

صفحة القوانين ثابتة (201)

$\Delta E = q + w$   
 $w =$  work done  
 $q =$  heat  
 $\Delta E =$  الطاقة الداخلية  
 $\Delta E = J$

$w = -P \Delta V$   
 $V =$  volume  
 $P =$  pressure  
 $w = J$

$\Delta E = \Delta H - RT \Delta n$   
 $(n =$  متفاعلات - نواتج)  
 $(R = 8,314 J/K)$  تحويل  
 $\Delta E = kJ/mol$

$C = ms$   
 $q = C \Delta t$   
 $q = ms \Delta t$   
 $C =$  السعة الحرارية  
 $S =$  الحرارة النوعية  $\xrightarrow{\text{تحويل}} J/g \cdot C^\circ$   
 $q =$  كمية الحرارة  
 $m =$  mass

$\Delta H_{rxn} = \sum n \Delta H_f^\circ(\text{Product}) - \sum m \Delta H_f^\circ(\text{reactant})$   
 direct method  
 طريقة مباشرة  
 $\left. \begin{matrix} \text{AL} \\ \text{C} \\ \text{I}_2 \end{matrix} \right\} \rightarrow \text{Zero}$

Hess Law  
 indirect method  
 طريقة غير مباشرة

$\Delta S_{rxn} = \sum n S^\circ(\text{Product}) - \sum m S^\circ(\text{reactant})$   
 $(J/K \cdot mol)$  الخ  $\left. \begin{matrix} \text{AL} \\ \text{C} \\ \text{I}_2 \end{matrix} \right\} \rightarrow$  لها قيمة

$\Delta G^\circ_{rxn} = \sum n G^\circ(\text{Product}) - \sum m G^\circ(\text{reactant})$   
 $(kJ/mol)$  الخ  $\left. \begin{matrix} \text{AL} \\ \text{O}_2 \\ \text{I}_2 \end{matrix} \right\} \rightarrow \text{Zero}$

$\Delta S = \frac{\Delta H}{T_f}$   
 fusion or vaporation  
 $\Delta H =$  molar Heat

$\Delta G^\circ = -RT \ln |K|$   
 $R = 8,314$   
 $K =$  ثابتة

$\Delta G = \Delta G^\circ + RT \ln |Q|$   
 $Q = \frac{\text{نواتج}}{\text{متفاعلات}} = \frac{[C][D]}{[A][B]}$   
 إذا الجواب موجب ( $\leftarrow$  to the left) اتجاه التفاعل  
 // // ( $\rightarrow$  to the right) سالب // //

صفحة قوانين ثابتة (3)

$\text{Percent by mass} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 100$	
$A = X_A = \frac{\text{moles of A}}{\text{Sum of mole A1 the compound}}$	mole fraction
$\frac{\text{moles of solute}}{\text{Liters of solution}}$	molarity mol/L
$\frac{\text{moles of solute}}{\text{mass of solvent}}$	molality mol/Kg
$\Delta T_b = K_b \cdot m$	Boiling point elevation
$\Delta T_f = K_f \cdot m$	Freezing " "
$P_{\text{solution}} = X_{\text{solvent}} \cdot P^{\circ}_{\text{solvent}}$	$P^{\circ}$ = الضغط النقي البخاري non-volatile
$P_{\text{solution}} = X_{\text{solute}} \cdot P^{\circ}_{\text{solute}} + X_{\text{solvent}} \cdot P^{\circ}_{\text{solvent}}$ <p style="text-align: center;"> <math>\swarrow</math> <math>\searrow</math>                  متطاير      غير متطاير             </p>	Volatile
$\Pi = M R T$	M = مولارية R = ثابت T = درجة الحرارة الباز الأسموزي
$\Delta t_b = i K_b \cdot m$ $\Delta t_f = i K_f \cdot m$	
$P_{\text{solution}} = X = \frac{n_{\text{solvent}}}{n_{\text{solvent}} + i n_{\text{solute}}} \cdot P^{\circ}$	electrolyte vant hoff
$P_{\text{solute}} = X = \frac{n_{\text{solvent}}}{n_{\text{solvent}} + i n_{\text{solute}}} \cdot P^{\circ} + X = \frac{i n_{\text{solute}}}{i n_{\text{solute}} + n_{\text{solvent}}} \cdot P^{\circ}$	
$\Pi = i M R T$	

$$\text{Rate} = \frac{-\Delta[A]}{a \cdot \Delta t} = \frac{\Delta[B]}{b \cdot \Delta t}$$

(موجب) النواتج (سالبي) المتفاعلات

$$\text{Rate} = k[A]^x[B]^y$$

rate law

- ① rate Law
- ② k
- ③ Rate

$x = A \text{ رتبة}$   
 $y = B \text{ رتبة}$  → (رتبة التفاعل  $x+y$ )

$$\ln[A] = -kt + \ln[A_0]$$

$\downarrow$        $\downarrow$   $\downarrow$        $\downarrow$   
 $y$        $m$     $x$    +    $b$

First order Reactions

$$\ln \left| \frac{A}{A_0} \right| = -k t$$

First order

إذا كان  $\ln$  يغير الوقت

$$t_{1/2} = \frac{0,693}{k}$$

reaction half-time

$$[A]_t = -kt + [A_0]$$

Zero order

$$\ln \left| \frac{k_1}{k_2} \right| = \frac{E_a}{R} \left( \frac{T_1 - T_2}{T_1 T_2} \right)$$

$R = 8,314 \text{ J/kmol}$

$$\ln k = \left( \frac{-E_a}{R} \right) \left( \frac{1}{T} \right) + \ln A$$

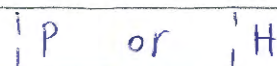
(رسم)

$$\ln |N| = \ln |N_0| - k t$$

$N = \text{number of Atoms}$  (درجة أولى)

$$t_{1/2} = \frac{0,693}{\lambda}$$

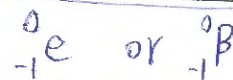
Proton



neutron



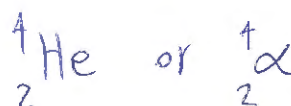
electron



Positron



( $\alpha$ ) particular



$$\ln|K| = \frac{nE^\circ}{0,0257V}$$

Equilibrium constant أوجد

$$E^\circ_{\text{cell}} = \frac{0,0257V}{n} \ln|K|$$

أوجد الطاقة

$$\Delta G^\circ = -nFE$$

Free-energy change أوجد

$$F = 96500 \text{ J/V}\cdot\text{mol}$$

$$E = E^\circ_{\text{cell}} - \frac{0,0257}{n} \ln|Q|$$

$E = \text{emf}$

$$Q = \frac{[J][E]}{[E][J]} \text{ (انشطه إذا كان العنصر غير متأكس)}$$

Fe, Cl, Al

$$C = A \cdot S$$

No of Coloumb = No of Amber X No of second

تحويل

1 mol of electrons = 1 Faraday

1 Faraday = 96500 Coloumb

$$PV = nRT$$