MATERIAL DE CONSULTA

Equação diferencial da continuidade de A:

Coordenadas retangulares:

$$\frac{\partial C_A}{\partial t} + \frac{\partial N_{A,x}}{\partial x} + \frac{\partial N_{A,y}}{\partial y} + \frac{\partial N_{A,z}}{\partial z} = R_A''' \qquad \frac{\partial \rho_A}{\partial t} + \frac{\partial n_{A,x}}{\partial x} + \frac{\partial n_{A,y}}{\partial y} + \frac{\partial n_{A,z}}{\partial z} = r_A'''$$

Coordenadas cilíndricas:

$$\frac{\partial C_A}{\partial t} + \left[\frac{1}{r}\frac{\partial (rN_{A,r})}{\partial r} + \frac{1}{r}\frac{\partial N_{A,\theta}}{\partial \theta} + \frac{\partial N_{A,z}}{\partial z}\right] = R_A''' \qquad \frac{\partial \rho_A}{\partial t} + \left[\frac{1}{r}\frac{\partial (rn_{A,r})}{\partial r} + \frac{1}{r}\frac{\partial n_{A,\theta}}{\partial \theta} + \frac{\partial n_{A,z}}{\partial z}\right] = r_A'''$$

Coordenadas esféricas:

$$\frac{\partial C_A}{\partial t} + \left[\frac{1}{r^2}\frac{\partial (r^2 N_{A,r})}{\partial r} + \frac{1}{r\,\mathrm{sen}\,\theta}\frac{\partial (N_{A,\theta}\ \mathrm{sen}\,\theta)}{\partial \theta} + \frac{1}{r\,\mathrm{sen}\,\theta}\frac{\partial N_{A,\phi}}{\partial \phi}\right] = R_A'''$$

$$\frac{\partial \rho_A}{\partial t} + \left[\frac{1}{r^2}\frac{\partial (r^2 n_{A,r})}{\partial r} + \frac{1}{r\,\mathrm{sen}\,\theta}\frac{\partial (n_{A,\theta}\ \mathrm{sen}\,\theta)}{\partial \theta} + \frac{1}{r\,\mathrm{sen}\,\theta}\frac{\partial n_{A,\phi}}{\partial \phi}\right] = r_A'''$$

Equação diferencial da continuidade em termos da lei da Fick:

$$\frac{\partial C_A}{\partial t} + \vec{\nabla}\left(-D_{AB}\vec{\nabla} C_A\right) + \vec{\nabla} C_A \vec{V} - R_A''' = 0 \qquad \frac{\partial \rho_A}{\partial t} + \vec{\nabla}\left(-D_{AB}\vec{\nabla} \rho_A\right) + \vec{\nabla} \rho_A \vec{v} - r_A''' = 0$$

Equação do fluxo global de A

$$\overrightarrow{N_A} = -D_{AB}\vec{\nabla} C_A + y_A\left(\overrightarrow{N_A} + \overrightarrow{N_B}\right) \qquad \overrightarrow{n_A} = -D_{AB}\vec{\nabla} \rho_A + w_A\left(\overrightarrow{n_A} + \overrightarrow{n_B}\right)$$

Constante universal dos gases ideais:

$$R = 8{,}314\ \frac{J}{mol.K} = 8{,}314\frac{m^3.Pa}{mol.K} = 8{,}314.10^{-2}\ \frac{L.bar}{mol.K} = 82{,}06\frac{cm^3 atm}{mol.K} = 62{,}36\frac{L.mmHg}{mol.K}$$

Conversões de unidades:

$$1\ atm = 1{,}013\ bar = 1{,}013.10^5\ Pa = 101{,}3\ kPa = 760\ mmHg = 1{,}013\ \frac{kgf}{cm^2} = 14{,}7\ psi$$

$$1\ m^3 = 1000\ L = 1000\ dm^3 = 10^6\ cm^3$$