

CHE 120 Nomenclature

Table 1 Elements

Hydrogen	H	Aluminum	Al	Manganese	Mn	Rubidium	Rb
Helium	He	Silicon	Si	Iron	Fe	Strontium	Sr
Lithium	Li	Phosphorus	P	Cobalt	Co	Silver	Ag
Beryllium	Be	Sulfur	S	Nickel	Ni	Cadmium	Cd
Boron	B	Chlorine	Cl	Copper	Cu	Tin	Sn
Carbon	C	Argon	Ar	Zinc	Zn	Iodine	I
Nitrogen	N	Potassium	K	Gallium	Ga	Cesium	Cs
Oxygen	O	Calcium	Ca	Germanium	Ge	Barium	Ba
Fluorine	F	Scandium	Sc	Arsenic	As	Gold	Au
Neon	Ne	Titanium	Ti	Selenium	Se	Mercury	Hg
Sodium	Na	Vanadium	V	Bromine	Br	Lead	Pb
Magnesium	Mg	Chromium	Cr	Krypton	Kr	Bismuth	Bi
						Uranium	U

Table 2 Polyatomic Ions (Most Common)

Acetate ion	$\text{CH}_3\text{COO}^{1-}$
Ammonium ion	NH_4^+
Carbonate ion	CO_3^{2-}
Hydrogen carbonate (bicarbonate) ion	HCO_3^{1-}
Hydronium ion	H_3O^+
Hydroxide ion	OH^{1-}
Nitrate ion	NO_3^{1-}
Nitrite ion	NO_2^{1-}
Phosphate ion	PO_4^{3-}
Hydrogen phosphate ion	HPO_4^{2-}
Dihydrogen phosphate ion	$\text{H}_2\text{PO}_4^{1-}$
Sulfate ion	SO_4^{2-}
Hydrogen sulfate (bisulfate) ion	HSO_4^{1-}

Table 3 Polyatomic Ions (Less Common)

Chromate ion	CrO_4^{2-}
Cyanide ion	CN^{1-}
Dichromate ion	$\text{Cr}_2\text{O}_7^{2-}$
Oxalate ion	$\text{C}_2\text{O}_4^{2-}$
Permanganate ion	MnO_4^{1-}
Peroxide ion	O_2^{2-}
Sulfite ion	SO_3^{2-}
Hydrogen sulfite (bisulfite) ion	HSO_3^{1-}
Thiosulfate ion	$\text{S}_2\text{O}_3^{2-}$
Hypochlorite ion*	ClO^{1-}
Chlorite ion*	ClO_2^{1-}
Chlorate ion*	ClO_3^{1-}
Perchlorate ion*	ClO_4^{1-}

*May extend these names for the Br and I analogs

Examples: BrO_2^{1-} is the bromite ion

IO_4^{1-} is the periodate ion

Table 4 Monoatomic Ions

Group 1A Metal ions (+1 charge)	-add ion to root name	(sodium ion)
Group 2A Metal ions (+2 charge)	-add ion to root name	(barium ion)
Group 3A Metal ions (+3 charge)	-add ion to root name	(aluminum ion)

Zinc (+2), Cadmium (+2) & Silver (+1)	-add ion to root name	(zinc ion)
Group 4A Nonmetal ions (-4 charge)	-change root name ending to ide & add ion	(carbide ion)
Group 5A Nonmetal ions (-3 charge)	-change root name ending to ide & add ion	(nitride ion)
Group 6A Nonmetal ions (-2 charge)	-change root name ending to ide & add ion	(oxide ion)
Group 7A Nonmetal ions (-1 charge)	-change root name ending to ide & add ion	(fluoride ion)
Hydrogen (+1 charge)	hydrogen ion	(-1 charge) hydride ion

Metals except Group 1A, 2A, 3A, zinc, cadmium and silver:

After root name add Roman numeral in parentheses to indicate charge, followed by ion.

Fe ³⁺	iron(III) ion	Fe ²⁺	iron(II) ion	Pb ²⁺	lead(II) ion
Cr ³⁺	chromium(III) ion	Cr ²⁺	chromium(II) ion	Sn ²⁺	tin(II) ion
Cu ²⁺	copper(II) ion	Cu ¹⁺	copper(I) ion	Ti ²⁺	titanium(II) ion
Co ³⁺	cobalt(III) ion	Co ²⁺	cobalt(II) ion	Mn ²⁺	manganese(II) ion
Hg ²⁺	mercury(II) ion	Hg ₂ ²⁺	mercury(I) ion	Ni ²⁺	nickel(II) ion

Table 5 Naming Ionic Compounds:

name cation name anion (dropping the “ion”).

examples:	NaCl	sodium chloride	Cu ₂ O	copper(I) oxide
	Ag ₂ SO ₄	silver sulfate	NH ₄ NO ₃	ammonium nitrate

Table 6 Naming Binary Molecular Compounds

Use the following prefixes* to indicate the number of each atom in the formula.

1 mono	2 di	3 tri	4 tetra	5 penta
6 hexa	7 hepta	8 octa	9 nona	10 deca

name the first element with the appropriate prefix, then the second element with prefix and the ending changed to -ide (the prefix “mono” is often omitted)

examples:	SF ₆	sulfur hexafluoride	N ₂ O	dinitrogen oxide
	N ₂ O ₅	dinitrogen pentaoxide	PCl ₃	phosphorus trichloride

*These prefixes are also used to give the number of water molecules in a hydrated substance.

Table 7 Naming Acids

Name of an acid is related to the name of its anion:

Anion	(add H ⁺ ions)	Acid
_____ide ion	→	hydro_____ic acid
_____ate ion	→	_____ic acid
_____ite ion	→	_____ous acid

Examples:	Cl ¹⁻	<u>chloride ion</u>	→	HCl _(aq)	<u>hydrochloric acid</u>
	NO ₃ ¹⁻	<u>nitrate ion</u>	→	HNO _{3(aq)}	<u>nitric acid</u>
	SO ₄ ²⁻	<u>sulfate ion</u>	→	H ₂ SO _{4(aq)}	<u>sulfuric acid</u>
	BrO ₂ ¹⁻	<u>bromite ion</u>	→	HBrO _{2(aq)}	<u>bromous acid</u>