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Comparative Analysis of Dielectric Constant and Loss Parameters of Ethanol and Methanol with Lorazepam

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ABSTRACT

In the dielectric relaxation study, the Debye relaxation equation and its derivatives used to analyze the experimental permittivity of Ethanol, Lorazepam binary mixture and Methanol, Lorazepam binary mixture over the frequency range of 10MHz to 50GHz. at temperature 283K, 288K, 293K and 298K and at the concentration of 0, 20, 40, 60, 80 and 100% of volume, to form the binary mixture. The plot of dielectric constant of Ethanol and Methanol against mole fraction of Lorazepam is useful to determine how well the experimental data fits the Debye equation.

KEYWORDS –Dielectric constant, Ethanol, Methanol, Lorazepam, Debye.

I. INTRODUCTION

To distinguish non-polar solvent and polar solvents, dielectric constant can be used. Generaly solvents with dielectric constant less than 15 are considered non-polar, while those with the value more than 15 as polar solvents. Technicaly dilectric constant measures the solvents ability to reduce the field strength of the electric field surrounding a charged particle immeresed in it. The dielectric relaxation can also used for study of H-bonded liquids [1]. Determination of complex permittivity spectra in the gigahertz range is now a days fairly straightforward for non-conducting liquids. Advanced microwave techniques have accelerated to remarkable levelopment of measuring complex permittivity over wide frequency range by time domain reflectometry TDR) technique [2].

he permittivity and dielectric loss are given by the Debye equation

$$\varepsilon^* = \varepsilon_\infty + \frac{(\varepsilon_0 - \varepsilon_\infty)}{(1 + i\omega\tau)}$$

iere $\varepsilon^* = \varepsilon' - i\varepsilon''$, ε' is known as dielectric dispersion and ε'' is known as dielectric loss which are given by –

$$\varepsilon' = \varepsilon_\infty + \frac{(\varepsilon_0 - \varepsilon_\infty)}{(1+\omega^2\tau^2)} \quad (1)$$

$$\varepsilon'' = \frac{(\varepsilon_0 - \varepsilon_\infty)\omega\tau}{(1+\omega^2\tau^2)} \quad (2)$$

ation (1) and (2) are known as Debye equations[3] which describes the behaviour of dielectric at various uencis. These equations used to compute the values of dielectric constant, loss factor, and relaxation time.

V. REFERENCES

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