Common Cations, Anions, Acids, Salts and Hydrate Nomenclature

Cations (positive ions)		**Anions** (negative ions)		**Acids** (H^+ and anion)	
H^+	***Hydrogen ion*** *(proton)*	H^-	***Hydride ion***		
NH_4^+	***Ammonium ion***	F^-	***Fluoride ion***	HF	***Hydrofluoric acid***
Main Group Ions		Cl^-	***Chloride ion***	HCl	***Hydrochloric acid***
Li^+	***Lithium ion***	Br^-	***Bromide ion***	HBr	***Hydrobromic acid***
Na^+	***Sodium ion***	I^-	***Iodide ion***	HI	***Hydroiodic acid***
K^+	***Potassium ion***	O^{2-}	***Oxide ion***		
Rb^+	***Rubidium ion***	OH^-	***Hydroxide ion***		
Cs^+	***Cesium ion***	O_2^{2-}	***Peroxide ion***		
Be^{2+}	***Beryllium ion***	S^{2-}	***Sulfide ion***	H_2S	***Hydrosulfuric acid***
Mg^2	***Magnesium ion***	HS^-	***Hydrogen sulfide ion***		
Ca^{2+}	***Calcium ion***	Se^{2-}	***Selenide Ion***		
Sr^{2+}	***Strontium ion***	N^{3-}	***Nitride ion***		
Ba^{2+}	***Barium ion***	N_3^-	Azide ion		
Al^{3+}	***Aluminum ion***	P^{3-}	***Phosphide ion***		
Sn^{2+}	***Tin(II)*** *(stannous)* ***ion***	As^{3-}	***Arsinide ion***		
Sn^{4+}	***Tin(IV)*** *(stannic)* ***ion***	C^{4-}	***Carbide ion***		
Pb^{2+}	***Lead(II)*** *(plumbous)* ***ion***	CN^-	***Cyanide ion***	HCN	***Hydrocyanic Acid***
Pb^{4+}	***Lead(IV)*** *(plumbic)* ***ion***	*Oxoanions*		*Oxoacids*	
Sb^{3+}	***Antimony(III)*** *(antimonous)* ***ion***	ClO_1^-	***Hypochlorite ion***	HClO	***Hypochlorous acid***
Sb^{5+}	***Antimony(V)*** *(antimonic)* ***ion***	ClO_2^-	***Chlorite ion***	$HClO_2$	***Chlorous acid***
Bi^{3+}	***Bismuth(III)*** *(bismuthous)* ***ion***	ClO_3^-	***Chlorate ion***	$HClO_3$	***Chloric acid***
Bi^{5+}	***Bismuth(V)*** *(bismuthic)* ***ion***	ClO_4^-	***Perchlorate ion***	$HClO_4$	***Perchloric acid***
Transition metal ions		SO_3^{2-}	***Sulfite ion***	H_2SO_3	***Sulfurous acid***
Cr^{2+}	***Chromium(II)*** *(chromous)* ***ion***	SO_4^{2-}	***Sulfate ion***	H_2SO_4	***Sulfuric acid***
Cr^{3+}	***Chromium(III)*** *(chromic)* ***ion***	HSO_4^-	***Hydrogen sulfate ion*** *(bisulfate ion)*		
Mn^{2+}	***Manganese(II)*** *(manganous)* ***ion***	$S_2O_3^{2-}$	***Thiosulfate ion***	$H_2S_2O_3$	***Thiosulfuric acid***
Mn^{3+}	***Manganese(III)*** *(manganic)* ***ion***	NO_2^-	***Nitrite ion***	HNO_2	***Nitrous acid***
Fe^{2+}	***Iron(II)*** *(ferrous)* ***ion***	NO_3^-	***Nitrate ion***	HNO_3	***Nitric acid***
Fe^{3+}	***Iron(III)*** *(ferric)* ***ion***	PO_3^{3-}	***Phosphite ion***	H_3PO_3	***Phosphorous acid***
Co^{2+}	***Cobalt(II)*** *(cobaltous)* ***ion***	PO_4^{3-}	***Phosphate ion***	H_3PO_4	***Phosphoric acid***
Co^{3+}	***Cobalt(III)*** *(cobaltic)* ***ion***	HPO_4^{2-}	***(Mono)hydrogen phosphate ion***		
Ni^{2+}	***Nickel(II)*** *(nickelous)* ***ion***	$H_2PO_4^-$	***Dihydrogen phosphate ion***		
Ni^{3+}	***Nickel(III)*** *(nickelic)* ***ion***	CO_3^{2-}	***Carbonate ion***	H_2CO_3	***Carbonic Acid***
Cu^+	***Copper(I)*** *(cuprous)* ***ion***	HCO_3^-	***Hydrogen carbonate ion*** *(bicarbonate ion)*		
Cu^{2+}	***Copper(II)*** *(cupric)* ***ion***	$C_2O_4^{2-}$	***Oxalate ion***	$H_2C_2O_4$	***Oxalic acid***
Ag^+	***Silver(I) ion***	NCO^-	***Cyanate ion***	HOCN	***Cyanic Acid***
Au^+	***Gold(I)*** *(aurous)* ***ion***	OCN^-	***Isocyanate ion***	HNCO	***Isocyanic acid***
Au^{3+}	***Gold(III)*** *(auric)* ***ion***	SCN^-	***Thiocyanate ion***	HNCS	***Thiocyanic Acid***
Zn^{2+}	***Zinc ion***	CrO_4^{2-}	***Chromate ion***	H_2CrO_4	***Chromic acid***
Cd^{2+}	***Cadmium ion***	$Cr_2O_7^{2-}$	***Dichromate ion***	$H_2Cr_2O_7$	**(Di)*Chromic acid***
Hg_2^{2+}	***Mercury(I)*** *(mercurous)* ***ion***	MnO_4^-	***Permanganate ion***		
Hg^{2+}	***Mercury(II)*** *(mercuric)* ***ion***				

Salts *(Made of ions, neutral in charge)*

Name: **(Cation)(anion) (prefix)hydrate** *(If # = 0 hydrate is omitted)*

Formula: **$(Cation)_m(Anion)_n \cdot (\#)H_2O$** *(If # = 0 H_2O is omitted)*

Examples

Cations on the left, anions on the right, charge must cancel

Strontium Chloride = Strontium ions and Chloride ions = Sr^{+2} and Cl^- = $SrCl_2$

Multiples of polyatomic ions require parenthesis

Ammonium Sulfate = Ammonium ions and Sulfate ions = NH_4^+ and SO_4^{2-} = $(NH_4)_2SO_4$

Calcium Phosphate = Calcium ions and Phosphate ions = Ca^{2+} and PO_4^{3-} = $Ca_3(PO_4)_2$

Waters of hydration *(use table to left)*

copper(II) sulfate pentahydrate = $CuSO_4 \cdot 5H_2O$

# of Water	Prefix
1	Mono
2	Di
3	Tri
4	Tetra
5	Penta
6	Hexa
7	Hepta
8	Octa
9	Nona
10	Deca
11	Undeca

Common Covalent Binary Inorganic Compounds

# of atoms	Prefix	Common Examples (element closest to fluorine goes on right)			
1	Mono	H_2	Hydrogen	N_2	Nitrogen
2	Di	O_2	Oxygen	NH_3	Ammonia
3	Tri	O_3	Ozone	NO	Nitrogen monoxide (Nitric Oxide)
4	Tetra	H_2O	Water (Dihydrogen Monoxide)	NO_2	Nitrogen dioxide
5	Penta	F_2	Fluorine	N_2O	Dinitrogen monoxide (Nitrous oxide)
6	Hexa	HF	Hydrogen fluoride	N_2O_2	Dinitrogen dioxide
7	Hepta	Cl_2	Chlorine	N_2O_4	Dinitrogen tetroxide
8	Octa	HCl	Hydrogen chloride	CO	Carbon monoxide
9	Nona	Br_2	Bromine	CO_2	Carbon dioxide
10	Deca	I_2	Iodine	CCl_4	Carbon tetrachloride

Organic Nomenclature and Symbolism

(Other group prefixes)(longest chain prefix)(highest bond root)(most important group suffix)

Bond Order	Name	Drawn	Root	Formula
1	Single	C-C	ane	C_nH_{2n+2}
2	Double	C=C	ene	C_nH_{2n}
3	Triple	C≡C	yne	C_nH_{2n-2}

Carbon has 4 bonds
In formula:
Groups -1 H
Other C-C bonds -2 H

Group Name	Drawn	Prefix	Suffix
Amine	$-NH_2$	Amino	amine
Ammonium ion	$-NH_3^+$		ammonium ion
Carboxylic acid*	 or -COOH or $-CO_2H$	Carboxyl	oic acid
Carboxylate ion*	 or $-COO^-$ or $-CO_2^-$		oate ion
Alcohol	-OH	Hydroxy	ol
Halogen	-F	Fluoro	
	-Cl	Chloro	
	-Br	Bromo	
	-I	Iodo	
Aromatic	 or C_6H_5 or -Φ or -Ph	Phenyl	

Carbon #	Chain Prefix: Systematic	Chain Prefix: Common**
1	Methyl	Formyl
2	Ethyl	Acetyl
3	Propyl	Propionyl
4	Butyl	Butyryl
5	Pentyl	Valeryl
6	Hexyl	Caproyl
7	Heptyl	Enanthyl
8	Octyl	Caprylyl
9	Nonyl	Pelargonyl
10	Decyl	Capryl

Drop 'yl' from prefix for longest chain

*Include carbon in chain prefix

**Don't use bond root (names only ane)
Drop 'o' from carboxyl groups ('ic' and 'ate')

Examples

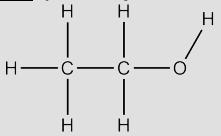
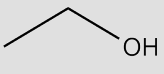
Name	Formula
Methane	CH_4
Ethane	C_2H_6
Propane	C_3H_8
Butane	C_4H_{10}
Pentane	C_5H_{12}
Methanol	CH_3OH
Ethanol	C_2H_5OH
Propanol	C_3H_7OH
Butanol	C_4H_9OH
Pentanol	$C_5H_{11}OH$

Systematic Name	Common Name	Formula
Methanoic acid	Formic acid	HCO_2H
Ethanoic acid	Acetic acid	CH_3CO_2H
Propanoic acid	Propionic acid	$C_2H_5CO_2H$
Butanoic acid	Butyric acid	$C_3H_7CO_2H$
Pentanoic acid	Valeric acid	$C_4H_9CO_2H$
Methanoate ion	Formate ion	HCO_2^-
Ethanoate ion	Acetate ion	$CH_3CO_2^-$
Propanoate ion	Propionate ion	$C_2H_5CO_2^-$
Butanoate ion	Butyrate ion	$C_3H_7CO_2^-$
Pentanoate ion	Valerate ion	$C_4H_9CO_2^-$

Name	Formula
1,2-Dichloroethane	$C_2H_4Cl_2$
Methylamine	CH_3NH_2
Methylammonium ion	$CH_3NH_3^+$
1,3-butadiene	C_4H_6
Hydroxyethanoic acid	$HOCH_2CO_2H$
Phenol	C_6H_5OH

Special Names	Formula
Benzene	C_6H_6
Toluene	$C_6H_5CH_3$

Most Common Formula Representations *(All represent ethanol)*

	Molecular Formula	Condensed Molecular Formula	Structural Formula	Line Formula
Example	C_2H_6O	CH_3CH_2OH		
Name				