

SOLUTION

CHE 305 – Separation Processes Spring 2010 – In Class on Distillation I

Use the McCabe-Thiele technique to step off stages in a rectifier for the purification of hexane from octane. It is desired to produce a product 95% pure in hexane. The rectifier has a total condenser, a reflux ratio of 2, and is operated at a uniform pressure of 1 bar. The feed to the column is 100 mol/hr (all vapor). What is the lowest possible liquid composition that can exit the bottom of the rectifier?

(XY Phase Diagram attached)

$$X_D = 0.95 \checkmark$$

$$R = 2 \checkmark$$

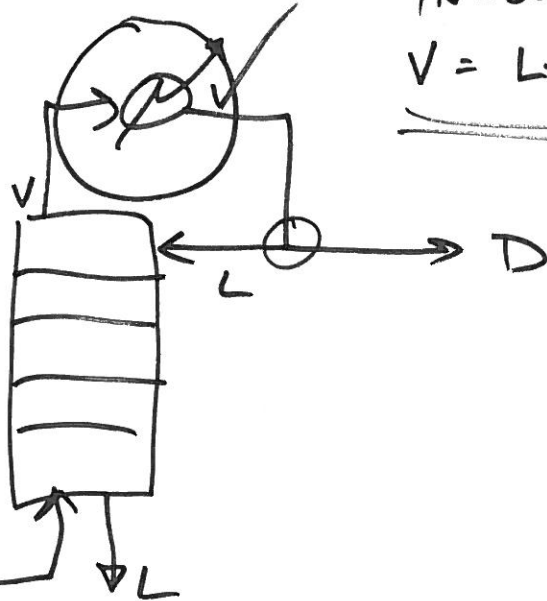
$$P = 1 \text{ bar} \checkmark$$

$$\phi = 1 \checkmark$$

$$X_1 = 0.13$$

$$IN = OUT$$

$$V = L + D$$



$$100 \frac{\text{mol}}{\text{hr}} = F$$

$$\text{Slope} = \frac{R}{R+1} = \frac{2}{2+1} = \frac{2}{3}$$

XY Phase Diagram for n-hexane (1) and n-octane (2) at 1 bar

