

# Chapter 4 – Reactions in Solutions

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- Solute gets dissolved, Solvent does the dissolving
- Molarity is (1)

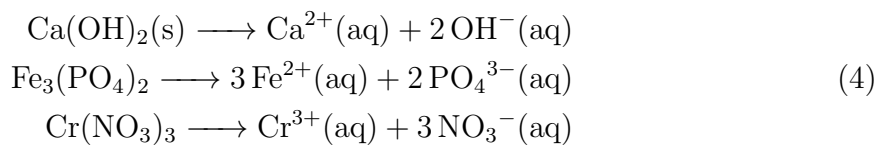
$$M = \frac{\text{mol}}{\text{L}} \quad (1)$$

- Electrolytes are ionic compounds that breakup in a solution (Ex. (2))



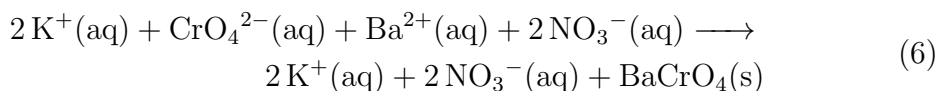
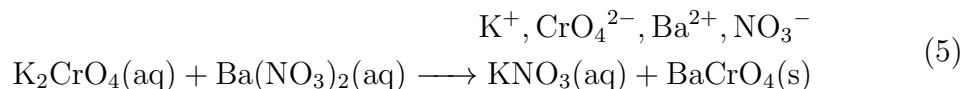
1. Strong Electrolyte vs. Weak Electrolyte – The more are broken up, the stronger the electrolyte
2. The Dilution Formula (3)

$$M_1V_1 = M_2V_2 \quad (3)$$



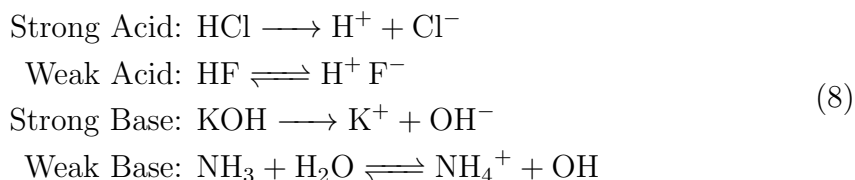
- Precipitation Reaction – Ionic compounds will either separate (soluble) or stay together (insoluble).
  1. Solubility Rules – If a compound contains any of the following three, it is soluble: Sodium ( $\text{Na}^+$ ), Potassium ( $\text{K}^+$ ), Nitrate ( $\text{NO}_3^-$ )

2. Ex. Potassium Chromate + Barium Nitrate (5). This is an example of a molecular equation with a double replacement. (6) is named a complete ionic equation. (7) is named a net equation, and is the only one that will be on the AP exam.



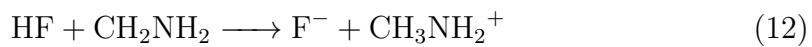
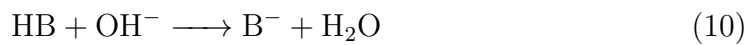
- Acid-Base Reaction

1. Acid – Produces  $\text{H}^+$
2. Base – Produces  $\text{OH}^-$
3. “Arrhenius” Way of thinking
4. Strong Acid – Completely Dissociates
  - (a) Examples: Hydrochloric ( $\text{HCl}$ ), Sulfuric ( $\text{H}_2\text{SO}_4$ ), Nitric ( $\text{HNO}_3$ ), Perchloric ( $\text{HClO}_4$ ), Hydrobromic ( $\text{HBr}$ ), Hydroiodic ( $\text{HI}$ )
5. Weak Acid – Does not completely dissociate. Sets up an equilibrium.
  - (a) Not a strong acid.
6. Strong Base – Completely dissociates.
  - (a) Hydroxides of column I and II.
7. Weak Base – Produce  $\text{OH}^-$  with reaction with water.
  - (a) It will always be explicitly stated if something is a weak base
8. Dissociation (8)



9. Strong Acid –  $\text{H}^+$
10. Strong Base –  $\text{OH}^-$
11. Weaks are represented as is

- 12. HCl and NaOH (9)
- 13. HB and KOH (10)
- 14. H<sub>2</sub>SO<sub>4</sub> and NH<sub>3</sub> (11)
- 15. HF and CH<sub>2</sub>NH<sub>2</sub> (12)



- 16. Titration – Adding acid to base or other way around (13)

$$M_a V_a = M_b V_b \quad (13)$$