

Ionic Compounds

An ionic compound, for the purposes of naming, consists of a metal combined with a non-metal or a polyatomic ion, *e.g.*, sodium and chlorine (NaCl) or barium and nitrate ($Ba(NO_3)_2$).

Metal (single valence) + Non-metal or ion

Metal + Non-metal (e.g., Na + Cl)

- Rule: Name of metal + name of non-metal + "-ide" suffix
 - e.g., NaCl \rightarrow Sodium chloride

Metal + polyatomic ion $(e.g., Na + CO_3)$

• Rule: Name of metal + name of ion

 $e.g., Na_2CO_3 \rightarrow Sodium carbonate$

Metal (multiple valences) + Non-metal or ion

Some metals (mostly transition metals) have multiple valence values, so you need to specify which value the metal has in the compound you are naming. You do this by placing the metal's valence value as a roman numeral in parentheses immediately after the metal's name.

Metal + Non-metal (e.g., Fe + O) Metal + polyatomic ion (e.g., $Fe + SO_4$)

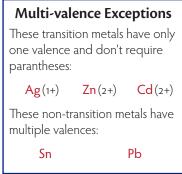
- Rule: Metal name (valence/charge) non-metal/ion name
 - e.g., FePO₄ \rightarrow Iron (III) phosphate Fe₃(PO₄)₂ \rightarrow Iron (II) phosphate

Covalent Compounds (Non-metal + Non-metal)

• Rule: Prefix + 1st element + prefix + 2nd element + "ide"

e.g., $P_2O_3 \rightarrow$ diphosphorous trioxide

 $CF_4 \rightarrow$ carbon tetraflouride (note no "mono" for first element)



Non-metal Prefixes				
1	Mono	6	Hexa	
2	Di	7	Hepta	
3	Tri	8	Octa	
4	Tetra	9	Nona	
5	Penta	10	Deca	

Naming Oxy-Anions

Number of Oxygens:

Start with the -ate ion; the others are based on the number of oxygens compared to that.

Start with the -ate ion		Na_2BrO_3	Sodium bromate
 –1 Oxygen 	Suffix -ite	Na_2BrO_2	Sodium Bromite
► –2 Oxygen	Prefix Hypo-, suffix -ite	Na ₂ BrO	Sodium hypobromite
+1 Oxygen	Prefix Per-, suffix -ate	Na_2BrO_4	Sodium perbromate
 Add H⁺ 	Prefix Hydrogen	Na2HBrO3 Na2HBrO2	Sodium hydrogenbromate Sodium hydrogenbromite

Naming Acids

Binary Acids

Hydrogen + one non-metal element

• Rule: "Hydro" + name of non-metal + "-ic" suffix + "acid"

The suffix replaces the "-ine" that ends the original element name.

e.g., HCl \rightarrow Hydrochloric acid

Oxyacids

Hydrogen + polyatomic ion

The name of one of these acids is derived from the name, and in particular the suffix, of the polyatomic ion. Note that it's not possible to derive these names without knowing the name of the ion.

lon name ends in "-ate"

• Rule: Name of ion with "-ate" replaced by "-ic" + "acid"

e.g., H_2CO_3 (Carbonate ion) \rightarrow Carbonic acid

The ion name is sometimes massaged to make pronounciation smoother.

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H_2SO_4 (Sulfate ion) \rightarrow Sulfuric acid (not "Sulfic acid")
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lon name ends in "-ite"

• Rule: Name of ion with "-ite" replaced by "-ous" + "acid"

e.g., HNO_2 (Nitrite ion) \rightarrow Nitrous acid

The ion name is sometimes massaged to make pronounciation smoother.

 H_2SO_3 (Sulfite ion) \rightarrow Sulfurous acid (not "Sulfous acid")