

CHE407: Separation Processes

Tutorial-7

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QUESTION (1)

A feed of 100 mol containing 50 mol% A and 50 mol% B is to be continuously flash-vaporized. Calculate the composition of both phases when 60% of the feed is vaporized. Solve this problem:

- Graphically.
- Analytically.

The equilibrium data are as follows where x and y are mole fraction of component A.

x_A	0	0.157	0.312	0.487	0.655	1.000
y_A	0	0.279	0.492	0.674	0.810	1.000

QUESTION (5)

A feed of 100 mol containing 50 mol% A, 25 mol% B and 25 mol% C is flashed vaporized at 1.0 atm and 100 °C. Calculate the amounts and composition of both phases. The vapor pressures at 100 °C are tabulated, as follows:

Substance	Vapor pressure in mmHg
A	1370
B	550
C	200

QUESTION (2)

Using MATLAB solve the following question:

- 11.7-2. (*Selected Topic*) **Boiling Point, Dew Point, and Flash Vaporization.** Following is the composition of a liquid feed in mole fraction: *n*-butane ($x_A = 0.35$), *n*-pentane ($x_B = 0.20$), *n*-hexane ($x_C = 0.25$), *n*-heptane ($x_D = 0.20$). At a pressure of 405.3 kPa calculate the following.
- Boiling point and composition of the vapor in equilibrium.
 - Dew point and composition of the liquid in equilibrium.
 - The temperature and composition of both phases when 60% of the feed is vaporized in a flash distillation.
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QUESTION (3)

Using Antoine Equation solve the following question:

- 11.3-5. **Steam Distillation of Benzene.** A mixture of 50 g mol of liquid benzene and 50 g mol of water is boiling at 101.32 kPa pressure. Liquid benzene is immiscible in water. Determine the boiling point of the mixture and the composition of the vapor. Which component will first be removed completely from the still?