

Guidelines for Nomenclature

Chem20, Elementary Chemistry

Base Element Names for Common Non-Metals

Chemical Symbol	Element Name	Base Element Name
N	Nitrogen	nitro-
P	Phosphorous	phosph-
O	Oxygen	ox -
S	Sulfur	sulf-
F	Fluorine	fluor-
Cl	Chlorine	chlor-
Br	Bromine	brom-
I	Iodine	iod-

Ionic Compounds – Metal to Non-Metal

Remember that the most metallic element is named first in the chemical formula; therefore the metal cation in ionic compounds will always be the first element named.

Type I – Group 1A/2A Metals, Polyatomic Cations

cation _ anion (+ ide if anion is an element)

Examples: MgS – magnesium sulfide, CaF₂ – calcium fluoride, Na₂O – sodium oxide.

Group	1A	2A	6A	7A
Charge	+1	+2	-2	-1

Exceptions: Ag⁺, Zn²⁺, Al³⁺

Type II – Group 1B-8B Transition Metals

cation(charge of cation in Roman numerals) _ anion (+ ide if anion is an element)

Examples: FeCl₂ – iron(II) chloride, PtO₂ – platinum(IV) oxide.

Names of polyatomic ions can substitute for any cation or anion.

Common Polyatomic Ions

4 Oxygens	3 Oxygens	2 Oxygens	1 Oxygen	0 Oxygens
phosphate, PO ₄ ³⁻	phosphite, PO ₃ ³⁻			
sulfate, SO ₄ ²⁻	sulfite, SO ₃ ²⁻			
	carbonate, CO ₃ ²⁻	carbonite, CO ₂ ²⁻		
	nitrate, NO ₃ ⁻	nitrite, NO ₂ ⁻		
			hydroxide, OH ⁻	
				cyanide, CN ⁻
				ammonium, NH ₄ ⁺

Examples: MgCO_3 – magnesium carbonate, NH_4Cl – ammonium chloride, AgNO_3 – silver nitrate, $\text{Fe}_2(\text{SO}_4)_3$ – iron(III) sulfate.

Acids – Releases H^+ in aqueous solution

Remember that the acidic H (the atom released as H^+) is always listed first.

Binary Acids – hydrogen + non-metal

“-ide”: (hydro)anion base name(+ic) _ acid

Examples: HBr – hydrobromic acid, HF – hydrofluoric acid, H_2Se – hydroselenic acid.

Oxyacids – hydrogen + oxyanion

“-ate”: anion base name(+ic) _ acid

Examples: H_2SO_4 – sulfuric acid, H_3PO_4 – phosphoric acid.

“-ite”: anion base name(+ous) _ acid

Examples: H_2SO_3 – sulfurous acid, HClO_3 – chlorous acid.

Molecular Compounds – Non-Metal to Non-Metal

Remember that the most metallic element is named first.

Hydrogen is treated as a member of Group 7A.

(prefix+)first element name _ (prefix+)second element base name(+ide)

In the case that the first element's prefix is “mono-”, no prefix is used.

Prefixes for Molecular Compounds

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

Examples: H_2O – dihydrogen monoxide*, N_2O_4 – dinitrogen tetroxide*, ClF_4 – chlorine tetrafluoride.

** If oxygen is the second element and its intended prefix ends with a vowel, that last vowel is dropped from the prefix leaving only the “o” from the base element name (“ox-”).*