density of mixtures along the curve of phase coexistence far from critical point in symmetrical part is described by equations:

$$\rho = \rho_k\left(1 \pm B_0\tau^{\beta_0} + B_1\tau^{\beta_1} \pm B_2\tau^{\beta_2} + ...\right),$$

$$\left(\rho_f - \rho_g\right)/2\rho_k = B_0\tau^{\beta_0} + B_2\tau^{\beta_2} + B_4\tau^{\beta_4} + ...,$$

where $\tau = (T - T_k)/T_k$ and $\omega = (\rho - \rho_k)/\rho_k$.

The average relative error is 1.5%..

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