

“Need to Know” for Chemistry

Symbol	Name	Symbol	Name	Symbol	Name
Ag	Silver	Fe	Iron	O	Oxygen
Al	Aluminum	H	Hydrogen	P	Phosphorus
Ar	Argon	He	Helium	Pb	Lead
Au	Gold	Hg	Mercury	Pt	Platinum
Ba	Barium	I	Iodine	Pu	Plutonium
Br	Bromine	K	Potassium	S	Sulfur / Sulphur
C	Carbon	Li	Lithium	Si	Silicon
Ca	Calcium	Mg	Magnesium	Sn	Tin
Cl	Chlorine	Mn	Manganese	Ti	Titanium
Co	Cobalt	N	Nitrogen	U	Uranium
Cr	Chromium	Na	Sodium	W	Tungsten
Cu	Copper	Ne	Neon	Zn	Zinc
F	Fluorine	Ni	Nickel		

Ionic Charges

1+	2+	Mainly multivalent				4+	3+	4-	3-	2-	1-	No charge
Li ⁺	Be ²⁺								N ³⁻	O ²⁻	F ⁻	
Na ⁺	Mg ²⁺								P ³⁻	S ²⁻	Cl ⁻	
K ⁺	Ca ²⁺				Fe ²⁺					Se ²⁻	Br ⁻	
Rb ⁺	Sr ²⁺				Fe ³⁺						I ⁻	
Cs ⁺	Ba ²⁺											
Fr ⁺	Ra ²⁺											

Multivalent Ions (not an inclusive list)

Charges	Element	Ionic Charges	Roman Numeral/Stock System	Latin “ic/ous” System
1+ or 2+	copper	Cu ⁺	copper (I)	cuprous
		Cu ²⁺	copper (II)	cupric
	mercury	Hg ⁺	mercury (I)	mercurous
		Hg ²⁺	mercury (II)	mercuric
1+ or 3+	gold	Au ⁺	gold (I)	aurous
		Au ³⁺	gold (III)	auric
2+ or 3+	iron	Fe ²⁺	iron (II)	ferrous
		Fe ³⁺	iron (III)	ferric
	nickel	Ni ²⁺	nickel (II)	nickelous
		Ni ³⁺	nickel (III)	nickelic
2+ or 4+	lead	Pb ²⁺	lead (II)	plumbous
		Pb ⁴⁺	lead (IV)	plumbic
	manganese	Mn ²⁺	manganese (II)	manganous
		Mn ⁴⁺	manganese (IV)	manganic
	tin	Sn ²⁺	tin (II)	stannous
		Sn ⁴⁺	tin (IV)	stannic

Latin system “enriched” – not testable

Polyatomic Ions

Name of Polyatomic Ion	Ion Formula	Ionic Charge
nitrate	NO_3^-	-1
nitrite	NO_2^-	
perchlorate	ClO_4^-	
chlorate	ClO_3^-	
chlorite	ClO_2^-	
hypochlorite	ClO^-	
hydroxide	OH^-	
bicarbonate	HCO_3^-	
acetate	$\text{C}_2\text{H}_3\text{O}_2^- / \text{CH}_3\text{COO}^-$	
permanganate	MnO_4^-	
cyanide	CN^-	
carbonate	CO_3^{2-}	-2
sulfate	SO_4^{2-}	-2
phosphate	PO_4^{3-}	-3
ammonium	NH_4^+	+1

Common Prefixes

Prefix or Suffix	Meaning	Example
Bi-	Hydrogen is present in the molecule	Sodium bicarbonate (NaHCO_3)
-ide	There are only 2 types of atoms present	Lead oxide (PbO)
-ate	There are 3 or more types of atoms and one is O	Calcium carbonate

Diatomic Elements

Element	Formula of Molecule	State at Room Temp.
hydrogen	H_2	gas
oxygen	O_2	gas
fluorine	F_2	gas
bromine	Br_2	liquid
iodine	I_2	solid / gas
nitrogen	N_2	gas
chlorine	Cl_2	gas

Covalent Prefixes

**mono is never used for the first element* Second element, drop -a & -o before vowel, ex. "pentoxide"*

Prefix	Number of Atoms	Prefix	Number of Atoms
Mon(o)-	1	hexa-	6
di-	2	hepta-	7
tri-	3	octa-	8
tetra-	4	nona-	9
penta-	5	deca-	10

Common Names

Common Name	Formula	Use/Occurrence
water	H_2O	Most commonly molecular compound on Earth; "universal" solvent
ammonia	NH_3	Used in window cleaners & in fertilizer production
nitric oxide	NO	An air pollutant produced in car engines when gasoline is burned
nitrous oxide	N_2O	Colourless gas used as an anesthetic (laughing gas)
hydrogen peroxide	H_2O_2	Used as a strong oxidizer, bleaching agent and disinfectant
methane	CH_4	Highly flammable hydrocarbon, main component of natural gas