**Bonding**Unit 5 Page 7

**Learning Target:**

**I will be able to** define covalent bond, explain how covalent bonds form covalent compounds, and discuss the characteristics of covalent bonding.  **I** **can** explain how covalent compounds form molecules by sharing valence electrons in ways that make the atoms more stable.

**Criteria for Success:**

**I can** construct electrons dot formulas to illustrate covalent bonds.

**Introduction to Bonding**

**A.** A chemical \_\_\_\_\_\_\_\_\_\_\_\_ is a mutual electrical attraction between the \_\_\_\_\_\_\_\_\_\_\_ charges in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charges in the valence levels of different atoms that binds the atoms together.

**B.** \_\_\_\_\_\_\_\_\_\_\_\_\_\_ tend to form so that each atom, by gaining, losing, or sharing electrons has an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons in its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ level.

**1.** The resulting arrangement of electrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the overall potential \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the system.

**Covalent Bonding**

**A.**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (aka molecular) bonds occur between two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms. Electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to complete the valence levels of the atoms.

**1.** Nonmetals have \_\_\_\_\_\_\_\_\_\_\_\_\_\_ effective nuclear charges (Zeff) and small \_\_\_\_\_\_\_\_\_\_\_\_, so they can attract and hold each others’ electrons to make shared \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons.

**2.** Atoms can make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds depending on whether they share one, two, or three pairs of electrons respectively.

**3.** The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ group of elements that are held together by covalent bonds is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Covalent compounds are also referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ compounds.

**Properties of Covalent Bonding**

**A.** Covalent compounds have relatively \_\_\_\_\_\_\_\_\_\_ melting points.

**B.** Covalent compounds typically do \_\_\_\_\_\_\_ conduct electrical current when dissolved in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ solutions.

**C.** The distance between two, covalently bonded atoms at their minimum potential energy, that is, that is the average distance between two bonded atoms, is the \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**1.** Generally, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**D.** \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the energy required to break a chemical bond and form neutral, isolated atoms. Typically represented in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ (kJ/mol).

**1.** Generally, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Directions:** Show how the atoms below would form covalent bonds by first drawing the neutral atoms and then redrawing the molecule the atoms would form.

**2.** 2 atoms of fluorine

**1.** 2 atoms of hydrogen

**4.** 2 atoms of nitrogen

**3.** 2 atoms of oxygen

**5.** 4 atoms of hydrogen and 1 atom of carbon

**6**. 2 atoms of hydrogen and two atoms of carbon