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Molecular interaction and dielectric relaxation study of DMSO-water binary mixtures using a TDR

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Complex permittivity spectra (CPS) for dimethylsulphoxide (DMSO) - Water mixtures, in the frequency range of 10 MHz-30 GHz have been examined, which include the entire concentration range using a time domain reflectometry (TDR) method. The Cole - Davidson relaxation model has been used to fit the CPS obtained from DMSO - Water mixtures. Mixture's relaxation time obtained high at volume fraction of water, $V_w = 0.3$. The study analyzes the intermolecular interactions using the Kirkwood correlation factor (KCF) and excess properties. The theoretical dielectric constant for mixtures has been computed using Alenka Luzar's hydrogen bonding model using different molecular parameters.

Keywords: Hydrogen bonding, Relaxation time, Intermolecular interaction, Permittivity