

Critical Behavior of Refractive Index of Binary Mixture Cyclohexane - Phenol

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Abstract

The dynamic viscosity of binary mixture of cyclohexane - phenol was measured over the entire possible range of concentrations and temperatures. The results above the critical temperature and critical concentration were analyzed by the mode coupling theory of one phase. The anomaly of dynamic viscosity was detected as a function of temperature and concentration. Dynamic viscosity anomaly was clearly observed near the critical temperature $T_c = 17.0$ °C and the critical concentration $\chi_c = 2.70\%$ by weight of phenol. The value of noncritical part of refractive index was found to be $n_{0D} = 1.4276$. The universal critical exponent for refractive index χ_n is also calculated to be 0.00156. The behavior of refractive index of cyclohexane -phenol obeys power law universality above the phase transition. The isobaric specific heat for the critical binary mixture c_{pc} was found to be 106.6 J/kg.K using two-scale factor universality. Joule's constant for cyclohexane - phenol binary mixture was found to be 4.1 Calorie/J.