

DETERMINATION OF VLE DATA FOR MTBE-BENZENE SYSTEM AND PREDICTION OF THERMODYNAMIC CONSISTENCY

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ABSTRACT

MTBE (Methyl Tertiary Butyl Ether) is an additive that can be blended with gasoline to make it burn more cleanly so as to improve overall air quality. There is contamination with considerable amounts of aromatic hydrocarbons such as Benzene, Toluene and Xylene (all 3 forms) in MTBE which leads to enormous pollution problems. Hence B-T-X must be separated from MTBE before MTBE is blended with gasoline and therefore it is essential to know the vapor liquid equilibrium characteristics of MTBE-aromatic hydrocarbon system. In the present investigation, isobaric vapor liquid equilibrium data (T-x-y) for MTBE – Benzene system are generated. The behavioral pattern between mole fraction of MTBE in the binary mixture and refractive index of the mixture has been correlated with logarithmic relation and the refractive index measurement has been found to be a simple and reliable technique for composition measurements of the MTBE – Benzene system. The vapor pressure data for MTBE and Benzene system are extracted from HYSYS simulator and used in thermodynamic correlations to determine the non-ideal characteristics for both liquid and vapor phases and Gibbs-Duhem relation is adopted to check the validity of VLE data. It has been found that the experimental data is valid and thermodynamically consistent.

KEYWORDS: Vapor-liquid equilibrium, MTBE, Benzene, thermodynamic consistency