



Organizer – Bond Types

Bond Type	Valence Electrons are...	Occurs between...	Examples
Ionic	TRANSFERRED as a result of an electronegativity difference greater than 1.7	Metals and nonmetals	<p>Sodium has 1 valence electron, chlorine has 7. A transfer benefits the stability of both:</p> <p style="text-align: center;"> $\text{Na } 1s^2 2s^2 2p^6 3s^1$  $\text{Cl } 1s^2 2s^2 2p^6 3s^2 3p^5$  </p> <p>This transfer forms ions, each with an octet:</p> <p style="text-align: center;"> $\text{Na}^+ 1s^2 2s^2 2p^6$ $\text{Cl}^- 1s^2 2s^2 2p^6 3s^2 3p^6$ </p> <p>All salts, which are composed of metals bonded to nonmetals, are ionic compounds and form ionic crystals. A few examples: MgCl_2, Na_2O, KI, CaO, LiF, BaS</p>
Covalent	<p>SHARED as a result of an electronegativity difference less than 1.7</p> <p style="text-align: center;">0 and 0.3 = equal sharing (nonpolar covalent)</p> <p style="text-align: center;">0.3 – 1.7 = unequal sharing (polar covalent)</p>	Nonmetals and other nonmetals	<p>The vast majority of all known compounds involve the covalent bonding of nonmetals to other nonmetals:</p> <p>H_2O – water, NH_3 – ammonia, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ – sucrose (table sugar), C_3H_8 – propane, C_2H_2 – acetylene $\text{C}_2\text{H}_5\text{OH}$ –ethyl alcohol</p>
Metallic	SHARED among all of the involved atoms in an “electron sea”	Metals and other metals	<p>This bonding occurs in any pure metals such as: Copper, gold, silver, iron, sodium, zinc</p> <p>Metallic bonding occurs in metals alloys such as: Brass, Bronze, Stainless steel</p>