

Activity Coefficient and Excess Gibbs Free Energies for the Binary Mixtures of Dimethylsulphoxide with Substituted Benzenes

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Excess Gibbs free energies (G^E) and activity coefficients (γ) have been measured at 298.15 K for the binary systems of dimethylsulphoxide (DMSO) with substituted benzenes. Substituted benzenes include toluene, ethylbenzene, chlorobenzene, bromobenzene and nitrobenzene. The vapor-liquid equilibrium (VLE) data were measured at 715 mm Hg. The experimental t-x data were used to estimate Wilson parameters and then used to calculate the equilibrium vapor compositions and the theoretical points for these binary mixtures. These Wilson parameters are used to calculate activity coefficients and these in turn are useful to calculate excess Gibbs free energy. The experimental results were discussed in terms of intermolecular interactions between component molecules. The excess Gibbs free energies are positive for the systems DMSO+ ethylbenzene and bromobenzene, whereas negative G^E values are observed for the systems DMSO + toluene, chlorobenzene and nitrobenzene.