$HC_2O_4^- \overset{K_2}{\rightleftharpoons} H^+ + C_2O_4^{2-}$

$K_2 = \dfrac{[H^+][C_2O_4^{2-}]}{[HC_2O_4^-]}$

$[HC_2O_4^-] = \dfrac{[H^+][C_2O_4^{2-}]}{K_2}$

$[H_2C_2O_4] = \dfrac{[H^+][HC_2O_4^-]}{K_1}$

sustituyo valor $[HC_2O_4^-]$

$[H_2C_2O_4] = \dfrac{[H^+]^2[C_2O_4^{2-}]}{K_1K_2}$

$$\alpha_{C_2O_4^{2-}} = \frac{[C_2O_4^{2-}]}{[C_2O_4^{2-}] + \frac{[H^+][C_2O_4^{2-}]}{K_2} + \frac{[H^+]^2[C_2O_4^{2-}]}{K_1K_2}}$$

Así si simplifico $[C_2O_4^{2-}]$

$$\alpha_{C_2O_4^{2-}} = \frac{1}{1 + \frac{[H^+]}{K_2} + \frac{[H^+]^2}{K_1K_2}}$$

luego $K_S' = \dfrac{K_S}{\alpha_{C_2O_4}} = \dfrac{K_S}{\frac{1}{1 + \frac{[H^+]}{K_2} + \frac{[H^+]^2}{K_1K_2}}} = K_S\left(1 + \frac{[H^+]}{K_2} + \frac{[H^+]^4}{K_1K_2}\right)$.

para poder calcular la solubilidad S' en función del la conc de $[H^+]$

$$CaC_2O_{4(s)} \rightleftharpoons Ca^{2+} + C_2O_4^{2-}$$

$S' \qquad S'$

K_S'

$K_S' = S'^2 \Rightarrow S' = \sqrt{K_S'}$

sustituir de los valores dados de pH.

$$S' = \sqrt{K_S\left(1 + \frac{[H^+]}{K_2} + \frac{[H^+]^2}{K_1K_2}\right)}$$

MADRID 2006.

Química

①

$$CaC_2O_4(s) \rightleftharpoons Ca^{2+} + C_2O_4^{2-}$$

$$\downarrow\uparrow K_2' \quad K_2' = \frac{K_w}{K_2}$$

$$HC_2O_4^-$$

$$\downarrow\uparrow K_1' \quad K_1' = \frac{K_w}{K_1}$$

$$H_2C_2O_4$$

Se escribe la expresión de K_S', teniendo en cuenta que s' es la solubilidad dependiente del pH.

$$CaC_2O_4 \rightleftharpoons Ca^{2+} + C_2O_4^{2-}$$

$$s' \qquad s'$$

$$K_S' = [Ca^{2+}]' \cdot [C_2O_4^{2-}]'$$

el calcio Ca^{2+} no sufre reacción lateral

queda como

$$K_S' = [Ca^{2+}] \cdot \frac{[C_2O_4^{2-}]}{\alpha_{C_2O_4^{2-}}}$$

$$\boxed{K_S' = \frac{K_S}{\alpha_{C_2O_4^{2-}}}}$$

debemos calcular el coeficiente lateral de $C_2O_4^{2-}$ cuyo valor

$$\alpha_{C_2O_4} = \frac{[C_2O_4^{2-}]}{[C_2O_4^{2-}] + [HC_2O_4^-] + [H_2C_2O_4]}$$

$$H_2C_2O_4 \overset{K_1}{\rightleftharpoons} H^+ + HC_2O_4^- \rightarrow \quad K_1 = \frac{[H^+][HC_2O_4^-]}{[H_2C_2O_4]}$$

$$[H_2C_2O_4] = \frac{[H^+][HC_2O_4^-]}{K_1} \quad [HC_2O_4^-] = \frac{K_1[H_2C_2O_4]}{[H^+]}$$