PS – Gas Absorptium

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Conteúdo

1 Absorptium

$$(g) \underset{\text{Desabsorptium}}{\overset{\text{Absorptium}}{\rightleftharpoons}} (l)$$

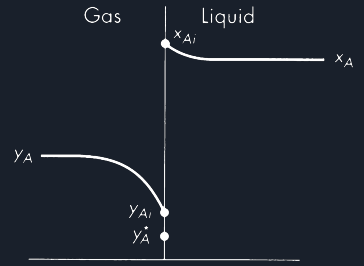
- Mass transference between the gas phase and the liquid phase
- $\overrightarrow{N_A}$: Vector that points in the direction of the absorptium
- *Stripping*: Reverse of absorptium

Tipos de absorção:

Absorção Física: Gases muito solúveis; NH_3 + Water

Absorção Química: Gases pouco solúveis; SO_2 + Water

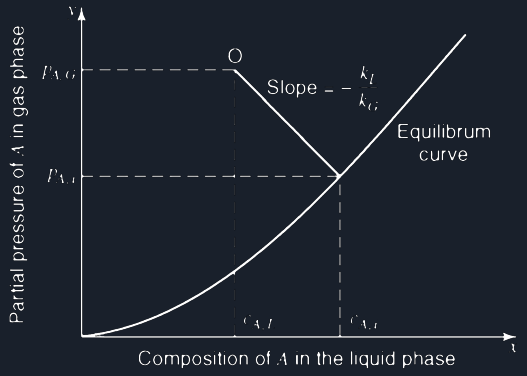
1.1 r: Rate of absorptium



$$\begin{cases} r = k_y \ a\,(y - y_i) \\ r = k_x \ a\,(x_i - x) \\ r = K_y \ a\,(y - y^*) \\ r = K_x \ a\,(x^* - y) \end{cases}$$

x, y: Mole fraction of component being absorbed

1.2 N_A: Flux of absorptium



$$\begin{cases} N_A = k_g \quad a\,(p_{A,g} - p_{A,i}) \\ N_A = k_l \quad a\,(c_{A,i} - c_{A,l}) \\ N_A = K_g \quad a\,(p_{A,g} - p_A^*) \\ N_A = K_l \quad a\,(c_A^* - c_{A,l}) \end{cases}$$

k : Solo

K : Global

$$\frac{1}{K_y\,a} = \frac{1}{k_y\,a} + \frac{m}{k_x\,a}; \qquad \frac{1}{K_x\,a} = \frac{1}{k_x\,a} + \frac{1}{m\,k_y\,a};$$

m : Local equilibrium slope

$1/k_y\,a$: Resistance of mass transfer in the gas film

$1/m\,k_x\,a$: Resistance of mass transfer in the liquid film

1.3 Henry's Law

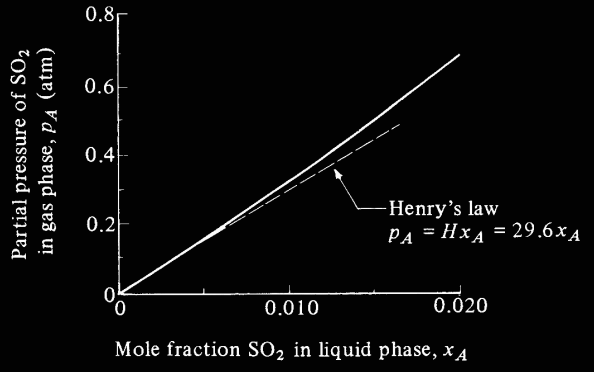


FIGURE 10.2-1. *Equilibrium plot for SO_2–water system at 293 K (20°C).*

$$y_A = m\,x_A; \quad m = p_A^*/p_t$$

$$y_a = m\,x_a \begin{cases} y_A^* = m\,x_A \\ y_A = m\,x_A^* \end{cases}$$

- From the given equation $y_a = m\,x_a$ we derive the equations with y_A^*