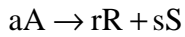


# Chap 9

9.1

가



,  $T_1$

$T_2$

$$\Delta H_{r2} = -(\text{H}_2 - \text{H}_1)_{\text{reactants}} + \Delta H_{r1} + (\text{H}_2 - \text{H}_1)_{\text{products}}$$

$$\Delta H_{r2} = \Delta H_{r1} + \int_{T_1}^{T_2} \nabla C_p dT$$

$$\nabla C_p = rC_{pR} + sC_{pS} - aC_{pA}$$

$$C_{pi} = \alpha_i + \beta_i T + \gamma_i T^2$$

$T_2$

$$\Delta H_{r2} = \Delta H_{r1} + \int_{T_1}^{T_2} (\nabla \alpha + \nabla \beta T + \nabla \gamma T^2) dT$$

$$= \Delta H_{r1} + \nabla \alpha (T_2 - T_1) + \frac{\nabla \beta}{2} (T_2^2 - T_1^2) + \frac{\nabla \gamma}{3} (T_2^3 - T_1^3)$$

T

$\Delta G^\circ$

$$\Delta G^\circ = r\Delta G_R^\circ + s\Delta G_S^\circ - a\Delta G_A^\circ = -RT \ln K = -RT \ln \frac{(f/f^\circ)_R^r (f/f^\circ)_S^s}{(f/f^\circ)_A^a}$$

$f^\circ$

fugacity

$$K_f = \frac{f_R^r f_S^s}{f_A^a}, \quad K_p = \frac{p_R^r p_S^s}{p_A^a}, \quad K_y = \frac{y_R^r y_S^s}{y_A^a}, \quad K_C = \frac{C_R^r C_S^s}{C_A^a}$$

$$K_f = K_p$$

$$K = \frac{K_p}{\{p^\circ = 1 \text{ atm}\}^{\Delta n}} = \frac{K_y \pi^{\Delta n}}{\{p^\circ = 1 \text{ atm}\}^{\Delta n}} = \frac{K_C (RT)^{\Delta n}}{\{p^\circ = 1 \text{ atm}\}^{\Delta n}}$$

$$\frac{d(\ln K)}{dT} = \frac{\Delta H_r}{RT^2}$$

$$\Delta H_r$$

$$\ln \frac{K_2}{K_1} = -\frac{\Delta H_r}{R} \left( \frac{1}{T_2} - \frac{1}{T_1} \right)$$

$$\Delta H_r$$

가

$$\ln \frac{K_2}{K_1} = \frac{1}{R} \int_{T_1}^{T_2} \frac{\Delta H_r}{T^2} dT$$

$$\Delta H_r \text{ 가}$$

$$\Delta H_r = \Delta H_{r0} + \int_{T_0}^T \nabla C_p dT$$

$$R \ln \frac{K_2}{K_1} = \nabla \alpha \ln \frac{T_2}{T_1} + \frac{\nabla \beta}{2} (T_2 - T_1) + \frac{\nabla \gamma}{6} (T_2^2 - T_1^2)$$

$$+ \left( -\Delta H_{r0} + \nabla \alpha T_0 + \frac{\nabla \beta}{2} T_0^2 + \frac{\nabla \gamma}{3} T_0^3 \right) \left( \frac{1}{T_2} - \frac{1}{T_1} \right)$$

9.2

가

가

가

9.3

(MFR

PFR

9.4 )

1.  $X_A$  T

2.  $X_A$  . (

가

.)

3.  $1/(-r_A)$   $X_A$  .

4. .

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가

$C_p'$  : A 1

$C_p''$  : A 1

$H'$  : A 1

$$\begin{aligned} H'' & : & A & 1 \\ \Delta H_{ri} & : & A & 1 & T_i \end{aligned}$$

9.6

$T_1$

가

$$H_1' = C_p'(T_1 - T_1) = 0$$

$$(X_A)$$

$$H_2'' X_A + H_2'(1 - X_A) = C_p''(T_2 - T_1)X_A + C_p'(T_2 - T_1)(1 - X_A)$$

$$\Delta H_{r1} X_A$$

$$0 = [C_p''(T_2 - T_1)X_A + C_p'(T_2 - T_1)(1 - X_A)] + \Delta H_{r1} X_A = 0$$

$$X_A = \frac{C_p' \Delta T}{-\Delta H_{r1} - (C_p'' - C_p') \Delta T}$$

9.7

9.7

$$C_p' - C_p'' = 0$$

$$X_A = \frac{C_p \Delta T}{-\Delta H_r}$$

$$C_p / -\Delta H_r$$

$X_A$  가

i) PFR

가 ,  $1/(-r_A)$   $X_A$  가 .

ii) MFR

MFR

, 가 가  
가  $C_p / -\Delta H_r$

, x 가 .

가

( 9.8(a)): PFR

가

(

9.8(b)) :

Recycle Reactor

가

가

( $C_p / -\Delta H_r$  가

): MFR

A 1

Q

$$X_A = \frac{C_p \Delta T - Q}{-\Delta H_{r2}}$$

가 Q

( )

MFR

$-r_A$

$\tau$

$$\left( \tau = C_{A0} \frac{X_A}{-r_A(X_A)} \right)$$

9.13

S

)

9.14

(  
가

가

M''

M'

M'''

(ignition point)

9.4-9.7 :