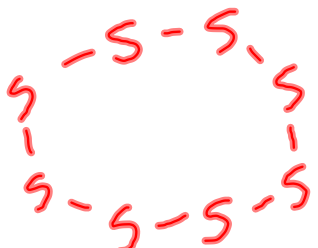


## Molecular Models

**What are the three-dimensional structures of the molecular substances: water (H<sub>2</sub>O), hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), methane (CH<sub>4</sub>), methanol (CH<sub>3</sub>OH), ethanol (C<sub>2</sub>H<sub>5</sub>OH), propane (C<sub>3</sub>H<sub>8</sub>), ammonia (NH<sub>3</sub>), chlorine and sulfur (cyclooctasulfur)?**



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Name	Molecular Formula	Structural Diagram
	CH <sub>4</sub>	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{H} \\   \\ \text{H} \end{array}$
	C <sub>2</sub> H <sub>5</sub>	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$
	Cl <sub>2</sub>	Cl-Cl
	S <sub>8</sub>	

# Ionic Hydrates

IONIC HYDRATES - are ionic compounds that have one or more water molecules loosely attached.

Hydrates are named by

[a] stating the name of the ionic compound

[b] following this with hydrate to which the prefix for the number of waters has been added.

Ex.  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}_{(s)}$



sodium carbonate decahydrate

sodium carbonate - 10-water

3												4												5		6		7		8		9		10	
H Hydrogen												He Helium												B Boron		C Carbon		N Nitrogen		O Oxygen		F Fluorine		Ne Neon	
11		12												13		14		15		16		17		18											
Li Lithium		Be Beryllium												Al Aluminium		Si Silicon		P Phosphorus		S Sulfur		Cl Chlorine		Ar Argon											
19		20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36	
K Potassium		Ca Calcium		Sc Scandium		Ti Titanium		V Vanadium		Cr Chromium		Mn Manganese		Fe Iron		Co Cobalt		Ni Nickel		Cu Copper		Zn Zinc		Ga Gallium		Ge Germanium		As Arsenic		Se Selenium		Br Bromine		Kr Krypton	
37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54	
Rb Rubidium		Sr Strontium		Y Yttrium		Zr Zirconium		Nb Niobium		Mo Molybdenum		Tc Technetium		Ru Ruthenium		Rh Rhodium		Pd Palladium		Ag Silver		Cd Cadmium		In Indium		Sn Tin		Sb Antimony		Te Tellurium		I Iodine		Xe Xenon	
55		56		57		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86	
Cs Cesium		Ba Barium		La Lanthanum		Hf Hafnium		Ta Tantalum		W Tungsten		Re Rhenium		Os Osmium		Ir Iridium		Pt Platinum		Au Gold		Hg Mercury		Tl Thallium		Pb Lead		Bi Bismuth		Po Polonium		At Astatine		Rn Radon	
87		88		89		104		105		106		107		108		109																			
Fr Francium		Ra Radium		Ac Actinium		Rf Rutherfordium		Db Dubnium		Sg Seaborgium		Bh Bohrium		Hs Hassium		Mt Meitnerium																			

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce Cerium	Pr Praseodymium	Nd Neodymium	Pm Promethium	Sm Samarium	Eu Europium	Gd Gadolinium	Tb Terbium	Dy Dysprosium	Ho Holmium	Er Erbium	Tm Thulium	Yb Ytterbium	Lu Lutetium
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium

# Naming and Writing Formulas for Acids and Bases

## Reminder:

Acids are aqueous hydrogen compounds that turn blue litmus red.

Bases are aqueous solutions of ionic hydroxides that turn red litmus blue.

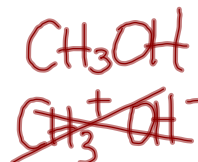
## IDENTIFYING ACIDS AND BASES FROM FORMULA'S

Most acid can be identified from **starting with H** or ending in **-COOH**.

i.e. HCl, H<sub>2</sub>SO<sub>4</sub>, CH<sub>3</sub>COOH

- **Note: NH<sub>3</sub> and CH<sub>4</sub> are not acids!**

Most bases can be identified from ending in **-OH**



Bases are named using the rules for naming ionic compounds.

**Ex. NaOH      sodium hydroxide**



When naming acids, common names (for common acids) or IUPAC names can be used.

### Classical Acid Names

- used the suffix **-ic** Ex. sulfuric
- used hydro and the suffix **-ic** Ex. hydrochloric
- used suffix **-ous** Ex. sulfurous
- and others (see inside back cover)

### IUPAC (modern) Acid Names

- name the acid as an aqueous hydrogen compound
- Ex. aqueous hydrogen sulfide - H<sub>2</sub>S<sub>(aq)</sub>

# Rules for Naming Acids

1. If anion ends in -ide, the acid is "hydro\_\_\_\_\_ic acid"

Ex. HCl



hydrochloric acid

aqueous hydrogen chloride

2. If anion ends in -ate, the acid is "\_\_\_\_\_ic acid"

Ex.  $\text{H}_2\text{SO}_4$



Sulfuric acid

aqueous hydrogen sulfate

3. If anion ends in -ite, the acid is "\_\_\_\_\_ous acid"

Ex.  $\text{H}_2\text{SO}_3$



Sulfurous acid

aqueous hydrogen sulfite

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EXERCISE # 29,30