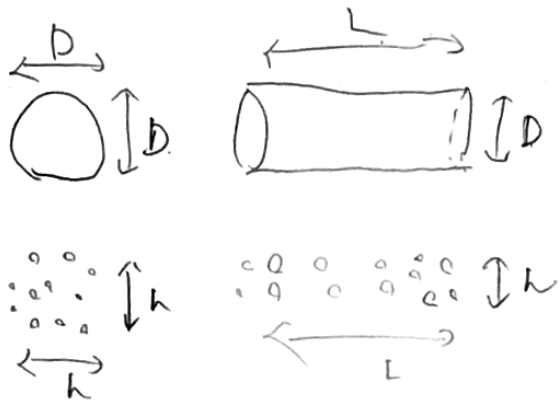
化学工学技士(基礎) 2021 - B.

B1 1) 限界粒子軌跡、



$$\eta = \frac{hL}{DL} = \frac{h}{D} \quad //$$

$$\eta = \frac{\frac{\pi h^2}{4}}{\frac{\pi D^2}{4}} = \left(\frac{h}{D}\right)^2 \quad //$$

2)

$$l = \frac{\alpha}{\frac{\pi}{4} D_f^2} = \frac{4\alpha}{\pi D_f^2} \quad //$$

$$l D_f W H \Delta x \times C \times \eta \times u = C u \eta l D_f W H \Delta x \quad //$$

$$u_0 W H \{C(x) - C(x+\Delta x)\} = C u \eta l D_f W H \Delta x$$

$$\frac{1}{C} \frac{C(x) - C(x+\Delta x)}{\Delta x} = \frac{u}{u_0} \eta \frac{4\alpha}{\pi D_f}$$

$$= \eta \times \frac{4\alpha}{\pi D_f (1-\alpha)} = m \quad //$$

$\Delta x \to 0$ に近づけると

$$\frac{dC}{C} = -m dx$$

$$\ln \frac{C}{C_0} = -m(x - x_0) = -mL$$

$$C = C_0 e^{-mL} \quad //$$

$$E = \frac{C_0 - C}{C_0} = 1 - \frac{C}{C_0} = 1 - e^{-mL} \quad //$$