Phase equilibrium properties of binary aqueous solutions containing ethanediamine, 1,2-diaminopropane, 1,3-diaminopropane, or 1,4-diaminobutane at several temperatures

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Abstract :

The vapour pressures of {ethanediamine (EDA) + water}, {1,2-diaminopropane (1,2-DAP) + water}, {1,3-diaminopropane (1,3-DAP) + water} or {1,4-diaminobutane (1,4-DAB) + water} binary mixtures, and of pure EDA, 1,2-DAP, 1,3-DAP, 1,4-DAB, and water components were measured by means of two static devices at temperatures between (293 and 363) K. The data were correlated with the Antoine equation. From these data, the excess Gibbs function (*GE*) was calculated for several constant temperatures and fitted to a fourth-order Redlich–Kister equation using the Barker's method. The {ethanediamine (EDA) + water}, and {1,2-diaminopropane (1,2-DAP) + water} binary systems show negative azeotropic behaviour. The aqueous solutions of EDA, 1,2-DAP, or 1,3-DAP exhibit negative deviations in *GE* for all investigated temperatures over the whole composition range whereas the (1,4-DAB + water) binary mixture shows negative *GE* for temperatures (293.15 < *T*/K < 353.15) and a sinusoidal shape for *GE* at *T* = 363.15 K.

Keywords :(Vapour + liquid) equilibria; Isoteniscope; Diamines; Water excess; Gibbs free energy.

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