

# Covalent Bonding

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## Chemistry Chapter 8

## Objectives

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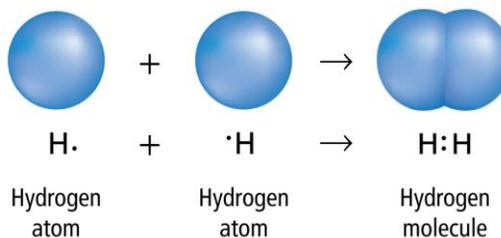
- **Apply** the Octet rule to atoms that form covalent bonds
- **Describe** the formation of single, double, and triple covalent bonds
- **Name** acidic solutions, molecular compounds
- **Summarize** the VSEPR bonding theory
- **Predict** the shape of, and the bond angle in, a molecule
- **Define** hybridization
- **Describe** how electronegativity is used to determine bond type
- **Compare and contrast** polar and nonpolar covalent bonds and polar and nonpolar molecules

## Covalent Bond

- **Covalent bonds** – sharing of electrons between atoms
  - Atoms gain stability when they share electrons and form covalent bonds (full octet, or **duet** for H)
  - Sharing valence electrons with other atoms also results in noble-gas electron configurations
  - Shared electrons are **counted as owned** by both atoms
  - A **molecule** is composed of two or more elements that are covalently bonded.
  - **Remember:** Ionic bonds form **formula units** or **ionic compounds**
- Covalent bonds can occur between same elements
  - **Diatomic elements** – H<sub>2</sub>, N<sub>2</sub>, O<sub>2</sub>, F<sub>2</sub>, Cl<sub>2</sub>, Br<sub>2</sub>, I<sub>2</sub>

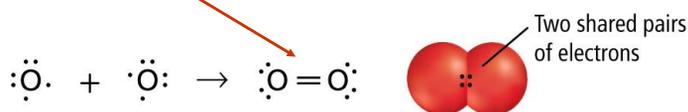
## Types of Covalent Bonds

- **Covalent Bonds**
  - Single – share one pair of electrons
  - Double – share two pairs of electrons
  - Triple – share three pair of electrons
- **Single Covalent Bonds**
  - When only one pair of electrons is shared, the result is a single covalent bond

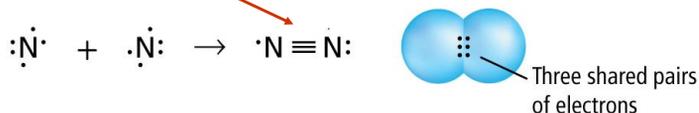


## Double & Triple Bonds

- **Double Bonds** form when **two pairs of electrons** are shared between two atoms



- **Triple Bonds** form when **three pairs of electrons** are shared between two atoms



## Naming Binary Molecular Compounds

Make sure it is a **binary covalent compound**

- The first element is always named first using the entire element name

A. Don't use 'mono' on first element



Nitrogen

- Write the root of the 2nd element

Nitrogen Ox

- Add "ide" to root

Nitrogen Oxide

- Use prefixes to show how many atoms of each type there are (Chem Info Sheet)

dinitrogen trioxide

A. If you have "ao" or "oo", turn it into "o"

## Naming Acids

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### Binary Acids

- All acids start with hydrogen
  - Acid name begins with the prefix **hydro-**
- Binary Acids end with the anion (negative ion)
  - The stem of the anion has the suffix **-ic** and followed by the word acid (remove the **-ide** ending)



**Hydro-**

(stem)-**ic** acid

**Hydrochloric** acid

## Naming Acids

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- An **Oxyacid** is an acid that contains both a hydrogen & **polyatomic**
  - Anion ends in **-ite**
    - Acid name is the stem of the anion with the suffix **-ous**, followed by the word acid
  - Anion ends in **-ate**
    - Acid name is the stem of the anion with the suffix **-ic**, followed by the word acid

$\text{H}_2\text{SO}_3$   
 $\text{SO}_3^{-2}$  Sulfite  
 (stem) **-ous** acid  
**Sulfurous acid**

$\text{H}_2\text{SO}_4$   
 $\text{SO}_4^{-2}$  Sulfate  
 (stem) **-ic** acid  
**Sulfuric acid**