

Vapor-Liquid Equilibria for Binary and Ternary Mixtures of Ethanol, 2-Butanone, and 2,2,4-Trimethylpentane at 101.3 kPa

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Vapor-liquid equilibrium (VLE) values at 101.3 kPa have been determined for the ternary system ethanol, 2-butanone, and 2,2,4-trimethylpentane (isooctane), and its constituent binary systems: ethanol and 2,2,4-trimethylpentane, ethanol and 2-butanone, and 2-butanone and 2,2,4-trimethylpentane. Minimum boiling azeotropes were observed for all three binary systems, while no azeotropic behavior was found for the ternary system. Calculations of nonideality of the vapor phase were made with the Soave-Redlich-Kwong equation of state.

The binary VLE data determined in this work passed the thermodynamic consistency test of Kojima *et al.* The VLE data obtained for the ternary system passed the McDermott-Ellis method as modified by Wisniak and Tamir. The activity coefficients of the binary mixtures were satisfactorily correlated as a function of mole fraction with the Wilson, NRTL, and UNIQUAC models. The models with their best-fitted binary parameters were used to predict the ternary vapor-liquid equilibrium.