

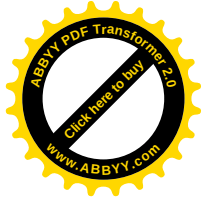
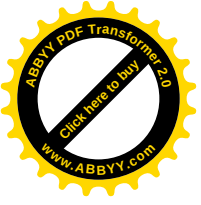
KESETIMBANGAN KIMIA

Tinjauan Termodinamika

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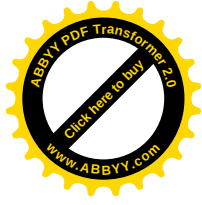
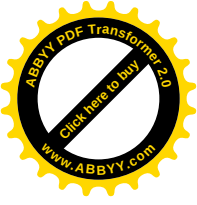
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TUJUAN MATERI

- Menerapkan prinsip – prinsip termodinamika dalam reaksi kimia
- Memperkenalkan konsep potensial kimia



FUNGSI GIBBS REAKSI



$$dG = \mu_A dn_A + \mu_B dn_B$$

Dimana dG = perubahan Gibbs molar parsial zat dlm campuran

dn_A, dn_B = perubahan kuantitas A, B

μ_A, μ_B = potensial kimia A, B

$\partial \xi$ = tingkat reaksi

Kemiringan fungsi gibbs saat tingkat reaksi berubah

$$\frac{\partial G}{\partial \xi}_{p,T} = \mu_B - \mu_A \quad \text{Jika } \mu_A > \mu_B \text{ reaksi berlangsung } A \longrightarrow B$$

Jika $\mu_A < \mu_B$ reaksi berlangsung $A \longleftarrow B$

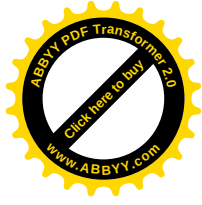
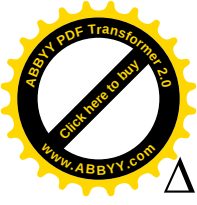
$\mu_A = \mu_B$ reaksi kesetimbangan

$$\Delta G_r = \mu_B - \mu_A$$

ΔG_r = kemiringan fungsi gibbs reaksi
perubahan G, kehilangan 1 mol A dan
pembentukan 1 mol B

$\Delta G_r = 0$ jika produk terbentuk dr reaktan pd komposisi kesetimbangan campuran rx

$$G_r^0 = \mu_B^0 - \mu_A^0$$



$\Delta G_r < 0$ reaksi berlangsung $A \longrightarrow B$, rx eksergonik

$\Delta G_r > 0$ reaksi berlangsung $A \longleftarrow B$, rx endergonik

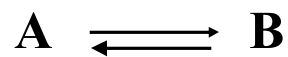
$$\Delta G^\circ = \Delta G_f^\circ(B) - \Delta G_f^\circ(A)$$

Dimana ΔG° = selisih fungsi gibbs molar standar produk dan reaktan

$\Delta G_f^\circ(A)$ = fungsi gibbs pembentukan standar reaktan murni A

$\Delta G_f^\circ(B)$ = fungsi gibbs pembentukan standar produk murni B

Komposisi Reaksi Dalam Kestimbangan



A, B gas sempurna

$$\Delta G_r = \mu_B - \mu_A$$

$$= \mu_B^\circ + RT \ln \frac{P_B}{P^\circ} - \mu_A^\circ + RT \ln \frac{P_A}{P^\circ}$$

$$\Delta G = \Delta G^\circ + RT \ln Q$$

Q_p = Quosien reaksi =
perbandingan tekanan parsial

$$= \Delta G^\circ + RT \ln \frac{P_B}{P_A}$$

$$\Delta G_r = \Delta G^\circ + RT \ln Q_p$$