

Naming Molecular Compounds

we can break the naming of inorganic compounds into four categories:

Ionic compounds

Molecular compounds

Acids and Bases

Hydrates

Molecular Compounds

Electrons are shared by the atoms.

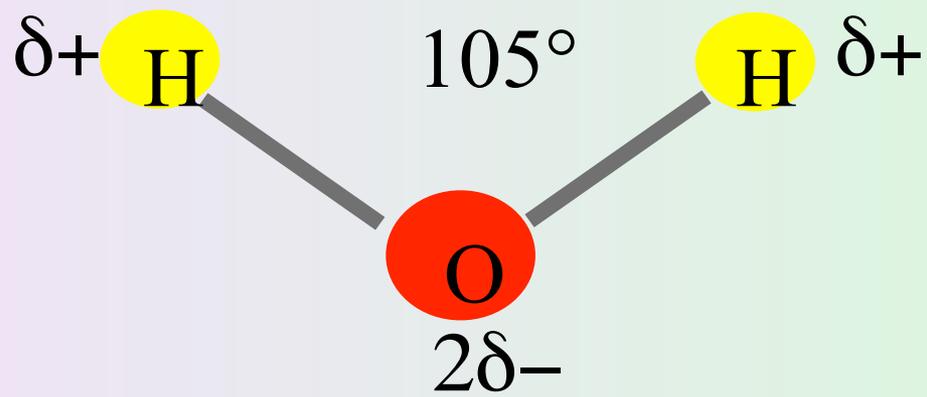
Covalent Bonds

Electrons however are not shared equally.

Molecular Compounds

Elements that are more electronegative assume an **apparent negative charge (δ^-)**.

Elements that are more electropositive assume an **apparent positive charge (δ^+)**.



naming binary compounds of nonmetals

- 1) less electronegative element named first
(and listed first in chemical formula)
- 2) more electronegative element named in usual
way (with -ide suffix)
- 3) **counting prefixes** are used with each name
but mono is not used with first name

Greek prefixes used in naming molecular compounds

Prefix	Meaning	Prefix	Meaning
Mono-	1	Hexa-	6
Di-	2	Hepta-	7
Tri-	3	Octa-	8
Tetra-	4	Nona-	9
Penta-	5	Deca-	10

Examples

CO	carbon monoxide
CO ₂	carbon dioxide
SO ₂	sulfur dioxide
SO ₃	sulfur trioxide
PCl ₃	phosphorus trichloride
PCl ₅	phosphorus pentachloride
NO ₂	nitrogen dioxide
N ₂ O ₄	dinitrogen tetroxide
Cl ₂ O ₇	dichlorine heptoxide

Name the following compounds



chlorine trifluoride



sulfur dichloride



dichlorine heptoxide

Naming Acids and Bases

Acids and Bases

An acid is a substance that yields hydrogen ions (H^+) when dissolved in water.

Acids that contain hydrogen, oxygen, and another element are called oxyacids.

Acids and Bases

Bases are substances that yield hydroxide ions (HO^-) when dissolved in water.

NaOH , KOH , $\text{Ba}(\text{OH})_2$, NH_3

Naming Acids

Naming an acid depends on whether the anion contains oxygen

If the anion does not contain oxygen the acid is named with the prefix *hydro* and the suffix *--ic*

If the anion contains oxygen the acid name is formed from the root name of the anion with the suffix *-ic or -ous*

Names for some binary acids

Anion

Corresponding Acid

F⁻ (fluoride)

HF (hydrofluoric acid)

Cl⁻ (chloride)

HCl (hydrochloric acid)

Br⁻ (bromide)

HBr (hydrobromic acid)

I⁻ (iodide)

HI (hydroiodic acid)

CN⁻ (cyanide)

HCN (hydrocyanic acid)

S²⁻ (sulfide)

H₂S (hydrosulfuric acid)

Polyatomic anions

sulfite SO_3^{2-}

sulfate SO_4^{2-}

hypochlorite ClO^-

chlorite ClO_2^-

chlorate ClO_3^-

perchlorate ClO_4^-

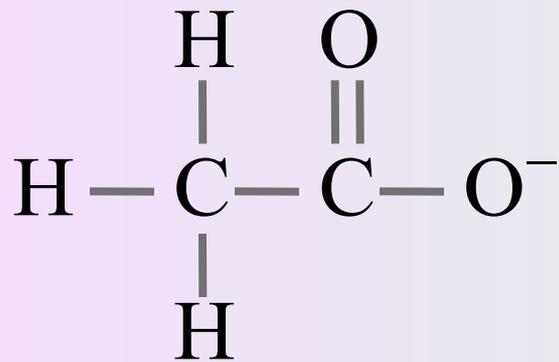
Ternary acids

three element acids

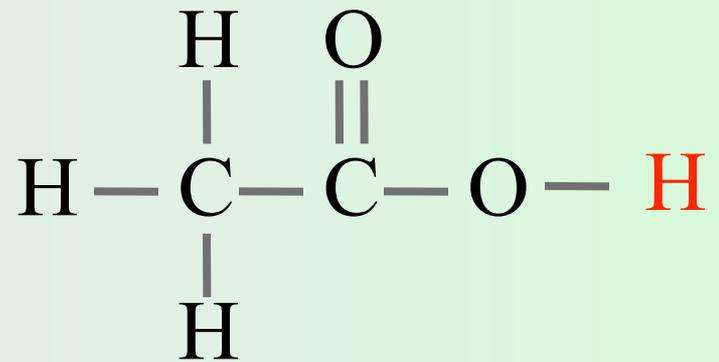
most ternary acids are oxyacids containing hydrogen, oxygen, and one other element

Oxyacids

acetate anion



acetic acid



Oxyacids

sulfite	SO_3^{2-}	sulfurous acid	H_2SO_3
		HOSOOH	
sulfate	SO_4^{2-}	sulfuric acid	H_2SO_4
		HOSO₂OH	

Oxyacids

perchlorate ClO_4^- **perchloric acid** HClO_4

HOClO_3

Addition of one O atom

chlorate ClO_3^- **chloric acid** HClO_3

HOClO_2

removal of one O atom

chlorite ClO_2^- **chlorous acid** HClO_2

HOClO

removal of two O atoms

hypochlorite ClO^- **hypochlorous acid** HOCl

Hydrates

Compounds that have a specific number of water molecules attached to them

Copper(II) sulfate pentahydrate



Copper(II) sulfate anhydrous



Anhydrous - the water molecules have been driven off by heating

