

## Chapter 3 Chemical Compounds Compounds

### Ionic “salts”

Transfer of electrons from + metal – non-metal  
Always empirical formula

### Covalent “molecules”

Sharing 2 or more pair e-  
Ex. C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> (CH<sub>2</sub>O)  
Diatomic elements

**Naming Binary Ionic compounds:** (Zumdahl emphasizes only naming first. Last section is for writing formulas)

Contains two ions: a positive *cation* metal with a negative *anion* non-metal

CD disk 1, sodium and chlorine gas to produce sodium chloride

Type I compounds, only 1 type of cation charge. From column 1,2, and 3 Ex. Na<sup>+</sup>, Ba<sup>2+</sup>, Al<sup>3+</sup>

Practice from memorized ions on the periodic table.

See rules on p. 128 for naming compounds

The cation is always named first and the anion second

The anion takes its name from the element name and adding ide

Practice Worksheet Sample 1

Type II compounds, metal cation can have more than one charge.

Generally from Transition Series. Except, Zn<sup>2+</sup>, Cd<sup>2+</sup>, Ag<sup>+</sup>

P. 131, Table 5.2 Old vs. Systematic Name

Cation charge can be determined by looking at the anion.

Compare FeCl<sub>3</sub> with FeCl<sub>2</sub>, What is charge on Fe in each case?

Name: Iron(III) chloride vs. Iron(II) chloride

Hint: Higher charge has -“ic” compared to lower charge with -“ous” (Ferrous wheel drawing)

Ion	Stock	Traditional	Example
Fe <sup>2+</sup>	Iron(II)	Ferrous	FeCl <sub>2</sub>
Fe <sup>3+</sup>	Iron(III)	Ferric	FeCl <sub>3</sub>
Pb <sup>2+</sup>	Lead(II)	Plumbous	PbO
Pb <sup>4+</sup>	Lead(IV)	Plumbic	PbO <sub>2</sub>

Practice Worksheet Sample 2

**Naming Compounds that contain Polyatomic Ions:** (usually only two words)

Oxyanions on page 140, Table 5.4

Ex. with Cl and O. Same charge is retained as oxygen atoms are increased or removed

Ex. ClO<sup>-</sup> hypochlorite

ClO<sub>2</sub><sup>-</sup> chlorite

ClO<sub>3</sub><sup>-</sup> chlorate

ClO<sub>4</sub><sup>-</sup> perchlorate

If need to indicate more than one polyatomic ion, use parenthesis.

Find only positive polyatomic ion

Practice Worksheet Sample 3

## Naming Binary Molecular Compounds:

Type III Contains two non-metals.

First element in formula is named first. Use full name of element

Second element is named as an anion (ide)

Prefixes denote number of atoms present.

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

Mono is never used for naming first element

**Practice Worksheet Sample 4**

## Naming Acids:

Acids are molecular compounds that contain H. Written first in formula to indicate its ability to be an acidic proton.

Types:

Monoprotic (ex. HCl), Diprotic ex. (H<sub>2</sub>SO<sub>4</sub>), Triprotic (ex. H<sub>3</sub>PO<sub>4</sub>)

Oxyacids; containing oxygen (see polyatomic ions)

Binary hydro acids end with “ic” acid

“ate” acids and with “ic” Ex. ClO<sub>3</sub><sup>–</sup> = chlorate, HClO<sub>3</sub> = chloric acid

“ite” acids end with “ous” Ex. SO<sub>3</sub><sup>2–</sup> = sulfite, H<sub>2</sub>SO<sub>2</sub> = sulfurous acid

**Practice Worksheet Sample 5**

## Homework: Complete Naming Compounds Worksheet

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## Writing Formulas of compounds

Subscripts represent numbers of atoms of each type of element. Avoid using 1.

Instruct students with naming as Stock (Roman Numerals) and Traditional (ic / ous) system. See table 5.2

Transition Metals need Roman Numerals. Columns IA, IIA, Al and B are always as predicted in ionic compounds.

## Homework: Writing Formulas of Compounds Worksheet