

Molecular Compounds and Acids

- **OBJECTIVES:**

- Apply the rules for naming and writing formulas for binary molecular compounds.

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- Name and write formulas for common acids.

Molecular compounds

- made of just ***nonmetals***
- smallest piece is a molecule
- can't be held together because of opposite charges.
- can't use charges to figure out how many of each atom

Molecular are easier!

- Ionic compounds use charges to determine how many of each.
 - Have to figure out charges.
 - Have to figure out numbers.
- Molecular compounds name tells you the number of atoms.
- Uses prefixes to tell you the number

Prefixes (Table 6.5, p.159)

- 1 = mono-
- 2 = di-
- 3 = tri-
- 4 = tetra-
- 5 = penta-
- 6 = hexa-
- 7 = hepta-
- 8 = octa-

Prefixes

- 9 = nona-
- 10 = deca-
- To write the name, write two words:

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- One exception is we don't write mono- if there is only one of the first element.
- No double vowels when writing names (oa oo)

Name These

- N_2O
- NO_2
- Cl_2O_7
- CBr_4
- CO_2
- BaCl_2

Write formulas for these

- diphosphorus pentoxide
- tetraiodine nonoxide
- sulfur hexafluoride
- nitrogen trioxide
- carbon tetrahydride
- phosphorus trifluoride
- aluminum chloride

Acids

Writing names and Formulas

Acids

- Compounds that give off hydrogen ions when dissolved in water.
- Must have H in them.
- will always be some H next to an anion.
- The **anion** determines the name.

Naming acids

- If the anion attached to hydrogen ends in -ide, put the prefix hydro- and change -ide to -ic acid
- HCl - hydrogen ion and chloride ion
- hydrochloric acid
- H₂S hydrogen ion and sulfide ion
- hydrosulfuric acid

Naming Acids

- If the anion has oxygen in it, then it ends in -ate or -ite
- change the suffix -ate to -ic acid (use no prefix)
- HNO₃ Hydrogen and nitrate ions
- Nitric acid
- change the suffix -ite to -ous acid
- HNO₂ Hydrogen and nitrite ions
- Nitrous acid

Name these

- HF
- H₃P
- H₂SO₄
- H₂SO₃
- HCN
- H₂CrO₄

Writing Acid Formulas

- Hydrogen will always be first
- name will tell you the anion
- make the charges cancel out.
- Starts with hydro?- no oxygen, -ide
- no hydro?, -ate comes from -ic, -ite comes from -ous

Write formulas for these

- hydroiodic acid
- acetic acid
- carbonic acid
- phosphorous acid
- hydrobromic acid

Acid Nomenclature

Anion	Action	Acid
-ide (chloride, Cl ⁻)	add H ⁺ ions	hydro-...ic acid (hydrochloric acid, HCl)
-ate (chlorate, ClO ₃ ⁻) (perchlorate, ClO ₄ ⁻)	add H ⁺ ions	...ic acid (chloric acid, HClO ₃) (perchloric acid, HClO ₄)
-ite (chlorite, ClO ₂ ⁻) (hypochlorite, ClO ⁻)	add H ⁺ ions	...ous acid (chlorous acid, HClO ₂) (hypochlorous acid, HClO)

- If the anion in the acid ends in *-ide*, change the ending to *-ic acid* and add the prefix *hydro-* :
 - HCl: hydrochloric acid
 - HBr: hydrobromic acid
 - HI: hydroiodic acid

Acid Nomenclature

Anion	Action	Acid
-ide (chloride, Cl ⁻)	add H ⁺ ions	hydro-...ic acid (hydrochloric acid, HCl)
-ate (chlorate, ClO ₃ ⁻) (perchlorate, ClO ₄ ⁻)	add H ⁺ ions	...ic acid (chloric acid, HClO ₃) (perchloric acid, HClO ₄)
-ite (chlorite, ClO ₂ ⁻) (hypochlorite, ClO ⁻)	add H ⁺ ions	...ous acid (chlorous acid, HClO ₂) (hypochlorous acid, HClO)

- If the anion in the acid ends in *-ite*, change the ending to *-ous acid* :
 - HClO: hypochlorous acid
 - HClO₂: chlorous acid

Acid Nomenclature

Anion	Action	Acid
-ide (chloride, Cl ⁻)	add H ⁺ ions	hydro-...ic acid (hydrochloric acid, HCl)
-ate (chlorate, ClO ₃ ⁻) (perchlorate, ClO ₄ ⁻)	add H ⁺ ions	...ic acid (chloric acid, HClO ₃) (perchloric acid, HClO ₄)
-ite (chlorite, ClO ₂ ⁻) (hypochlorite, ClO ⁻)	add H ⁺ ions	...ous acid (chlorous acid, HClO ₂) (hypochlorous acid, HClO)

- If the anion in the acid ends in *-ate*, change the ending to *-ic acid* :
 - HClO₃: chloric acid
 - HClO₄: perchloric acid
