Lesson 9: Forming Compounds (Nelson Textbook Page 178)

Learning Goals

- I can identify compounds as ionic or molecular.

- **Chemical compounds** are formed from **elements** in the **Periodic Table.**
- **Chemical Compounds can be ionic or molecular (covalent).**
- **Molecular = covalent**

Ionic Compounds

- Consist of a **metal** and a **non-metal**

Examples:

- Sodium (Na) and Chlorine (Cl) combine to form table salt (NaCl).

Molecular (covalent) compounds

- Consist of **two non-metals**

Examples:

- Carbon (C) and oxygen (O) combine to form carbon dioxide (CO_2).

Ionic or Molecular?

1. $CaCl_2$
2. N_2S_3
3. K_2S
4. CF_4
5. NaCl
6. Al_2O_3
7. NCl_3
8. CO_2
9. PF_5
10. LiBr

Ionic or Molecular?

1. $CaCl_2$ Molecular
2. N_2S_3 Molecular
3. K_2S Ionic
4. CF_4 Molecular
5. NaCl Ionic
6. Al_2O_3 Ionic
7. NCl_3 Molecular
8. CO_2 Molecular
9. PF_5 Molecular
10. LiBr Ionic

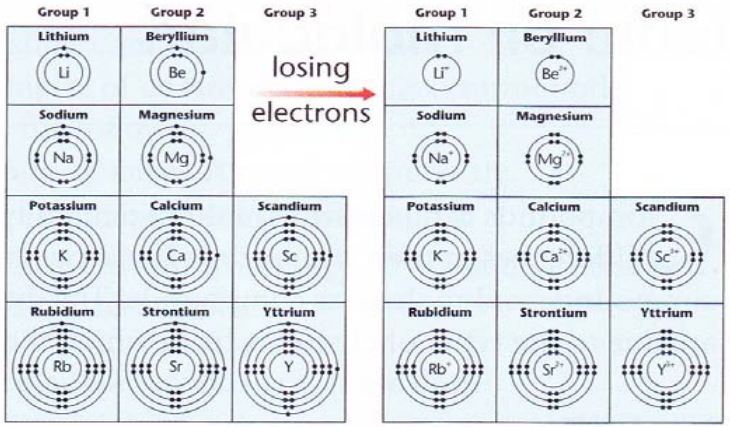
Three Ways Elements Become Stable

- **Metals LOSE electrons** to non-metals, to form **positive ions**.
- **METALS** usually have **less than 4 electrons** in their **outer shell** → easily to lose than gain
- **Non-metals GAIN electrons** from metals, to form **negative ions**.
- **NON-METALS** usually have **more than 4 electrons** in their **outer shell** → easily to gain than lose
- **Non-metals SHARE electrons** (non-metal + non-metal)

Table 2.1 The Three Ways That Elements Become Stable

1. Metals lose electrons to form positive ions.

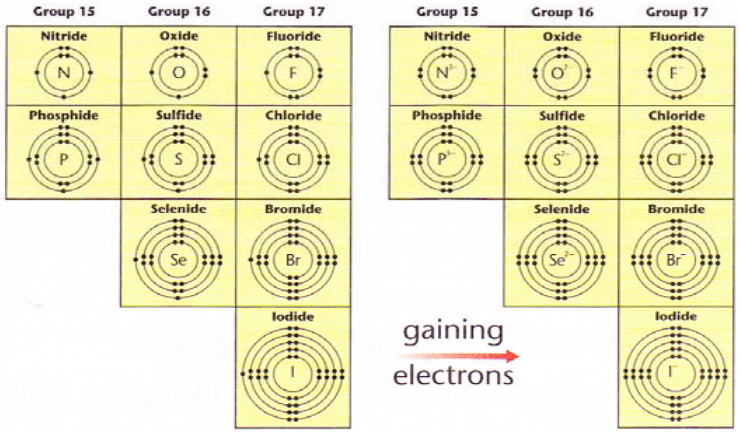
The charge on the Group 1 metal ions is +1 because they have lost one electron. The Group 2 metal ions have a charge of +2, and the Group 3 metal ions have a charge of +3.



Metal atoms can lose electrons to become stable. Because they have lost electrons, which have a negative charge, the charge on metal ions is positive. All metal ions have a stable electron-shell structure.

2. Non-metals gain electrons to form negative ions.

The charge on the Group 17 non-metal ions is −1 because they have gained one electron. The Group 16 non-metal ions have a charge of −2, and the Group 15 non-metal ions have a charge of −3.



Non-metal atoms can gain electrons to become stable. Because they have gained electrons, which have a negative charge, the charge on metal ions is negative. Notice that the name of a negative ion ends in "ide." All non-metal ions have a stable electron-shell structure.

3. Non-metals share electrons.

Non-metal atoms can also share electrons with other non-metal atoms to become stable. Their electron shells overlap. Since electrons have not been lost or gained, there is no charge on the atoms when electrons are shared.