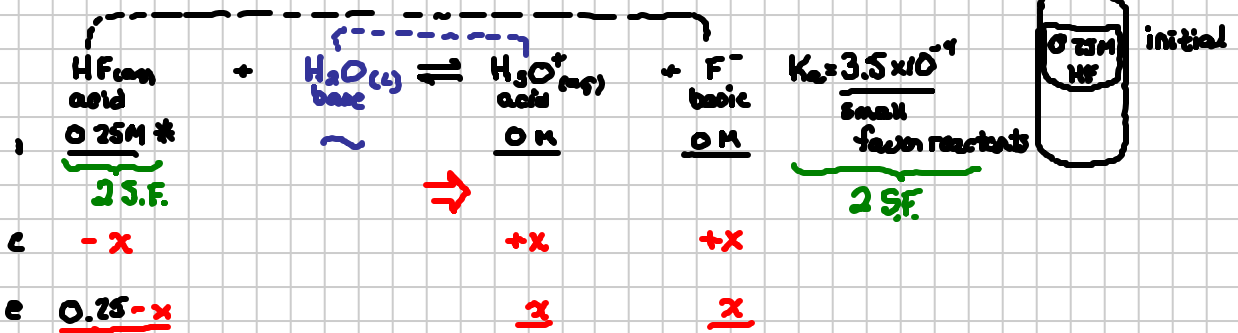


Lecture 11: Weak Acid Equilibrium and pH

Note Title

Bottle Labels Lie! 8/31/2011

Example. What is the pH of a 0.25M HF acid solution?



L.M.A. $K_a = \frac{[H_3O^+][F^-]}{[HF]}$ $\left\{ 3.5 \times 10^{-4} = \frac{x \cdot x}{(0.25-x)} \right.$ solve for x
 $\leftarrow x \approx 0$

$$3.5 \times 10^{-4} = \frac{x^2}{0.25}$$

$$x = 9.354 \times 10^{-3}$$

$$\% \text{ ionization} = \frac{9.354 \times 10^{-3}}{0.25} \cdot 100 = 3.74\% < 5\%$$

$$[HF]_{eq} = 0.25 - x = 0.24M \leftarrow \text{Label } 0.25M$$

$$[H_3O^+] = x = 9.3 \times 10^{-3}M$$

$$[F^-] = x = 9.3 \times 10^{-3}M$$

$$pH = -\log[H_3O^+] = -\log(9.354 \times 10^{-3}) = 2.029 = 2.03$$

SF problem = # decimal digits in pH.