Ionic Bonding

When metals react with nonmetals, electrons are transferred from the metal atoms to the non-metal atoms, forming **ions**. The resulting compound is called an **ionic** compound.

- magnesium + oxygen \rightarrow magnesium of ite O calcium + chlorine \rightarrow calcium horide

In both of these reactions, the metal atoms give electrons to the non-metal atoms. The metal atoms become positive ions and the nonmetal atoms become negative ions.

There is a strong electrostatic force of attraction between these oppositely charged ions – this is called an **ionic bond**.



Some molecules contain a double or triple bond. This type of bond occurs when more than one pair of electrons are shared between the atoms to attain a full outer shell (double bond -2 pairs of electrons, triple bond -3 pairs of electrons).

Covalent Bonding

A covalent bond forms when two nonmetal atoms share a pair of electrons. The electrons involved are in the outer shells of the atoms. An atom that shares one or more of its electrons will complete its outer shell.

Covalent bonds are **strong** – a lot of energy is needed to break them. Substances with covalent bonds often form molecules with low melting and boiling points, such as hydrogen and water. These substances have strong covalent bonds within the molecules (between the atoms), but weak intermolecular forces between the molecules. This means that only a small amount of heat energy is required to separate the molecules from each other.



Dot and Cross Models

Dot and cross models show how a pair of electrons form a covalent bond. Look at the diagram to the right showing the covalent bonding of H20 in a dot and cross model.

