

Poster Presentation

Two – Scale – Factor Universality of Binary Liquid Critical Mixture

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Abstract

The dynamic shear viscosity of a binary liquid mixture phenol – water has been measured at different temperatures and concentrations. The critical temperature T_c and critical concentration x_c are found to be 67.0°C and 33.90% by weight of phenol respectively, the critical density ρ_c is measured to be 0.8952 gm/cm³. The critical and background amplitudes of specific heat at constant pressure are calculated to be 78.117 J/kg.K and 85.292 J/kg.K respectively. The pressure derivative of the critical temperature along the critical line T_c' is calculated to be 9.722×10^{-6} K/Pa.

The dynamic shear viscosity of binary liquid mixture phenol – cyclohexane has been measured at different temperatures and concentrations. The critical temperature T_c and critical concentration x_c are found to be 17.0°C and 2.70% by weight of phenol respectively. The critical density ρ_c is measured to be 0.7627 gm/cm³. The critical and background amplitudes of isobaric thermal expansion coefficient α_{pc} and α_{pb} are calculated to be 4×10^{-6} K⁻¹, 6×10^{-4} K⁻¹ respectively. The pressure derivative of the critical temperature T_c' for the binary is calculated to be 1.083×10^{-8} K/Pa.

The universal quantity $R+\xi$ of both binary liquid critical mixtures phenol – water and phenol – cyclohexane are calculated to be 0.2716 and 0.2699 respectively. The values are in a good agreement with the theoretical value of $R+\zeta$. The two binary liquid critical mixtures belong to the class of universality "Two – Scale – Factor Universality".