Summary

The first chapter gives an introduction of dielectric relaxation spectroscopy, Alcohols, the Butanol Isomers and TDR technique.

Second chapter describes the theories related to static and dynamic dielectric permittivity, the dielectric relaxation and different models related to the dielectric relaxation theories. The parameters like Kirkwood correlation factor, Excess dielectric properties, thermodynamic properties and Bruggeman factor are also included in this chapter.

The chapter third deals with experimental techniques and methodology adopted for the study including principle of time domain reflectometry, establishment and development of TDR, data analysis and calibration method used for the determination of high frequency permittivity of binary mixtures of Aqueous solutions.

Chapter four presents the study of dielectric relaxation in aqueous Tertiary Butyl Alcohol (TBA) solutions using time domain reflectometry technique. The values of dielectric permittivity spectra are measured at entire concentrations in the frequency range of 10 MHz to 30 GHz and at temperature range of 25°C to 10°C. using complex permittivity spectra Dielectric parameters such as Static dielectric constant (ε₀), Relaxation time (τ), are calculated. Thermodynamic parameters, Kirkwood correlation factor, Bruggmann factor, excess dielectric properties are also determined for aqueous TBA.

Chapter five deals with dielectric relaxation study of 2-Butanol with water using TDR technique. The dielectric permittivity spectra are measured over entire concentrations in the frequency range of 10 MHz to 30 GHz and at temperature range of 20°C to 0°C. Dielectric parameters such as Static dielectric constant (ε₀), Relaxation time (τ), are calculated. Kirkwood correlation factor, Bruggmann factor, Thermodynamic parameters, excess dielectric properties are also determined for aqueous 2-Butanol.

Chapter six concerns with the study of 1-Butanol aqueous solutions. The values of dielectric permittivity measured over seven different concentrations of volume fraction of 1-Butanol in the frequency range of 10 MHz to 30 GHz. Dielectric parameters such as Static dielectric constant (ε₀), Relaxation time (τ). The contribution of hydrogen bonds to dielectric properties of the mixture has been studied Kirkwood correlation factor, Excess dielectric constant, Thermodynamic properties are also determined.

Chapter seven deals with the summary and conclusion of the present study.