

BI

(a) $N_{A\delta} = -N_{A\gamma}$

(b) $N_{A\delta} = -cD_{AB} \frac{d\gamma_A}{d\delta} + \gamma_A(N_A + N_B) = -cD_{AB} \frac{d\gamma_A}{d\delta}$

$N_{A\delta} = N_{A\delta} \beta$ (βは定数)

$\frac{dN_{A\delta}}{d\delta} = \frac{d(N_{A\delta} \beta)}{d\delta} = \beta \frac{dN_{A\delta}}{d\delta} = 0$

∴ $\frac{d^2 \gamma_A}{d\delta^2} = 0$

$\frac{d\gamma_A}{d\delta} = L = \frac{N_{A\delta}}{-cD_{AB}}$
 $\gamma_A = L\delta + C$ (Cは積分定数)

B.C. $\delta = 0$ $\gamma_A = \gamma_{A\delta}$ ∴ $C = \gamma_{A\delta}$

∴ $\gamma_A = -\frac{N_{A\delta}}{cD_{AB}} \delta + \gamma_{A\delta}$

B.C. $\delta = \delta$ $\gamma_A = \gamma_{A\delta}$

$\gamma_{A\delta} = -\frac{N_{A\delta}}{cD_{AB}} \delta + \gamma_{A\delta} = \frac{N_{A\delta}}{cK}$

∴ $N_{A\delta} = \frac{\gamma_{A\delta}}{\left(\frac{1}{cK} + \frac{\delta}{cD_{AB}}\right)} = \frac{c\gamma_{A\delta}}{\frac{1}{K} + \frac{\delta}{D_{AB}}}$

Kn非常に大 $\delta < \lambda$ ∴ $\frac{1}{K} \ll \frac{\delta}{D_{AB}}$ ∴ $N_{A\delta} = \frac{c\gamma_{A\delta}}{\delta} D_{AB}$ 拡散律速

Kn小さい $\frac{1}{K} \gg \frac{\delta}{D_{AB}}$ ∴ $N_{A\delta} = Kc\gamma_{A\delta}$ 反応律速