Acids

The special chemistry of hydrogen

Acids produce hydrogen ion (H^+) in water solution.

$H^+_{(aq)}$, $H_3O^+_{(aq)}$, and a proton in water are all identical chemical notations. All three describe the same chemical situation.

$$H^+_{(aq)} + H_2O_{(l)} \rightarrow \quad H_3O^+_{(aq)}$$

A hydrogen atom is one proton and one electron.

Losing one electron gives one proton $\rightarrow$ H^+

Properties of Acids

The defining characteristic of acids is that they produce H^+ in water solution.

Acids react with metals to produce salt and $H_{2\,(g)}$

Acids taste sour

Acids turn litmus (an indicator) red (or pink)

Acids turn phenolphthalein colorless

Acids neutralize bases to form salt and water

Acids have a pH of less than 7

Properties of Bases

The defining characteristic of bases is that they produce OH^- in water solution.

Bases feel slippery

Bases taste bitter

Bases turn litmus (an indicator) blue

Bases turn phenolphthalein red (magenta)

Bases neutralize acids to form salt and water

Bases have a pH of more than 7

Systematic Naming of Acids

Because acids are such special compounds there is an additional naming system used just for acids.

Binary Acids

Names of compounds that used to be
hydrogen _____ide

are changed to be hydro _____ic acid.

Examples:

HCl hydrogen chloride ⇨ hydrochloric acid

HBr hydrogen bromide ⇨ hydrobromic acid

H_2S hydrogen sulfide ⇨ hydrosulfuric acid

Oxy Acids

Names of compounds that used to be
hydrogen _____ate

are changed to _____ic acid.

Examples:

HNO_3 hydrogen nitrate ⇨ nitric acid

H_2SO_4 hydrogen sulfate ⇨ sulfuric acid

H_2CO_3 hydrogen carbonate ⇨ carbonic acid

Oxy Acids

Names of compounds that used to be
hydrogen _____ite

are changed to _____ous acid.

Examples:

HNO_2 hydrogen nitrite ⇨ nitrous acid

H_2SO_3 hydrogen sulfite ⇨ sulfurous acid

$HClO_2$ hydrogen chlorite ⇨ chlorous acid