

VAPOR LIQUID EQUILIBRIUM AND RESIDUE CURVE MAP FOR ACETIC ACID-WATER-ETHYL ACETATE TERNARY SYSTEM

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Abstract

Azeotropic behavior is relatively a common phenomenon, one of the most efficient methods of treating an azeotrope is the introduction of an entrainer (mass separation) through the process of heterogeneous azeotropic and/or extractive distillation. For the design of such a process the need of vapor liquid equilibrium (VLE) data remains of the fundamental importance. The number of ternary and quaternary VLE data available in the literature is very scarce in comparison with homogeneous binary VLE data. So the attempt is made to find experimental VLE data for the ternary system acetic acid-water-ethyl acetate at 301 K and 1 atm, by using modified form of Othmer's still apparatus and analyzed by refractive index method. The system becomes heteroazeotropic due to addition of ethyl acetate which acts as an entrainer. The obtained experimental VLE data was used to plot the residue curve map (RCM) which is a triangular diagram often used to describe the equilibrium relationships for ternary mixtures. Ternary diagrams makes an effective tool for the heuristic synthesis and shortcut design to separation processes. The RCM analysis is also used to estimate distillation parameters such as feed location, distillations regions etc.

Keywords : Experimental data; VLE; Ternary; Residue Curve Map