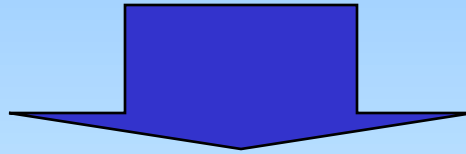
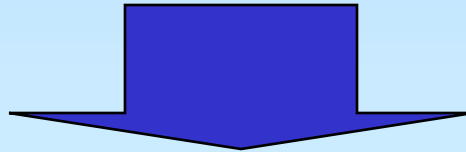


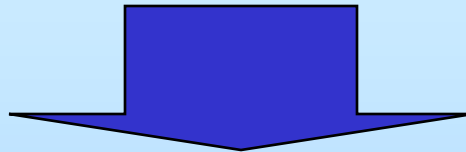
Equilibrios de distribución líquida-líquida



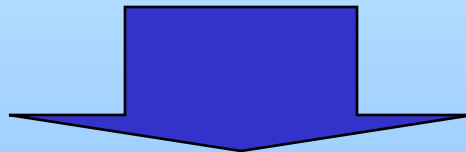
Ecuación de distribución de Nernst



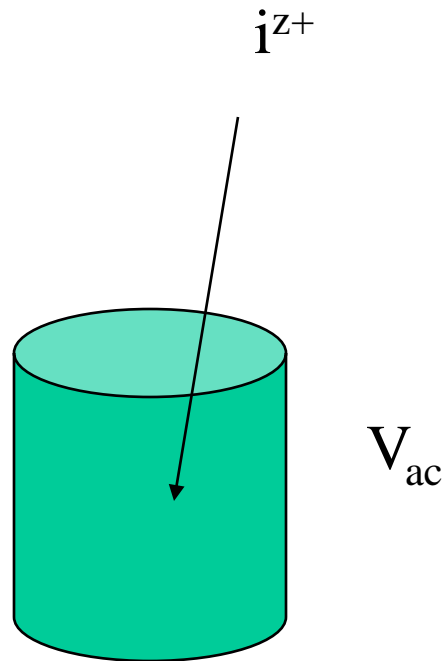
Definición de $f = (n_{\text{extraída}}/n_0) = f(K_D, p(V_{\text{org}}/V_{\text{ac}}), \text{pH})$



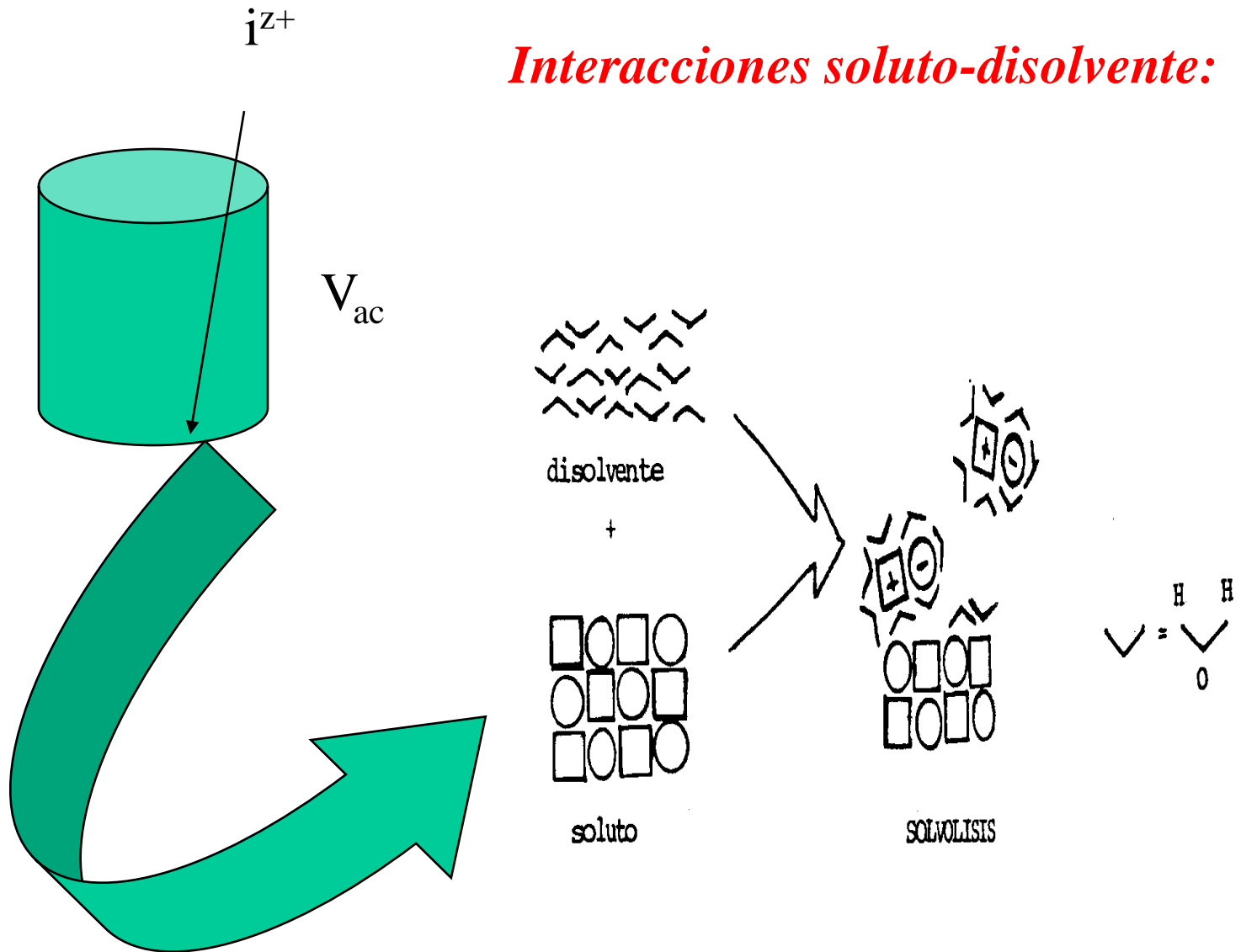
Gráficas $\log (f/1-f) = f(\text{pH}, p(V_{\text{org}}/V_{\text{ac}})) \rightarrow \text{pH}_{1/2}$



PROCESO I: FORMACIÓN DE DISOLUCIONES (QA I):



Interacciones soluto-disolvente:



Energía libre de Gibbs de solvatación por mol: “propiedad molar Parcial”:

Potencial electroquímico

$$\bar{\mu}_{ac} = \mu_{quim} + zF\phi_a$$

Interacción química soluto-disolvente

Energía libre de Gibbs de solvatación por mol: “propiedad molar Parcial”:

Potencial electroquímico

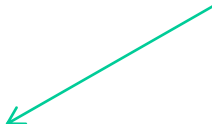
$$\bar{\mu}_{ac} = \mu_{quim} + zF\phi_a$$

Interacción eléctrica *soluto-disolvente*

Interacción química *soluto-disolvente*

Energía libre de Gibbs de solvatación por mol: “propiedad molar Parcial”:

Potencial electroquímico


$$\bar{\mu}_{ac} = \mu_{quim} + zF\phi_a = \mu_{i(a)}^{\circ} + RT \ln a_{i(a)} + zF\phi_a ;$$

Energía libre de Gibbs de solvatación por mol: “propiedad molar Parcial”

$$\bar{\mu}_{ac} = \mu_{quim} + zF\phi_a = \mu_{i(a)}^{\circ} + RT \ln a_{i(a)} + zF\phi_a ;$$

Potencial electroquímico

μ = potencial electroquímico

μ° = potencial químico estándar

R = constante de los gases

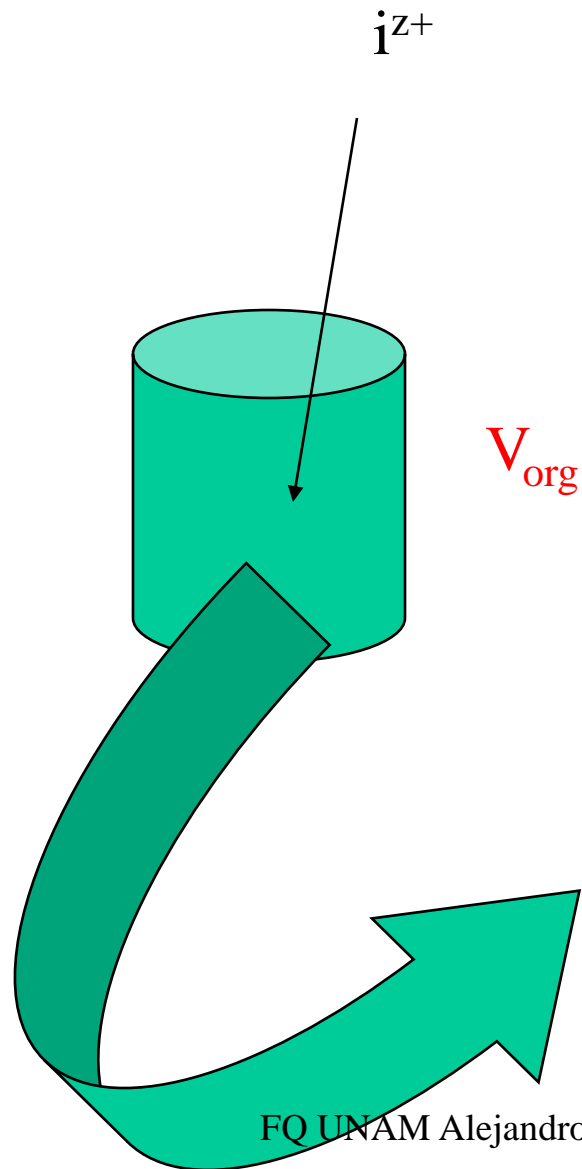
$a_{i(ac)}$ = actividad de i -ésima especie en agua

z = carga de la i -ésima especie

F = constante de Faraday

ϕ_a = potencial interno del agua.

Ahora en disolvente organico:



Energía libre de Gibbs de solvatación por mol: “propiedad molar Paricial”

$$\overline{\mu}_{\text{org}} = \mu_{\text{quim}} + zF\phi_{\text{org}} = \mu_{i(\text{org})}^{\circ} + RT \ln a_{i(\text{org})} + zF\phi_{\text{org}} ;$$

μ = potencial electroquímico

μ° = potencial químico estándar

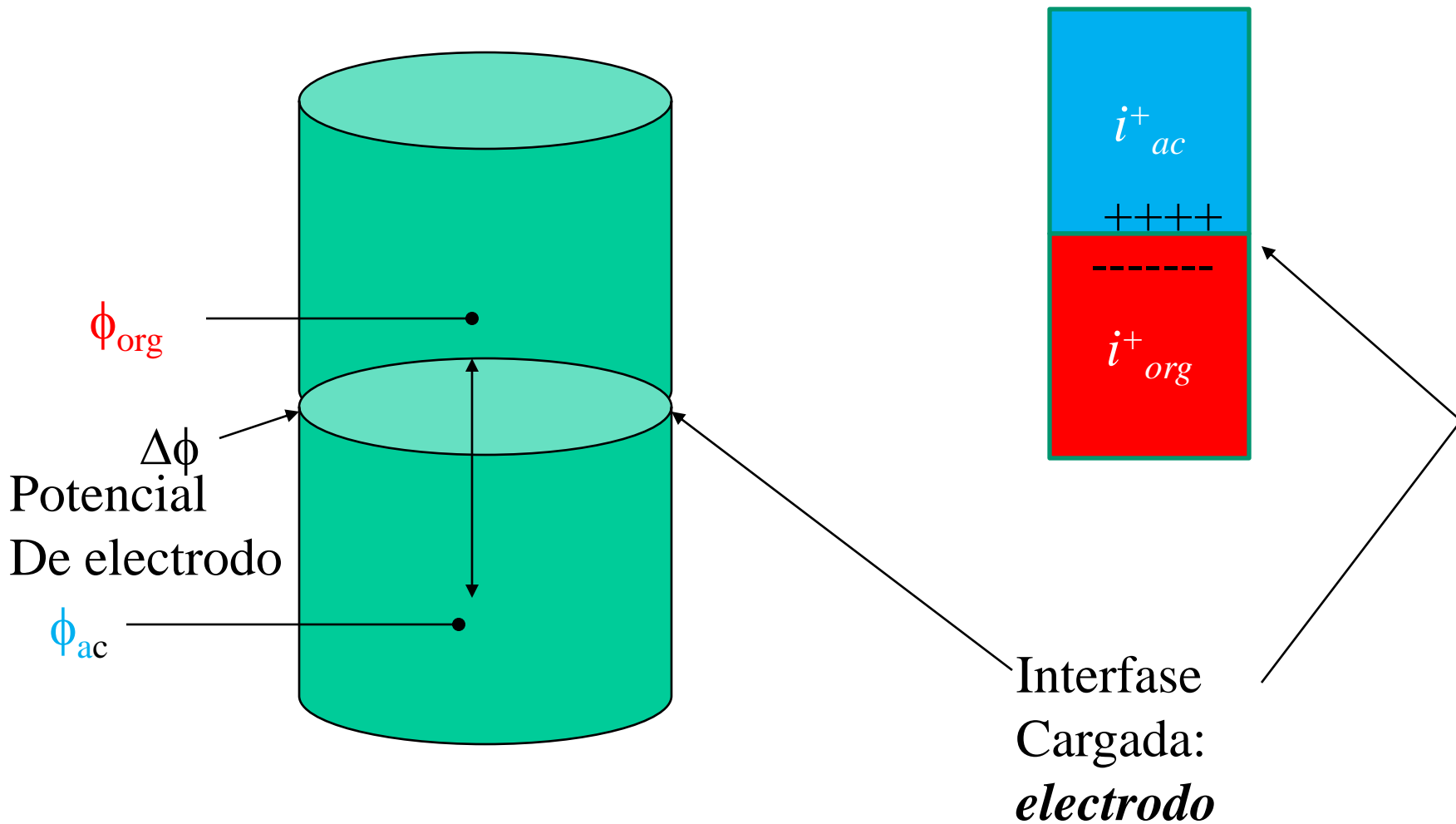
R = constante de los gases

$a_{i(\text{ac})}$ = actividad de i -ésima especie en agua

z = carga de la i -ésima especie

F = constante de Faraday

ϕ_a = potencial interno del agua.

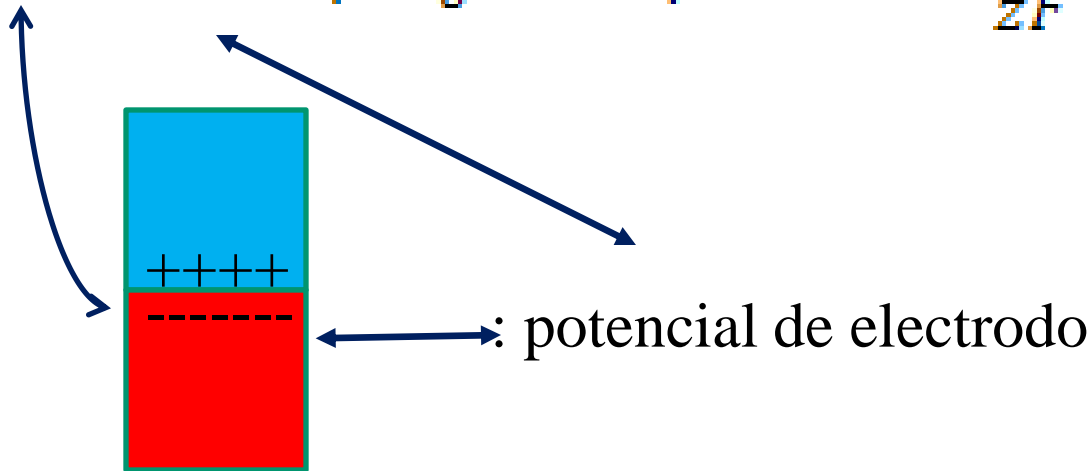


Equilibrio: $\bar{\mu}_{ac} = \bar{\mu}_{org}$

$$\mu^\circ_{i(org)} + RT \ln a_{i(org)} + zF\phi_{org} = \mu^\circ_{i(a)} + RT \ln a_{i(a)} + zF\phi_a$$

$$zF(\phi_{org} - \phi_{ac}) = (\mu_{i(org)}^0 - \mu_{i(ac)}^0) + \frac{RT}{zF} \ln \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$

$$\Delta\phi_{ac}^{org} = (\phi_{org} - \phi_{ac}) = \frac{(\mu_{i(org)}^0 - \mu_{i(ac)}^0)}{zF} + \frac{RT}{zF} \ln \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$



ECUACIÓN DE NERNST:

$$\Delta\phi_{ac}^{org} = \Delta\phi^0 + \frac{RT}{zF} \ln \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$

ECUACIÓN DE NERNST:

Relación entre actividad y concentración:

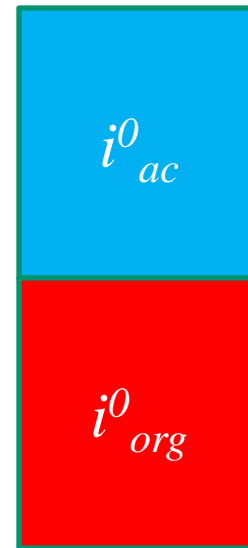
Debye-Hückel: $a_i = Y_i[i]$:

$$\Delta\phi_{ac}^{org} = \Delta\phi^0 + \frac{RT}{zF} \ln \frac{[a_{i(org)}]}{[a_{i(ac)}]} = \Delta\phi^0 + \frac{RT}{zF} \ln \frac{[Y_{i(org)}]}{[Y_{i(ac)}]} + \frac{RT}{zF} \ln \frac{[i]_{org}}{[i]_{ac}}$$

$$(\Delta\phi_{org}^{ac}) = \Delta\phi^{o'} + \frac{0.059V}{z} \log \frac{[i]_{org}}{[i]_{ac}}$$

CASO PARTICULAR DEL ELECTRODO LÍQUIDO-LÍQUIDO:

$$Z = 0$$



CASO PARTICULAR DEL ELECTRODO LIQUIDO-LÍQUIDO: $Z = 0$

$$\mu_{i(\text{org})}^{\circ} + RT \ln a_{i(\text{org})} + \cancel{zF\phi_{\text{org}}} = \mu_{i(\text{a})}^{\circ} + RT \ln a_{i(\text{a})} + \cancel{zF\phi_{\text{a}}}$$

$$\mu_{i(\text{org})}^{\circ} + RT \ln [a_{i(\text{org})}] = \mu_{i(\text{ac})}^{\circ} + RT \ln [a_{i(\text{ac})}]$$

CASO PARTICULAR DEL ELECTRODO LIQUIDO-LÍQUIDO: $Z = 0$

$$\mu_{i(\text{org})}^{\circ} + RT \ln a_{i(\text{org})} + \cancel{zF\phi_{\text{org}}} = \mu_{i(\text{a})}^{\circ} + RT \ln a_{i(\text{a})} + \cancel{zF\phi_{\text{a}}}$$

$$\mu_{i(\text{org})}^{\circ} + RT \ln [a_{i(\text{org})}] = \mu_{i(\text{ac})}^{\circ} + RT \ln [a_{i(\text{ac})}]$$

$$\mu_{i(org)}^0 + RT \ln[a_{i(org)}] = \mu_{i(ac)}^0 + RT \ln[a_{i(ac)}]$$

$$\Delta\mu^{\circ} = RT \ln \left(\frac{[a_{i(org)}]}{[a_{i(ac)}]} \right)$$

$$\mu_{i(org)}^0 + RT \ln[a_{i(org)}] = \mu_{i(ac)}^0 + RT \ln[a_{i(ac)}]$$

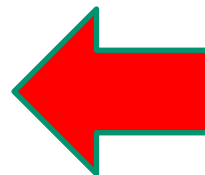
$$\Delta\mu^0 = RT \ln \left(\frac{[a_{i(org)}]}{[a_{i(ac)}]} \right)$$

$$10^{\Delta\mu^0/RT} = K_D = \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$

$$\mu_{i(org)}^0 + RT \ln[a_{i(org)}] = \mu_{i(ac)}^0 + RT \ln[a_{i(ac)}]$$

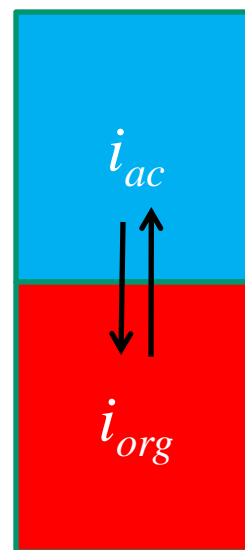
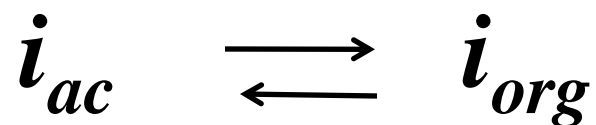
$$\Delta\mu^0 = RT \ln \left(\frac{[a_{i(org)}]}{[a_{i(ac)}]} \right)$$

$$10^{\Delta\mu^0/RT} = K_D = \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$



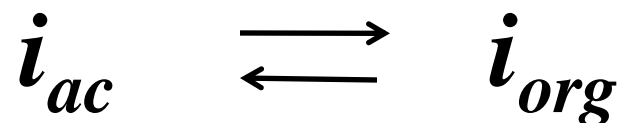
***EVIDENCIA
DE UN ;NUEVO
EQUILIBRIO
QUÍMICO!***

*Equilibrio químico de distribución
líquido-líquido:*

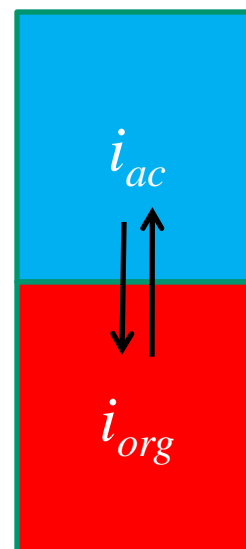


“cambio de reactividad química por transferencia de masa interfacial”

*Equilibrio químico de distribución
líquido-líquido:*



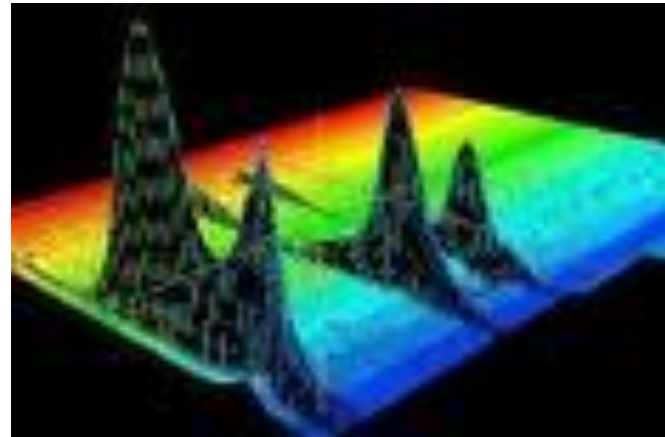
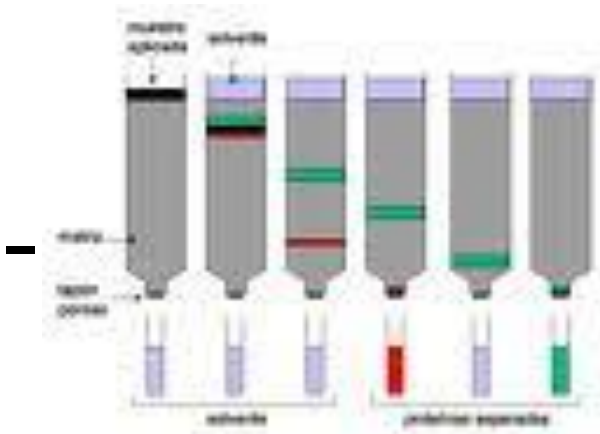
$$10^{\Delta\mu^\circ/RT} = K_D = \frac{[a_{i(org)}]}{[a_{i(ac)}]}$$



Ley de distribución de Nersnt.

Aplicaciones:

-Separaciones analíticas:



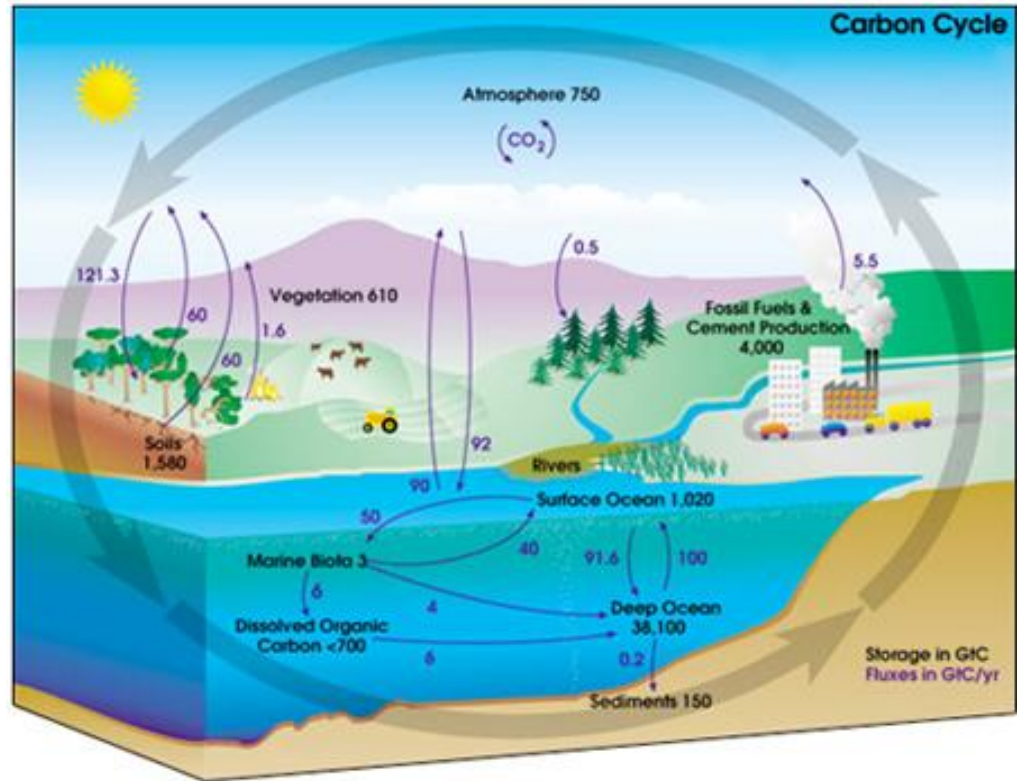
Aplicaciones:



**-Separaciones
preparativas:**

-

Aplicaciones:



- Caracterización Ambiental*
- Química farmacéutica*
- Toxicología*
- Energética*
- nanquímica*