

Chem 115 Lecture 10, 2/28/08
Acids, Bases and Intro to pH

In grouping reactions, different kinds of process take place

In Exchange reaction, oxidation number does not change but the oxidation number changes in a redox reaction

The pH scale is used to identify acids and bases and also to indicate their level of strength
A chemical indicator is not the same thing as pH scale, but can tell you by its color what range of pH a solution is in. You only add a couple of drops of indicator to a solution - its purpose is to show a color to indicate pH. Chemical indicators can change to two or more forms (molecule with the H^+ attached or missing the H^+) which have different colors.

The pH scale helps us to know whether a solution is acidic, basic or neutral and how strong or weak they can be.

Solutions can be classified into (1) Acids
(2) Base
(3) Neutral

pH is how much H^+ or OH^- is present in the solution. “p” means “the $-\log$ of” something.

Some characteristics of acids and base can be found on page 3 of the lecture slide.

$[H^+]$ means the concentration of H^+ , where concentration is how much (specifically how many moles) of H^+ is in a liter of a solution

Note that Concentration is how much solute is in a given amount of solution.

The H^+ concentration in the solution increases when an acidic chemical is added to water
 OH^- rises when a base substance is added to pure water.

For every water that breaks we get one H^+ and one OH^- (see diagram on page 4 for more)

When you add some acid to pure water, the H^+ concentration goes up. Conversely, when you add some base to pure water the concentration of OH^- goes up.

Acid anhydrides are also considered acids because when you add them to pure water, the H^+ concentration goes up. Anhydrides means “without water.”

These are non-metal oxides that when you dissolve them in water, they react to form acid solution and no change in oxidation number of the non-metal.

The chemical formula of a base often contains hydroxide ion. These ionic compounds break apart to form OH^- ions and cation (metals).

Note that Organic alcohol group that ends on “ol” and contains the functional group OH are not base they don't ionize to form OH ions.

You can recognize an acid, when a chemical added to water breaks apart to form H^+ ion and something else.

When the concentration of H^+ goes up a lot in an acidic solution, the acid is strong but when it goes up a little, the acid is weak. (see page 5 for common strong and weak acids)

You can measure how strong an electrolyte (solute) is by the conductivity of the solution, When the pH of a solution is far from 7 (between 1 and 4 if it's an acid, or between 11 to 14 if it's a base) it is a strong acid or base, but when the pH is close to 7 (between 5 and 7 for an acid, or between 7 to 9 if it's a base) it is a weak acid or base.