

Dielectric Relaxation Studies of Binary Mixtures of *N*-Methylformamide and Tetramethylurea in Benzene Using Microwave Absorption Data

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Z. Naturforsch. **63a**, 230 – 236 (2008); received August 31, 2007

The dielectric relaxation time (τ) and dipole moment (μ) of binary mixtures of different molar concentrations of *N*-methylformamide (NMF) in binary mixtures of NMF and tetramethylurea (TMU) in benzene have been calculated at 25, 30, 35 and 40 °C using standard standing wave microwave techniques and following the single frequency (9.885 GHz) concentration variational method of Gopala Krishna. The energy parameters (ΔH_ϵ , ΔF_ϵ , ΔS_ϵ) for the dielectric relaxation process of binary mixtures containing 30 mol% of NMF have been calculated at different temperatures, and comparison has been made with the corresponding energy parameters (ΔH_η , ΔF_η , ΔS_η) for the viscous flow process. Based on these studies, it was inferred that the dielectric relaxation process can be treated as a rate process just like the viscous flow process. Solute-solvent and solute-solute molecular associations have been proposed.

Key words: Microwave Absorption; Dielectric Relaxation; Dielectric Constant; Relaxation Times; Solute-Solute Interaction.