

Rules for Naming Compounds

Rules are different and unique for naming three different types of compounds:

- Covalent = nonmetal + nonmetal
- Ionic = metal + nonmetal
- Acid = starts with H

Naming Covalent Compounds

Rule 1: Element with lower group number and/or higher period number goes first. (left and lower)

Examples: H₂O, CO₂, NO₂, SO₂

Rule 2: Drop ending of second element and add -IDE

Examples: oxygen → oxide, fluorine → fluoride, sulfur → sulfide

Rule 3: Add prefixes to show number of atoms in compound, but DON'T add "mono" to first element (1 is assumed)

Examples: carbon monoxide (CO), triphosphorus tetranitride (P₃N₄)

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

Naming Ionic Compounds AND Writing Ionic Formulas

Rule 1: Name the cation and then the anion (no capitalization!)

Examples: NaCl = sodium chloride, MgF₂ = magnesium fluoride

Rule 2: Drop ending of second element and add -IDE

Rule 3: Do NOT use prefixes. You determine subscripts based on charges of ions.

Rule 4: When using transition metals, indicate charge with Roman numeral in parentheses

Examples: Fe₃(PO₄)₂ = iron (II) phosphate, mercury (I) chloride = HgCl

Rule 5: When using polyatomic ions, do not use parentheses unless multiple ions are needed.

Examples: NaNO₃, (NH₄)₃PO₄

Rule 6: When polyatomic ions contain oxygen, less oxygen atoms ends with -ite, while more oxygen atoms ends in -ate

Examples: nitrite vs. nitrate, sulfite versus sulfate

Rule 7: When more than two oxygen options exist, there is also hypo- + -ite and per- + -ate.

-ide	F ⁻ , fluoride	Cl ⁻ , chloride	Br ⁻ , bromide	I ⁻ , iodide
hypo- + -ite	FO ⁻ , hypofluorite	ClO ⁻ , hypochlorite	BrO ⁻ , hypobromite	IO ⁻ , hypoiodite
-ite	FO ₂ ⁻ , fluorite	ClO ₂ ⁻ , chlorite	BrO ₂ ⁻ , bromite	IO ₂ ⁻ , iodite
-ate	FO ₃ ⁻ , fluorate	ClO ₃ ⁻ , chlorate	BrO ₃ ⁻ , bromate	IO ₃ ⁻ , iodate
per- + -ate	FO ₄ ⁻ , perfluorate	ClO ₄ ⁻ , perchlorate	BrO ₄ ⁻ , perbromate	IO ₄ ⁻ , periodate

Naming Acids

Rule 1: Memorize them! When no oxygen, hydro + anion + -ic

HCl	hydrochloric acid
HF	hydrofluoric acid
HBr	hydrobromic acid
HI	hydroiodic acid

Rule 2: When acids contain oxygen, use just polyatomic ion name with -ous for -ite and -ic for -ate

Examples:

Acid name

H₂SO₃, sulfurous acid

H₂SO₄, sulfuric acid

HClO, hypochlorous acid

HClO₂, chlorous acid

HClO₃, chloric acid

HClO₄, perchloric acid

Anion name:

SO₃²⁻, sulfite

SO₄²⁻, sulfate

ClO⁻, hypochlorite

ClO₂⁻, chlorite

ClO₃⁻, chlorate

ClO₄⁻, perchlorate