

List of Equations

Van't Hoff Equation: $\ln(K_1/K_2) = \Delta H/R \cdot (1/T_2 - 1/T_1)$

Gas constant: $R = 1.987 \text{ cal mole}^{-1} \text{ K}^{-1}$, $8.314 \text{ J mole}^{-1} \text{ K}^{-1}$, $0.082 \text{ L atm mole}^{-1} \text{ K}^{-1}$

$-\log(\gamma) = (0.5Z^2\mu^{0.5})/(1+\mu^{0.5})$

$\Delta G = \Delta G^{\circ} + RT\ln(Q)$

C 12

H 1

$\Delta G^{\circ} = -RT\ln K$

O 16

N 14

$PV = nRT$

S 32

Cl 35.5

$\Delta G^{\circ} = \sum_{\text{Pr oducts}} n_i \Delta G_{f-i}^{\circ} - \sum_{\text{Re ac tan ts}} n_i \Delta G_{f-i}^{\circ}$

Hg 200

Constants, conversions

$Q = \frac{\prod [\text{Pr oducts}]^{n_i}}{\prod [\text{Re ac tan ts}]^{n_i}}$

$R = 1.987 \text{ cal/mol-K}$

$= 8.314 \text{ J/mol-K}$

$= 0.082 \text{ L-atm/mole-K}$

$\text{pX} = -\log([X])$

$1 \text{ inch} = 2.54 \text{ cm}$

$T(^{\circ}\text{K}) = 273 + T(^{\circ}\text{C})$

$1 \text{ gallon} = 3.78 \text{ L}$

$G = H - TS$

$\text{Alk} = [\text{HCO}_3^-] + 2[\text{CO}_3^{2-}] + [\text{OH}^-] - [\text{H}^+]$

$\text{Alk} = \Sigma[\text{Cations}] - \Sigma[\text{Anions}]$

$\text{Carbonate alkalinity} = [\text{CO}_3^{2-}] + [\text{OH}^-] - [\text{H}^+] - [\text{H}_2\text{CO}_3]$

$\text{Caustic Alkalinity} = [\text{OH}^-] - [\text{HCO}_3^-] - 2[\text{H}_2\text{CO}_3] - [\text{H}^+]$

$$\alpha_0 = \frac{[H^+]^2}{[H^+]^2 + K_{a1}[H^+] + K_{a1}K_{a2}}$$

$I = \frac{1}{2} \sum C_i z_i^2$

$$\alpha_1 = \frac{K_{a1}[H^+]}{[H^+]^2 + K_{a1}[H^+] + K_{a1}K_{a2}}$$

$$\alpha_2 = \frac{K_{a1}K_{a2}}{[H^+]^2 + K_{a1}[H^+] + K_{a1}K_{a2}}$$

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