

## CHAPTER 6 – CHEMICAL BONDS

### SECTION 6.1 – IONIC BONDS

- When the \_\_\_\_\_ occupied energy level of an atom is filled with \_\_\_\_\_, the atom is stable and not likely to \_\_\_\_\_.
- The \_\_\_\_\_ have stable electron configurations with \_\_\_\_\_ valence electrons (or two in the case of \_\_\_\_\_).
- The \_\_\_\_\_ of an element depend on the number of \_\_\_\_\_.
- An \_\_\_\_\_ is a model of an atom in which each \_\_\_\_\_ represents a \_\_\_\_\_.
- Some elements achieve \_\_\_\_\_ through the \_\_\_\_\_ of electrons between atoms.
- An atom that has a net \_\_\_\_\_ is called an \_\_\_\_\_.
- An ion with a \_\_\_\_\_ charge is an \_\_\_\_\_. \_\_\_\_\_ like the  $\text{Cl}^-$  ion are named by adding the suffix \_\_\_\_\_ to the element name. (Ex.  $\text{Cl}^- =$  \_\_\_\_\_)
- An ion with a \_\_\_\_\_ charge is a \_\_\_\_\_. The name of a \_\_\_\_\_ is the same as the \_\_\_\_\_. (Ex.  $\text{Na}^+ =$  \_\_\_\_\_)
- The \_\_\_\_\_ that an ion has are based on the number of \_\_\_\_\_ that an element has.
- All of the \_\_\_\_\_ in the same \_\_\_\_\_ have the same \_\_\_\_\_.
- Is it easier for lithium to gain 7 more electrons or lose 1 electron?
- What charge would lithium have?
- Is it easier for beryllium to gain 6 more electrons or lose 2 electrons?
- What charge would beryllium have?
- Is it easier for boron to gain 5 more electrons or lose 3 electrons?
- What charge would boron have?
- Is it easier for carbon to gain 4 more electrons or lose 4 electrons?
- What charge would carbon have?
- Is it easier for nitrogen to gain 3 more electrons or lose 5 electrons?
- What charge would nitrogen have?
- Is it easier for oxygen to gain 2 more electrons or lose 6 electrons?
- What charge would oxygen have?
- Is it easier for fluorine to gain 1 more electron or lose 7 electrons?
- What charge would fluorine have?
- Would neon want to gain or lose electrons?
- What charge would neon have?
- Since \_\_\_\_\_ in the same \_\_\_\_\_ have the same number of \_\_\_\_\_, they all have the same \_\_\_\_\_.
- A \_\_\_\_\_ is the force that holds \_\_\_\_\_ together as a unit.
- An \_\_\_\_\_ is the force that holds \_\_\_\_\_ together.
- An \_\_\_\_\_ forms when electrons are \_\_\_\_\_ from one atom to another.
- When an \_\_\_\_\_ is formed, electrons are \_\_\_\_\_ until each atom has a full outer \_\_\_\_\_.

- Compounds that contain \_\_\_\_\_ are \_\_\_\_\_, which can be represented by \_\_\_\_\_.
- A \_\_\_\_\_ is a notation that shows what \_\_\_\_\_ a compound contains and the \_\_\_\_\_ of the atoms or ions of these \_\_\_\_\_ in the compound.
- A \_\_\_\_\_ for an ionic compound tells you the \_\_\_\_\_ in the compound.
- \_\_\_\_\_ whose particles are arranged in a \_\_\_\_\_ are called \_\_\_\_\_.
- \_\_\_\_\_ tend to have \_\_\_\_\_ melting points (above 300°C).
- Ionic compounds are \_\_\_\_\_ in the \_\_\_\_\_ state, but they can \_\_\_\_\_ heat or electricity when they are \_\_\_\_\_.
- Ionic compounds are \_\_\_\_\_, so they \_\_\_\_\_ when struck by a hammer.
- The properties of \_\_\_\_\_ can be explained by the strong \_\_\_\_\_ among ions within a \_\_\_\_\_.

### SECTION 6.1 ASSESSMENT

1. What is an atom least likely to react?
2. Describe one way an element can achieve a stable electron configuration.
3. What characteristic of ionic bonds can be used to explain the properties of ionic compounds?
4. What will the ratio of ions be in any compound formed from a Group 1 metal and a Group 17 nonmetal?
5. Why do ionic compounds include at least one metal?
6. Based on their chemical formulas, which of these compounds is not likely to be an ionic compound: KBr, SO<sub>2</sub>, or FeCl<sub>3</sub>?

### SECTION 6.2 – COVALENT BONDING

- A \_\_\_\_\_ is a chemical bond in which two atoms \_\_\_\_\_ a pair of \_\_\_\_\_.
- When two atoms share \_\_\_\_\_ of electrons, the bond is called a \_\_\_\_\_.
- A \_\_\_\_\_ is a neutral \_\_\_\_\_ that are joined together by one or more \_\_\_\_\_.
- The \_\_\_\_\_ between the shared electrons and the \_\_\_\_\_ in each nucleus hold the atoms together in a \_\_\_\_\_.
- Many \_\_\_\_\_ elements exist as \_\_\_\_\_. Diatomic means \_\_\_\_\_. They are \_\_\_\_\_.
- When two atoms share \_\_\_\_\_ of electrons, the bond is called a \_\_\_\_\_.
- When two atoms share \_\_\_\_\_ of electrons, the bond is called a \_\_\_\_\_.

### SECTION 6.2 ASSESSMENT

1. What attractions hold atoms together in a covalent bond?

- Which of these elements does not bond to form molecules: oxygen, chlorine, neon, or sulfur?
- Based on their electron dot diagrams, what is the formula for the covalently bonded compound of nitrogen and hydrogen?

### SECTION 6.3 – NAMING COMPOUNDS AND WRITING FORMULAS

- The name of an \_\_\_\_\_ must distinguish the \_\_\_\_\_ from other ionic compounds containing the same \_\_\_\_\_.
- The \_\_\_\_\_ of an ionic compound describes the \_\_\_\_\_ in the compound.
- A \_\_\_\_\_ made from only \_\_\_\_\_ elements is a \_\_\_\_\_.
- When naming an \_\_\_\_\_ the name of the \_\_\_\_\_ does not change and the name of the \_\_\_\_\_ has the suffix \_\_\_\_\_.
- Ex.  $\text{MgBr}_2 =$  \_\_\_\_\_
- Many \_\_\_\_\_ form more than one type of \_\_\_\_\_.
- When a \_\_\_\_\_ forms more than one ion, the name of the ion contains a \_\_\_\_\_ to indicate the \_\_\_\_\_ of the ion.
- Ex:  $\text{Fe}^{+2} =$  \_\_\_\_\_  
 $\text{Fe}^{+3} =$  \_\_\_\_\_
- A \_\_\_\_\_ bonded group of \_\_\_\_\_ that has a positive or negative \_\_\_\_\_ and acts as a unit is a \_\_\_\_\_.
- Place the symbol of the \_\_\_\_\_ first, followed by the symbol of the \_\_\_\_\_.
- Use \_\_\_\_\_ to show the \_\_\_\_\_ of the ions in the \_\_\_\_\_.
- Because all compounds are \_\_\_\_\_, the total \_\_\_\_\_ on the cations and anions must add up to \_\_\_\_\_.
- To \_\_\_\_\_ in an ionic compound, you can \_\_\_\_\_ the charges if they are not the \_\_\_\_\_.
- The name and formula of a \_\_\_\_\_ describe the \_\_\_\_\_ of atoms in a molecule of the \_\_\_\_\_.
- \_\_\_\_\_ only contain \_\_\_\_\_.
- The name of the \_\_\_\_\_ is the same. The name of the \_\_\_\_\_ ends in the suffix \_\_\_\_\_.
- \_\_\_\_\_ tell the number of \_\_\_\_\_ of each element. A \_\_\_\_\_ is not used when the \_\_\_\_\_ only has \_\_\_\_\_.
- Ex.  $\text{CO}_2 =$  \_\_\_\_\_

#### PREFIXES

1 =	2 =	3 =	4 =	5 =
6 =	7 =	8 =	9 =	10 =

- Write the \_\_\_\_\_ for the elements in the order the \_\_\_\_\_ appear in the name. The \_\_\_\_\_ indicate the \_\_\_\_\_ of atoms of each \_\_\_\_\_ in this molecule.
- Ex: diphosphorus pentoxide = \_\_\_\_\_

### SECTION 6.3 ASSESSMENT

1. What does the formula of an ionic compound describe?
2. What do the name and formula of a molecular compound describe?
3. What suffix is used to indicate an anion?
4. Why are Roman numerals used in the names of compounds that contain transition metals?
5. What is a polyatomic ion?
6. How is it possible for two different ionic compounds to contain the same elements?
7. How many potassium ions are needed to bond with a phosphate ion?
8. What are the name of these ionic compounds:  $\text{LiCl}$ ,  $\text{BaO}$ , and  $\text{Na}_3\text{N}$ ?
9. Name the molecular compounds with these formulas:  $\text{N}_2\text{O}_7$  and  $\text{CO}$ .
10. What is the formula for the ionic compound formed from potassium and sulfur?

### SECTION 6.4 – THE STRUCTURE OF METALS

- In a \_\_\_\_\_, valence electrons are \_\_\_\_\_ to move among the atoms, so the \_\_\_\_\_ are surrounded by a \_\_\_\_\_.
- A \_\_\_\_\_ is the attraction between a \_\_\_\_\_ and the shared \_\_\_\_\_ that surround it.
- The \_\_\_\_\_ in a metal form a \_\_\_\_\_ that is held in place by strong \_\_\_\_\_ between the cations and the surrounding \_\_\_\_\_.
- The more \_\_\_\_\_ an atom can contribute to the shared pool, the \_\_\_\_\_ the metallic bond will be.
- The \_\_\_\_\_ within a metal lattice explains the fact that metals are good \_\_\_\_\_.
- An \_\_\_\_\_ is a mixture of two or more elements that have \_\_\_\_\_.

### SECTION 6.4 ASSESSMENT

1. What holds metal ions together in a metal lattice?
2. What characteristic of a metallic bond explains some of the properties of metals?
3. Explain why the metallic bonds in some metals are stronger than the bonds in other metals.
4. Why are metals good conductors of electric current?
5. Can two different elements form a metallic bond together?