

Non-stoichiometric model of the relationship of the isotherms of excess molar properties of ternary mixtures with the isotherms of binary mixtures

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Abstract

The analysis of the known asymmetric and symmetric models of the isotherms properties relationship in binary and ternary mixtures has been carried out. As the objects we used experimental data on mole volumes (293.15 K) of binary systems: water (1) + ethanol (2), water (1) + 1-propanol (3) and ethanol (2) + 1-propanol (3) and ternary mixture: water (1) + ethanol (2) + 1-propanol (3), as well as reference data on enthalpy of mixing (298.15 K) binary systems: water (1) + ethanol (2), water (1) + 1,4-dioxane (3) and ethanol (2) + 1,4-dioxane (3) and ternary mixture: water (1) + ethanol (2) + 1,4-dioxane (3). Excess molar volumes (V^E) and enthalpies of mixing (H^E) of binary systems are described with the help of Redlich-Kister equation and non-stoichiometric models. Efficiency of symmetric and asymmetric models for ternary systems is estimated by the minimum of mean-square deviations of the rated data from experimental ones. Application of Tsibulka's allowance is shown on the example of alignment of Radoikovich model. In describing the physical and chemical properties of ternary mixtures with the use of asymmetric models we used in the algorithm for choosing an asymmetric top, based on the comparison of polarity (structure) criteria of the individual components of mixtures.