

Poster Presentation

Critical Behavior of the Density of Binary Liquid Mixture Cyclohexane – Phenol

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Abstract

The dynamic shear viscosity coefficients of the binary liquid mixture cyclohexane - phenol for different temperatures and concentrations are measured using glass capillary viscometer. Dynamic shear viscosity anomaly is observed near the critical temperature $T_c = 17.0^\circ\text{C}$ and the critical concentration $x_c = 2.70\%$ by weight of phenol. Mode Coupling Theory is used to fit our experimental data above the critical temperature. It is found that the value of noncritical part of the dynamic shear viscosity $\eta_0 = 0.8174$ cP. The power law is expected for the mass density above critical temperature. The value of noncritical part of the mass density is found to be $\rho_0 = 0.7357 \frac{\text{gm}}{\text{cm}^3}$. The critical isobaric thermal expansion coefficient $\alpha_p c$ was calculated to be $2.07 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$. The critical isobaric specific heat c_p was found to be 106.6 J/kg.K , Joule's constant. Joule's constant was found $4.11180 \text{ Calori/joule}$ and pressure derivation of the critical temperature T_c' was also calculated to $1.22 \times 10^{-4} \text{ K/Pa}$.