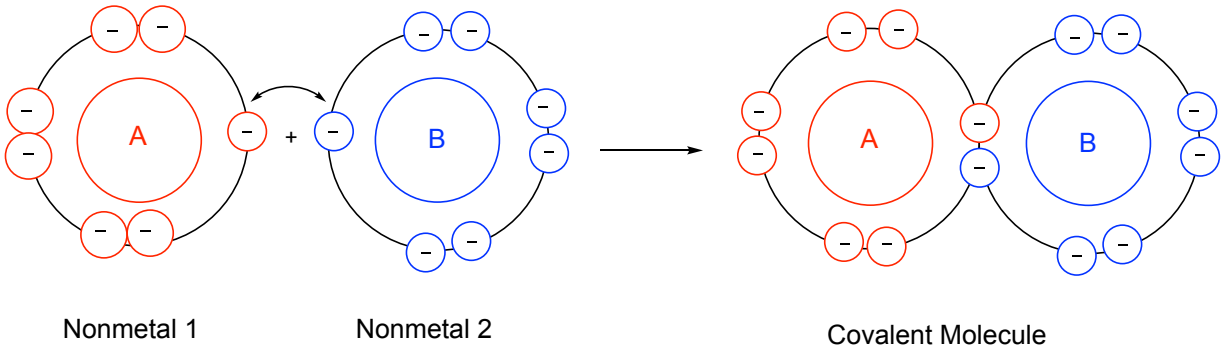
Covalent Bonds (Molecular Compounds)

- Occurs between **two nonmetals**
- Electrons are **shared**



- **How to Name:**
  - General formula:
    - Prefix for # atoms (least electronegative non-metal) + prefix for # atoms (root of most electronegative non-metal) + -ide

Number of Atoms	Prefix
1	Mono-
2	Di-
3	Tri-
4	Tetra-
5	Penta-
6	Hexa-
7	Hepta-
8	Octa-

  - Naming Exceptions:
    - Do not use mono- for the first element if there's only one atom
  - Example 1: CI_4
    - Least electronegative non-metal = Carbon (C); atoms = 1→ no prefix
    - Most electronegative non-metal = Iodine (I); root = iod; # of atoms = 4 → tetra
    - Formula Applied: Carbon tetraiodide
    - Name: Carbon tetraiodide

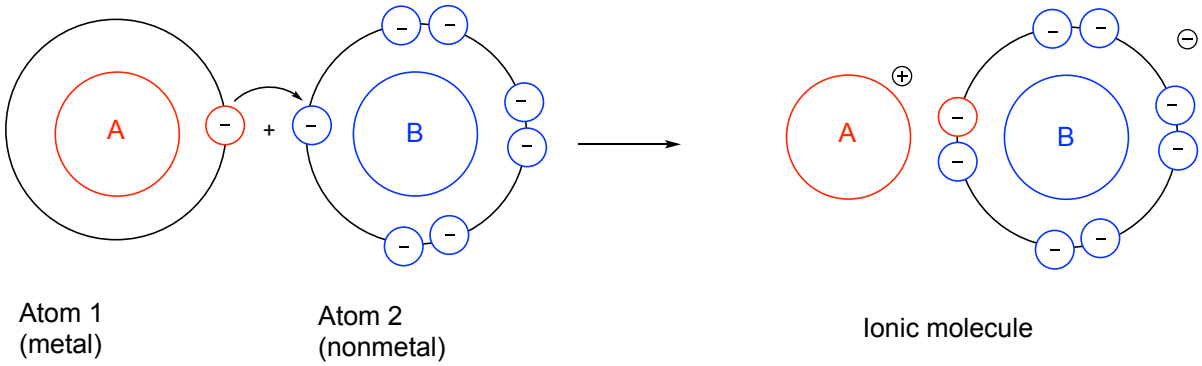
- Example 2: N_2O_3
  - Least electronegative non-metal = Nitrogen (N); atoms = 2 → di
  - Most electronegative non-metal = Oxygen (O); root = ox; atoms = 3 → tri
  - Formula Applied:Dinitrogen trioxide
  - Name: Dinitrogen trioxide

- **Practice: Name the Following Compounds:**
  1. SO_3
  2. BF_3
  3. P_3N_5

- **Practice: Write the Formulas for the Following Names:**
  1. Dihydrogen monosulfide
  2. Dicarbon hexabromide
  3. Triselenium heptoxide

Ionic Bonds

- Between a metal and a nonmetal
- Electrons are transferred
- When an atom loses an electron, it becomes a positive ion (cation)
- When an atom gains an electron, it becomes a negative ion (anion)



- **How to Name:**
  - **Possibility One: Metals with a fixed charge**
    Includes **Group 1, Group 2, Al^{3+}, Zn^{2+}, Ag^{+}**
    - General Formula: Metal name + non-metal root name + -ide
    - No Roman numerals used (since charge doesn't vary)

    Example: Al_2O_3

    - Metal = Aluminum (Al), charge = +3
    - Non-metal = Oxygen (O), root = ox, charge = -2
    - Formula Applied: Aluminum oxide
    - Name: Aluminum oxide

Practice: Name the Following Compounds:

1. BaO
2. ZnS

Practice: Write the Formulas for the Following Names:

1. Sodium chloride
2. Magnesium oxide

- **Possibility Two: Metals with a Variable Charge**
  These are transition metals (charges vary).
  We use Roman numerals to indicate the metal's charge.
  - General Formula: Metal + (Roman numeral to indicate charge of metal) + root name of non-metal + -ide
  - Tip: Use the known charge of the non-metal to calculate the metal's charge so that the compound is neutral

    Example: $FeCl_2$
    - Step 1: Analyze
      - Cl = -1
      - 2 Cl^{-1} = -2 total
      - There's 1 Fe → must be +2 to balance the charge
      - Charge Balance: (+2) + (-1 x 2) = 0
    - Step Two: Apply formula
      - Metal = Iron, charge = +2 → Roman numeral = (II)
      - Non-metal = Clorine → root = chlor
      - Formula Applied: Iron (II) chloride
      - Name: Iron (II) chloride

Practice: Name the Following Compounds

1. Mn_2S_3
2. Hg_2Cl_2

Practice: Write the Formulas for the Following Names:

1. Nickel (III) chloride
2. Chromium (IV) oxide