The Periodic Table

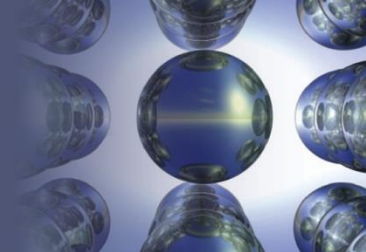© Cengage Learning. All Rights Reserved.

Groups or Families

▪ Table of common charges formed when creating ionic compounds.

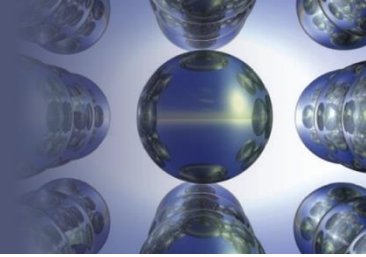| Group or Family	Charge
Alkali Metals (1A)	1+
Alkaline Earth Metals (2A)	2+
Halogens (7A)	1–
Noble Gases (8A)	0

Naming Compounds

- Binary Compounds

  - Composed of two elements

  - Ionic and covalent compounds included

- Binary Ionic Compounds

  - Metal—nonmetal

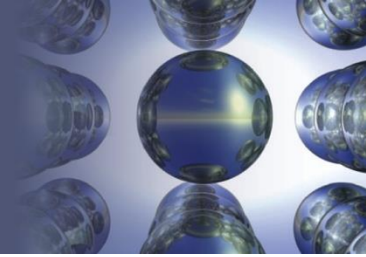- Binary Covalent Compounds

  - Nonmetal—nonmetal

Binary Ionic Compounds (Type I)

1. The cation is always named first and the anion second.

2. A monatomic cation takes its name from the name of the parent element.

3. A monatomic anion is named by taking the root of the element name and adding *–ide*.

Binary Ionic Compounds (Type I)

- Examples:

  KCl   Potassium chloride

  $MgBr_2$ Magnesium bromide
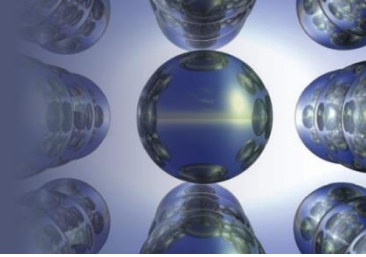
  CaO   Calcium oxide
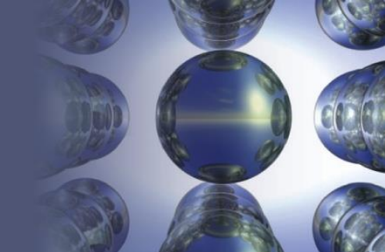
Binary Ionic Compounds (Type II)

- Metals in these compounds form more than one type of positive ion.

- Charge on the metal ion must be specified.

- Roman numeral indicates the charge of the metal cation.

- Transition metal cations usually require a Roman numeral.

- Elements that form only one cation do not need to be identified by a roman numeral.

Binary Ionic Compounds (Type II)

- Examples:

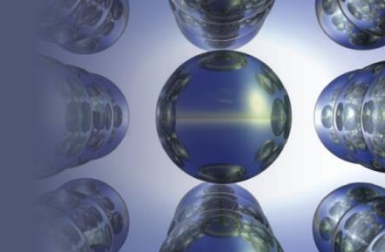|	
CuBr	Copper(I) bromide
FeS	Iron(II) sulfide
PbO_2	Lead(IV) oxide

Polyatomic Ions

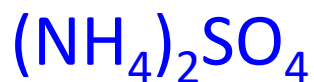- Must be memorized (see Table 2.5 on pg. 65 in text).
- Examples of compounds containing polyatomic ions:
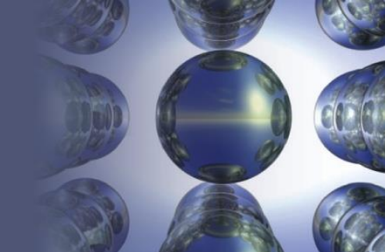
  NaOH   Sodium hydroxide

  $Mg(NO_3)_2$ Magnesium nitrate

  $(NH_4)_2SO_4$ Ammonium sulfate

Binary Covalent Compounds (Type III)

- Formed between two nonmetals.

1. The first element in the formula is named first, using the full element name.

2. The second element is named as if it were an anion.

3. Prefixes are used to denote the numbers of atoms present.

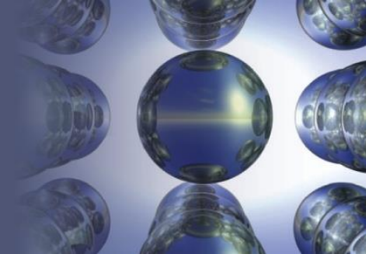4. The prefix *mono-* is never used for naming the first element.

Prefixes Used to Indicate Number in Chemical Names

Table 2.6 | Prefixes Used to Indicate Number in Chemical Names

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

Binary Covalent Compounds (Type III)

- Examples:

  CO_2 Carbon dioxide

  SF_6 Sulfur hexafluoride
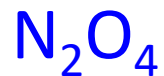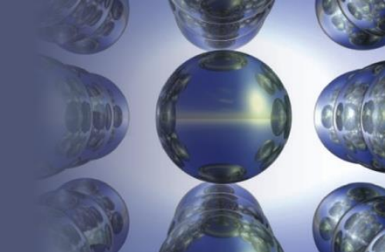
  N_2O_4 Dinitrogen tetroxide
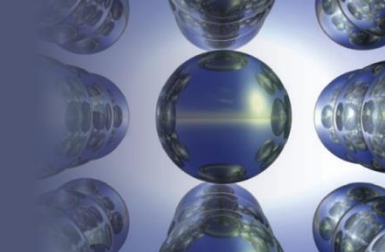
Acids

- Acids can be recognized by the hydrogen that appears first in the formula—HCl.

- Molecule with one or more H^+ ions attached to an anion.

Acids

- If the anion does *not* contain oxygen, the acid is named with the prefix *hydro–* and the suffix *–ic*.

- Examples:

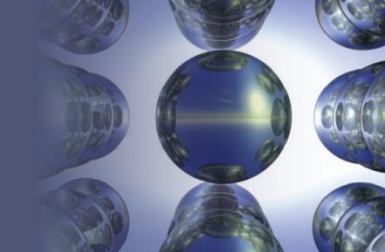 HCl   Hydrochloric acid

  HCN   Hydrocyanic acid

  H_2S Hydrosulfuric acid

Acids

- If the anion *does* contain oxygen:

  - The suffix *–ic* is added to the root name if the anion name ends in *–ate*.

- Examples:

  HNO_3 Nitric acid

  H_2SO_4 Sulfuric acid

  $HC_2H_3O_2$ Acetic acid

Acids

- If the anion *does* contain oxygen:

  - The suffix *–ous* is added to the root name if the anion name ends in *–ite*.

- Examples:

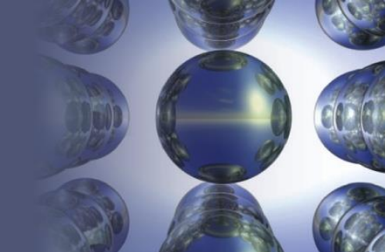 HNO_2 Nitrous acid

  H_2SO_3 Sulfurous acid

  $HClO_2$ Chlorous acid