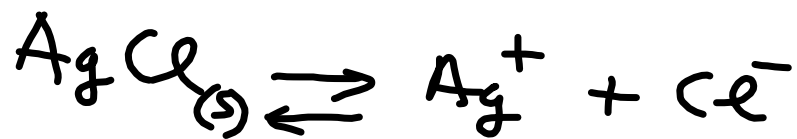


K_{sp} Problems

5. Given $[Ag^+] = 3.5 \times 10^{-2}$ find K_{sp}



$$K_{sp} = [Ag^+][Cl^-]$$

$$K_{sp} = (3.5 \times 10^{-2})(3.5 \times 10^{-2})$$

$$= 1.2 \times 10^{-3}$$

10. $AlPO_4 \rightleftharpoons Al^{3+} + PO_4^{3-}$

$$K_{sp} = [Al^{3+}][PO_4^{3-}]$$

$$9.8 \times 10^{-21} = x \cdot x$$

$$\sqrt{9.8 \times 10^{-21}} = \sqrt{x^2}$$

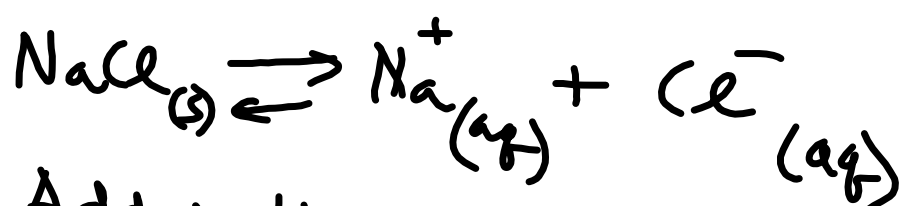
$$9.9 \times 10^{-11} = x$$

Meaning of K_{eq}

1. When K_{eq} is large (>1) there are more products than reactants.
2. If k is small (<1) there are more reactants -----
3. If $k=1$ [products \approx reactants] approximately
At equilibrium.

Common Ion Effect

Recall- Demonstration on solubility of NaCl.



Added HCl (conc) \rightarrow
Some solid NaCl crystallized

Explain using Le Chatelier's ...

Stress - $\uparrow [\text{Cl}^-]$.

Shift - reactants

Consequence - $[\text{Cl}^-] \downarrow$

Also $[\text{Na}^+] \downarrow$

$\text{NaCl}_{(s)} \uparrow$

This is the common ion effect.

Examples - Common Ion

What is the solubility of AgCl added to a solution of 0.10 mol/L NaCl ? (Given $K_{sp} = 1.8 \times 10^{-10}$)

	$\text{AgCl}(s)$	\rightleftharpoons	Ag^+	$+$	Cl^-
I			0		0.10
C			x		x
E			x		$0.10 + x$

$$K_{sp} = [\text{Ag}^+][\text{Cl}^-]$$

$$1.8 \times 10^{-10} = x \cdot (0.10 + x)$$

$$1.8 \times 10^{-10} = x \cdot (0.10)$$

$$\frac{1.8 \times 10^{-10}}{0.10} = x$$

$$1.8 \times 10^{-9} = x$$

mol/L

↑ assume x is small

Check assumption

* correct!

Compare to solubility of AgCl in H_2O

$$\left(1.3 \times 10^{-5} \text{ mol/L} \right)$$

Questions 3, 8, 9
worksheet

Introduction to Acid-Base Equilibrium

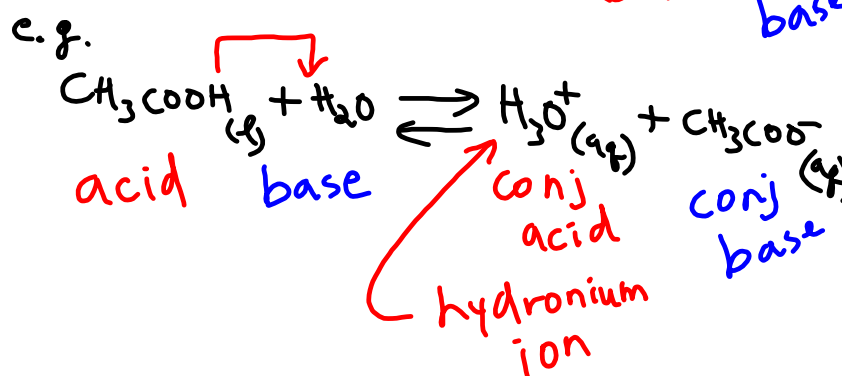
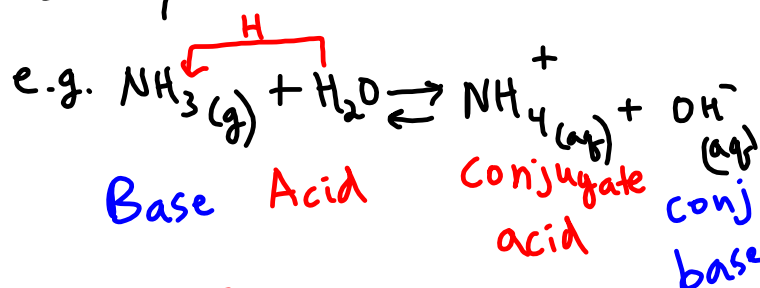
Text - Ch. 14 & 15

Definitions -

1. Common -	<u>Acid</u> Sour taste	<u>Base</u> bitter slippery
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2. Arrhenius -	<u>H^+ ions</u> e.g. HCl CH_3COOH HNO_3	<u>OH^-</u> e.g. NaOH $Ca(OH)_2$
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3. Brønsted -Lowry	proton (H^+) donor	proton receiver
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Amphoteric - behaves like an acid or base e.g. H_2O

Questions - p. 557 # 1-7