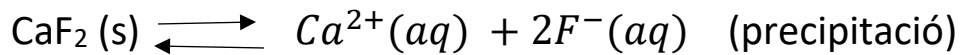
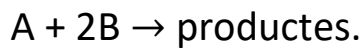


CINÈTICA QUÍMICA, VELOCITATS DE REACCIÓ:



$$K_{ps} = [\text{Ca}^{2+}][\text{F}^{-}]^2 \quad \text{el } [\text{F}^{-}] \text{ és el determinant}$$

$$\frac{[\text{F}^{-}]}{2} = [\text{Ca}^{2+}] = \text{solubilitat.}$$

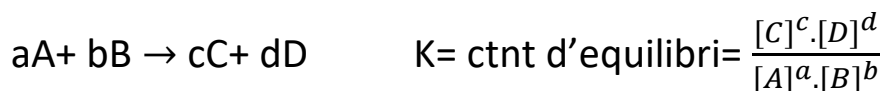


$$t=0 \quad [A]=[A]_0 \quad \text{i} \quad [B]=[B]_0$$

$$t=t' \quad [A]=[A]_0-x \quad \text{i} \quad [B]=[B]_0-2x$$

tornant a la mecànica de les equacions de velocitat, tenim que
 $dx/dt = k \cdot ([A]_0-x) \cdot ([B]_0-2x)^2 \quad (*)$

recordem que en àcid-base també usem els constants de velocitat "k" i segueixen el mateix criteri quan a exponents:



(*) se resol usant el mètode de les *integrals racionals*:

tenim $dx/([A]_0-x) \cdot ([B]_0-2x)^2 = k \cdot dt$ llavors

$$\int \frac{dx}{(A_0 - x)(B_0 - 2x)^2} = \int k \cdot dt$$

Que resoldrem usant les integrals racionals:

$$\begin{aligned} & \int \frac{dx}{(A_0 - x)(B_0 - 2x)^2} \\ &= \int \frac{Mdx}{([A]_0 - x)} + \int \frac{Ndx}{([B]_0 - 2x)} + \int \frac{Qdx}{([B]_0 - 2x)^2} \\ & \frac{M(B_0 - 2x)^2}{(A_0 - x)(B_0 - 2x)^2} + \frac{N(A_0 - x)(B_0 - 2x)}{(A_0 - x)(B_0 - 2x)^2} + \frac{Q(A_0 - x)}{(A_0 - x)(B_0 - 2x)^2} \\ & 1 = M(B_0 - 2x)^2 + N(A_0 - x)(B_0 - 2x) + Q(A_0 - x) \end{aligned}$$

$$1 = M.B_0^2 - M.4.B_0x + M.4.x^2 + N.A_0B_0 - N.A_02x - N.B_0x + M.4.x^2 + Q.A_0 - Qx$$

$$\left. \begin{aligned} M.4.x^2 + 2.N.x^2 &= 0 \\ M.4.B_0x - N.A_02x - N.B_0x - Qx &= 0 \\ M.B_0^2 + N.A_0B_0 + Q.A_0 &= 1 \end{aligned} \right\}$$

$$M = -N/2, \quad -N/2.4B_0 - N.2A_0 - N.B_0 - Q = 0,$$

$$-\frac{N}{2}.B_0^2 + N.A_0B_0 + Q.A_0 = 1$$

$$N(2B_0 + A_0^2) + Q = 0 \quad \frac{-Q}{(2B_0 + A_0^2)}.A_0 = 1$$

$$Q = \frac{2B_0 + A_0^2}{(B_0^2 + A_0B_0 + 2B_0 + A_0^2)} \quad N = \frac{-1}{(B_0^2 + A_0B_0 + 2B_0 + A_0^2)}$$

$$M = \frac{1}{2.(B_0^2 + A_0B_0 + 2B_0 + A_0^2)}$$

Per tant:

$$\begin{aligned} \int \frac{dx}{(A_0 - x)(B_0 - 2x)^2} &= \int \frac{Mdx}{([A]_0 - x)} + \int \frac{Ndx}{([B]_0 - 2x)} + \int \frac{Qdx}{([B]_0 - 2x)^2} = \\ &= -M.Ln([A]_0 - x) + M.Ln([B]_0 - 2x) - \frac{Q}{2.([B]_0 - 2x)} = k.t \end{aligned}$$