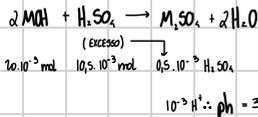


ex:  $MCH: 200ml, 0,1 mol/L + 105 ml, 0,1 mol/L$



ex:  $K_a = 5 \cdot 10^{-2} \cdot (0,4 \cdot 10^{-2})^2 = 80 \cdot 10^{-8} = 8 \cdot 10^{-7}$

$[H^+] = M \cdot \alpha = 2 \cdot 10^{-4} \therefore pH = -(0,3 - 4) = 3,7$

**PRODUTO DE SOLUBILIDADE (Kps ou Ks)**

UM COMUM: menos solúvel, mais precipitado

• equilíbrio heterogêneo

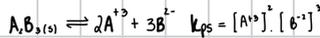
↳ Solutos são compostos pouco solúveis ou insolúveis

↑ Kps = + SOLÚVEL (para mesmo padrão)

PREVISÃO DE PRECIPITAÇÃO

$[C] \cdot [B] > Kps$

PODE SER USADO PARA DETERMINAR SOLUBILIDADE



ex:  $AB(s) \rightleftharpoons A^+ + B^- \therefore s = s + s$

$Kps = [A^+] \cdot [B^-] = s^2$

$Kps = s^2 \quad s = \sqrt{Kps}$

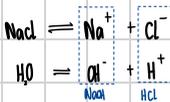
ex:  $A_2B \rightleftharpoons 2A^+ + B^{2-} \therefore s = 2s + s$

$Kps = [A^+]^2 \cdot [B^{2-}] = (2s)^2 \cdot s = 4s^3$

$Kps = 4s^3 \quad s = \sqrt[3]{Kps/4}$

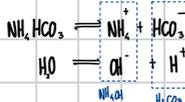
**HIDRÓLISE SALINA**

1 SAL (ácido e base fortes)



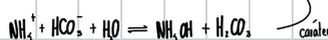
• não ocorre hidrólise (sal neutro)

2 SAL (ácido e base fracas)



• ocorre hidrólise dos dois

EQUAÇÃO  $K_a \cdot K_b = \text{lev. ácido} \cdot K_a \cdot K_b = \text{lev. básico}$



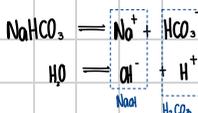
$K_h = \frac{[H_2CO_3][NH_4OH]}{[NH_4^+][HCO_3^-]}$

ex:  $AB_3 \rightleftharpoons 3A^+ + B^{3-} \therefore s = 3s + s$

$Kps = [A^+]^3 \cdot [B^{3-}] = (3s)^3 \cdot s = 27s^4$

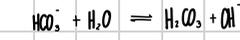
$Kps = 27s^4 \quad s = \sqrt[4]{Kps/27}$

2 SAL (base forte e ácido fraco)



• Ocorre hidrólise do ânion

EQUAÇÃO *caráter básico*



$K_h = \frac{[H_2CO_3][OH^-]}{[HCO_3^-]}$

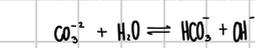
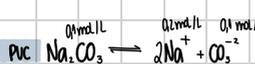
ou  $K_h = \frac{K_w}{K_a}$  *eletrólito fraco*

ex:  $A_2B_3 \rightleftharpoons 2A^{2+} + 3B^{2-} \therefore s = 2s + 3s$

$Kps = [A^{2+}]^2 \cdot [B^{2-}]^3 = 108s^5$

$Kps = 108s^5 \quad s = \sqrt[5]{Kps/108}$

ou  $K_h = \frac{K_w}{K_a \cdot K_b}$

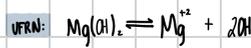


1	0,1	—	0	0
---	-----	---	---	---

R/F	∞	—	∞	∞
-----	---	---	---	---

ε	0,1 - ∞	—	∞	∞
---	---------	---	---	---

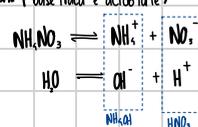
$K_h = \frac{[HCO_3^-][OH^-]}{[CO_3^{2-}]} = 2,5 \cdot 10^{-4} = \frac{x^2}{0,1} \therefore x = 5 \cdot 10^{-5}$



proporção:  $10^{-4} \quad 10^{-4} \quad 2 \cdot 10^{-4}$

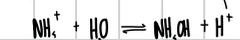
$Kps = 10^{-4} \cdot (2 \cdot 10^{-4})^2 = 4 \cdot 10^{-12}$

3 SAL (base fraca e ácido forte)



• Ocorre hidrólise do cátion

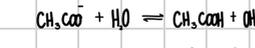
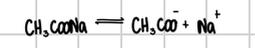
EQUAÇÃO *caráter ácido*



$K_h = \frac{[NH_4OH][H^+]}{[NH_4^+]}$

ou  $K_h = \frac{K_w}{K_b}$  *eletrólito fraco*

UERJ  $K_h = \frac{K_w}{K_a} = \frac{10^{-14}}{2 \cdot 10^{-5}} = 0,5 \cdot 10^{-9}$



1	$5 \cdot 10^{-2}$	—	0	0
---	-------------------	---	---	---

R/F	∞	—	∞	∞
-----	---	---	---	---

ε	$5 \cdot 10^{-2}$	—	∞	∞
---	-------------------	---	---	---

$K_h = 5 \cdot 10^{-10} = \frac{x^2}{5 \cdot 10^{-2}} = \frac{\sqrt{25 \cdot 10^{-12}}}{5 \cdot 10^{-2}} = 5 \cdot 10^{-6}$

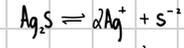
$pH = -\log 5 \cdot 10^{-6} = -(\log 5 + \log 10^{-6}) = 5,3$

$pH = 14 - 5,3 = 8,7$

ACAFE  $CaCl_2 \therefore Kps = 4s^3 \quad AB_2$

$CaCO_3 \therefore Kps = s^2 \quad AB$

$Ca_3(PO_4)_2 = 108s^5 \quad AB_2$



$3,2 \cdot 10^{-50} = (2s)^2 \cdot s$

$3 \sqrt[3]{3,2 \cdot 10^{-50}} = 4s^3 \therefore 2 \cdot 10^{-17}$

$CuI = \sqrt{10^{-12}} = 10^{-6}$

$BiI_3 = \sqrt[4]{\frac{2,7 \cdot 10^{-33}}{2,7}} = \sqrt[4]{10^{-30}} = 10^{-7,5}$