CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The modified hard sphere equation of state used in this study combines the analytical expression of Ishikawa et al. for the hard sphere repulsive term and the empirical attractive term of the Soave - Redlich-Kwong (SRK) equation of state. This equation possesses the qualities of realism and simplicity of the SRK equation, contains only two temperature dependent parameters and remains a cubic equation in terms of density (or volume). It is much simpler to use than the equations proposed by Ishkawa et al.(ICL).

This study emphasizes the following pure component properties: saturated liquid volume , saturated vapor volume, vapor pressure, and compressibility factor. The main conclusions may be stated as follows:

[1] The modified hard sphere equation predicts saturated liquid volumes as accurately as the hard sphere ICL equation and with better accuracy than the PR and SRK equations.

[2] The modified hard sphere equation predicts saturated vapor volumes as accurately as the hard sphere ICL and PR equations and more accurately than the SRK equation.

[3] The modified hard sphere equation predicts vapor pressure as accurately as the hard sphere ICL and PR equations and more accurately than the SRK equation.

[4] The modified hard sphere equation predicts compressibility factors of superheated vapor state as accurately as the ICL, PR and SRK equations at low temperatures and pressures.

The applicability of the modified hard sphere equation for predicting vapor-liquid equilibrium (VLE) values, indicates that the modified hard sphere equation is suitable for VLE calculations for systems containing light hydrocarbons.

Comparisons make on VLE values for four binary systems at twenty-eight isothermal conditions indicate that the modified hard sphere equation yields better representation of the data than the method of PR .

RECOMMENDATIONS

Further studies should be carried on as follows :

1) Study other pure components such as n-octane, benzene, acetylene, CO_2 , CO, O_2 , H_2 ,and ammonia etc. .

2) Use a binary interaction coefficient , c_{ij} , to calculate VLE for the purpose of accuracy.