# Dielectric Relaxation of Binary Mixtures of Tetrahydrofuran and N-Methylformamide in Benzene Solution Using Microwave Absorption Studies

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Using standard standing wave microwave X-band technique and following Gopala Krishna's single frequency (9.90 GHz) concentration variational method, the dielectric relaxation times $\tau$ and the dipole moments $\mu$ of dilute solutions of Tetrahydrofuran (THF), N-methylformamide (NMF), and THF+NMF binary mixtures in benzene solutions have been calculated at different temperatures (25 ℃, 30 ℃, 35 ℃, and 40 ℃). The energy parameters ($\Delta H_\varepsilon$, $\Delta F_\varepsilon$, $\Delta S_\varepsilon$) for the dielectric relaxation process for the THF+NMF binary mixture containing 30 mol% THF have been calculated at 25 ℃, 30 ℃, 35 ℃, and 40 ℃ and compared with the corresponding viscosity parameters. A good agreement between the free energy of activation from these two sets of values shows that the dielectric relaxation process like the viscous flow process can be treated as a rate process. From relaxation time behaviour of THF and NMF binary mixture in benzene solution, solute-solute types of the molecular association has been proposed.

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