

Acids: Properties of aqueous solutions of acids

- 1) sour taste
- 2) change the color of acid-base indicators
- 3) some acids produce hydrogen gas when reacting with certain metals
- 4) acids react with bases forming a salt and water
- 5) acids are electrolytes

Acid nomenclature

binary acids contain only two different elements - hydrogen and one of the more electronegative elements

HF hydrofluoric acid

HCl hydrochloric acid

HBr hydrobromic acid

HI hydriodic acid

H₂S hydrosulfuric acid

Oxyacids contain hydrogen, oxygen, and a third (usually nonmetal) element. These are known as ternary acid because they contain 3 different elements.

CH_3COOH acetic acid acetate ion

H_2CO_3 carbonic acid carbonate ion

HClO_3 chloric acid chlorate ion

H_2SO_4 sulfuric acid sulfate ion

Common Industrial Acids

Sulfuric: most commonly produced industrial chemical in the world. It is used in the petroleum industry as well as in the production of metals, paper, paint, dyes, detergents, and car batteries.

Nitric: has a "suffocating" odor, will stain proteins yellow, used in making explosives as well as rubber, plastics, dyes, and pharmaceuticals.



Phosphoric: used to make fertilizers and animal feed. Non-toxic and used as a flavoring agent in beverages.

Hydrochloric: stomach acid, used in "pickling" iron and steel (essentially eats away surface impurities). Concentrated HCl is often referred to as muriatic acid and can be found in hardware stores.

Acetic: vinegar contains between 4-8%, used in making plastics, food supplements such as lysine. Also used as a fungicide.

Bases

- taste bitter
- change the color of acid-base indicator
- dilute solutions feel slippery
- react with acids to produce a salt and water
- are electrolytes

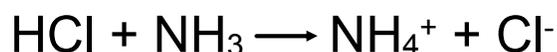
Arrhenius Acid is a chemical compound that increases the concentration of H^+ ions in an aqueous solution.

Arrhenius Base is a chemical compound that increases the concentration of OH^- ions in an aqueous solution.

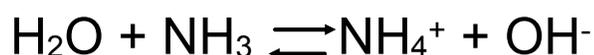
A **strong acid** is one that ionizes completely in an aqueous solution - strong electrolytes with a hydrogen make strong acids. **Strong bases** are ones that completely dissociates in water.

Bronsted-Lowry acid is a molecule or ion that is a proton donor

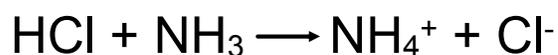
essentially, a molecule that reacts and gives a H^+ to another molecule is a Bronsted-Lowry acid.



Water can also act as a Bronsted-Lowry acid



Bronsted-Lowry base is a molecule or ion that is a proton acceptor.



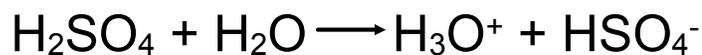
The ammonia is the Bronsted-Lowry base because it accepts the proton from the HCl.

In a Bronsted-Lowry acid-base reaction, protons are transferred from one reactant (acid) to another reactant (base).

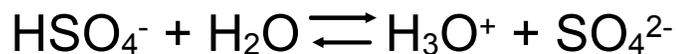
Monoprotic acid is one in which each molecule can donate one proton.

Polyprotic acid is one in which each molecule can donate more than one proton.

First stage is a strong acid -



Second stage is a weak acid -



Lewis acid is an atom, ion, or molecule that accepts an electron pair to form a covalent bond.

