Problem 10.44

Following are data for G^E and H^E (both in J/mol) for equimolar mixtures of the same organic liquids. Use all of the data to estimate values of G^E, H^E, and TS^E for the equimolar mixture at 25 deg C.

At T = 10 deg C, G^E = 544.0 and H^E = 932.1
At T = 30 deg C, G^E = 513.2 and H^E = 893.4
At T = 50 deg C, G^E = 494.2 and H^E = 845.9

Problem 12.3

The pressure above a mixture of ethanol and ethyl acetate at 70 deg C is measured to be 86 kPa. what are the possible compositions of the liquid and vapor phases?

Problem 12.4

The pressure above a mixture of ethanol and ethyl acetate at 70 deg C is measured to be 78 kPa. what are the possible compositions of the liquid and vapor phases?

Problem 13.1

Assuming the validity of Raoult's Law, do the following calculations for the benzene(1)/toluene(2) system:

(a) Given x_1=0.33 and T=100 deg C, find y_1 and P.
(b) Given y_1=0.33 and T=100 deg C, find x_1 and P.
(c) Given x_1=0.33 and P=120 kPa, find y_1 and T.
(d) Given y_1=0.33 and P=120 kPa, find x_1 and T.

Problem 13.6

Of the following liquid/vapor systems, which can be approximately modeled by Raoult's Law? For those which cannot, why? Table B.1 in Appendix B may be useful.

(a) Benzene/toluene at 1 atm.
(b) n-Hexane/n-heptane at 25 bar.
(c) Hydrogen/propane at 200 K.
(d) Isooctane/n-octane at 100 degC.
(e) Water/n-decane at 1 bar.