

Calcolo del pH

di una soluzione del sale MHA

$$[\text{H}^+]^2 = \frac{K_{a2}[\text{HA}^-] + K_w}{1 + \frac{[\text{HA}^-]}{K_{a1}}}$$

di una soluzione del sale MH₂A

$$[\text{H}^+]^2 = \frac{K_{a2}[\text{H}_2\text{A}^-] + K_w}{1 + \frac{[\text{H}_2\text{A}^-]}{K_{a1}}}$$

di una soluzione del sale M₂HA

$$[\text{H}^+]^2 = \frac{K_{a3}[\text{HA}^{2-}] + K_w}{1 + \frac{[\text{HA}^{2-}]}{K_{a2}}}$$

Formule di Bjerrum

per un acido monoprotico

$$[\text{HA}] = [\text{HA}]_0 \frac{[\text{H}^+]}{[\text{H}^+] + K_{a1}}$$

$$[\text{A}^-] = [\text{HA}]_0 \frac{K_{a1}}{[\text{H}^+] + K_{a1}}$$

per un acido diprotico

$$[\text{H}_2\text{A}] = [\text{H}_2\text{A}]_0 \frac{[\text{H}^+]^2}{[\text{H}^+]^2 + K_{a1}[\text{H}^+] + K_{a1}K_{a2}}$$

$$[\text{HA}^-] = [\text{H}_2\text{A}]_0 \frac{K_{a1}[\text{H}^+]}{[\text{H}^+]^2 + K_{a1}[\text{H}^+] + K_{a1}K_{a2}}$$

$$[\text{A}^{2-}] = [\text{H}_2\text{A}]_0 \frac{K_{a1}K_{a2}}{[\text{H}^+]^2 + K_{a1}[\text{H}^+] + K_{a1}K_{a2}}$$

per un acido triprotico

$$[\text{H}_3\text{A}] = [\text{H}_3\text{A}]_0 \frac{[\text{H}^+]^3}{[\text{H}^+]^3 + K_{a1}[\text{H}^+]^2 + K_{a1}K_{a2}[\text{H}^+] + K_{a1}K_{a2}K_{a3}}$$

$$[\text{H}_2\text{A}^-] = [\text{H}_3\text{A}]_0 \frac{K_{a1}[\text{H}^+]^2}{[\text{H}^+]^3 + K_{a1}[\text{H}^+]^2 + K_{a1}K_{a2}[\text{H}^+] + K_{a1}K_{a2}K_{a3}}$$

$$[\text{HA}^{2-}] = [\text{H}_3\text{A}]_0 \frac{K_{a1}K_{a2}[\text{H}^+]}{[\text{H}^+]^3 + K_{a1}[\text{H}^+]^2 + K_{a1}K_{a2}[\text{H}^+] + K_{a1}K_{a2}K_{a3}}$$

$$[\text{A}^{3-}] = [\text{H}_3\text{A}]_0 \frac{K_{a1}K_{a2}K_{a3}}{[\text{H}^+]^3 + K_{a1}[\text{H}^+]^2 + K_{a1}K_{a2}[\text{H}^+] + K_{a1}K_{a2}K_{a3}}$$

Equazione di van 't Hoff

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

Equazione di Clausius-Clapeyron

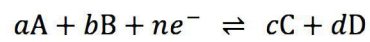
$$\ln \frac{p_1}{p_2} = -\frac{\Delta H_{\text{vap}}^\circ}{R} \left(\frac{1}{T_1} + \frac{1}{T_2} \right)$$

Relazioni tra ΔE° , ΔG° e K

$$\Delta G^\circ = -nF\Delta E^\circ$$

$$\Delta E^\circ = \frac{RT}{nF} \ln K$$

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

Equazione di Nernst

$$E = E^\circ - \frac{RT}{nF} \ln \frac{[C]^c [D]^d}{[A]^a [B]^b}$$