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**Critical Behavior of the Ultrasonic Attenuation for the Binary Mixture of Water – Phenol**

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Abstract

The dynamic shear viscosity of the binary liquid mixture water – phenol was measured for different temperatures and concentrations using the glass capillary and digital viscometers. Dynamic shear viscosity anomaly was detected near the critical temperature T\_(c )= 67 °C and the critical concentration x\_c= 33.9% by weight of phenol. The specific heat at constant pressure was calculated using the two scale factor universality and found to be 241.9 J/(kg K). The critical and the background isobaric thermal expansion coefficients were determined and found to be 2.729 x10-3 °Cˉ¹ and 22.59 x10-3 °Cˉ¹ respectively. Ultrasonic attenuation data at 9, 15, 30 and 35 MHz were analyzed using the dynamic scaling theory of Ferrell and Bhattacharjee. The values of α\_c/f^2 versus f^(ˉ¹˙⁰⁶) yield a straight line as predicted by the theory. The experimental values of α(x\_c,T)/(α\_c (x\_c,T\_c)) for water – phenol were compared to the scaling function F(ω\*') and showed good agreement with the theory.