A thermodynamic study of glucose and related oligomers in aqueous solution: Vapor pressures and enthalpies of mixing

Vapor pressures above aqueous solutions of glucose and maltose at both 298.06 K and 317.99 K and vapor pressures above aqueous solutions of cellobiose, maltotriose, maltotetraose, and maltopentaose at 317.99 K have been measured. The excess enthalpies have been recorded for all of the above-mentioned systems at 318.15 K. A theoretical model is examined in which existing interaction parameters, calculated for the water + 1,2-ethanediol system by using a molecular mechanical approach, are incorporated into the UNIQUAC equation to describe the vapor pressures of the aforementioned series of saccharides in aqueous solution. This so-called transference principle is found to be of interest in furthering the discussion concerning the applicability of lattice-based models for solution theory.