

Chemistry (Math Notes) Module #9

Acids and bases:
• Neutralize each other
• They can be weak or strong
• When they come together they have reactions.

I. Key Terms/Concepts

Concentration:
The number of molecules in H₂O

Concentrated:
Lots of molecules in H₂O

Diluted:
A small amount of molecules in H₂O

Strength:
Based on number of molecules that do their job (weak = a small amount that do their job; strong = many that do their job).

Indicator:
A substance that turns one color in the presence of acids and another color in the presence of bases

Acid:
A molecule that donates H⁺ ions (proton donors)

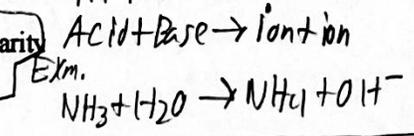
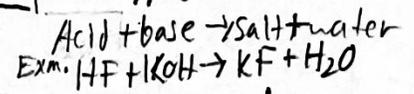
Base:
A molecule that accepts H⁺ ions (proton acceptors)

Amphiprotic:
Compound that can act as either an acid or a base, depending on the situation.

II. Chemical Reactions

- Formation:** A reaction that starts with 2 or more elements and produces one compound. (A+B → AB)
- Decomposition:** A reaction that changes a compound into its constituent elements. (AB → A+B)
- Combustion: (complete)** A reaction in which O₂ is added to a compound containing C and H, producing CO₂ and H₂O.
Incomplete A reaction in which O₂ is added to a compound containing C and H, producing CO or C and H₂O.
- Acid-Base** A reaction in which an acid reacts with a base by the neutralization of both (by forming) ions.

Two types of Acid/base reactions



III. Molarity & Dilution Equation:

Concentration is amount / volume. Examples of concentration units are g/ml, g/cm³, mole/ml

In chemistry we often use molarity to measure concentration. Molarity (M) is the number of moles / # liters of solution.

Chemists usually keep "stock" solutions, which are then diluted for use.

$$M_1 \times V_1 = M_2 \times V_2$$

M₁ is the molarity of the stock solution.

V₁ is the molarity of the stock solution.

M₂ is the molarity of the new solution that the chemist wants

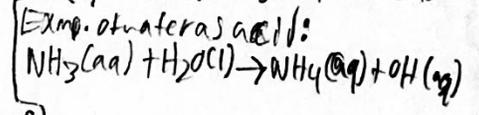
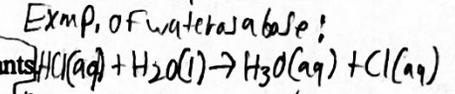
V₂ is the volume of the new solution that the chemist wants.

(molarity) x (# liters) = # moles

Remember, a typical stoichiometry problem is set up by giving the information of one substance, but asks for information of another substance.

In these problems, molarity for one substance is given, but molarity or grams of a second substance must be determined.

water is amphiprotic!



IV. Titration

What is a titration?

It is Stoichiometry. You always begin with a balanced
Chemical equation.

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3/8/23

You take a known amount of acid & add a known to it slowly. An
indicator will change color, indicating that you have added just enough base
to eat up all the acid. This is the
end point, allowing you to determine the Concentration of the acid. This
technique also works in reverse, adding an acid slowly to a known amount of a
base.

$$M_{\text{acid}} \times V_{\text{acid}} = M_{\text{base}} \times V_{\text{base}}$$