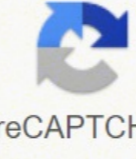


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Chapter 6 – Chemical Bonding

6-1 Introduction to Chemical Bonding

- A. - Intro**
1. A **chemical bond** is a mutual attraction between the nuclei and electrons of different atoms that binds the atoms together.
  2. By bonding with each other, atoms decrease in energy, thereby creating more stable arrangements of matter.
- B. - Types of Chemical Bonding**
1. **Ionic bonding** is chemical bonding that results from the attraction between large numbers of positive and negative ions.
  2. **Covalent bonding** results from the sharing of electron pairs between two atoms.
    - a. In a purely covalent bond, the shared electrons are shared equally by the two bonded atoms.
  3. The degree to which bonding between atoms of two elements is ionic or covalent can be estimated by calculating the electronegativity difference in the elements.
  4. A **nonpolar covalent bond** is a covalent bond in which the bonding electrons are shared equally by the bonded atoms, resulting in a nonpolar distribution of electrical charge.
  5. A **polar covalent bond** is a covalent bond in which the bonded atoms have an unequal attraction for the shared electrons (and a resulting unbalanced distribution of charge).
  6. Complete the following table to summarize this section:

Bond Type	% Ionic Character	Electronegativity difference	Bonding electrons are...
Ionic	Greater than 50%	Greater than 1.7	Transferred
Polar covalent	As high as 50%	As high as 1.7	Shared unequally
	As low as 50%	As low as 1.7	
Nonpolar covalent	As high as 50%	As high as 1.7	Shared equally
	As low as 50%	As low as 1.7	

\*\*\*On a separate piece of paper, answer Chapter Review Problems #33 & 34 from page 196. Attach your answers to THIS PAGE!

6-2 Covalent Bonding and Molecular Compounds

- A. - Intro**
1. A **molecule** is a group of atoms that are held together by covalent bonds.
  2. A **molecular compound** is a chemical compound whose smallest units are molecules.
  3. A **chemical formula** indicates the number of atoms of each kind in a chemical compound by using atomic symbols and numerical subscripts.
    - a. A **molecular formula** shows the types and numbers of atoms combined in a molecule of a molecular (covalently bonded) compound.
  4. A **diatomic molecule** is a molecule containing only two atoms.
  5. Turn to page 243 in your book, and look at Table 8-1. Make a list here of the seven elements that occur in nature as diatomic molecules:

Element	Symbol	Molecular Formula

3) Which of these kinds of energy travels in the form of waves?  
 A. chemical  
 B. kinetic  
 C. potential  
 D. sound

4) How does an object gain potential energy?  
 A. by melting  
 B. by gaining speed  
 C. by cooling to a lower temperature  
 D. by being raised above the ground

5. Fill in each blank with a word from the list. One word will be left over.  
 sound, heat, waves, mechanical, chemical, electrical  
 \_\_\_\_\_ energy travels through wires.

Ch 13 Study Guide (Chemical Bonds)

1. Fill in the table below with the correct values:

Element Name	Ion Symbol	# Protons	# Electrons	Charge	Ion Type
Fluorine	F <sup>-</sup>	9	10	-1	Anion
Iodine	I <sup>-</sup>	53	54	-1	Anion
Sulfur	S <sup>2-</sup>	16	18	-2	Anion
Potassium	K <sup>+</sup>	19	18	+1	Cation
Calcium	Ca <sup>2+</sup>	20	18	+2	Cation
Bromine	Br <sup>-</sup>	35	36	-1	Anion
Strontium	Sr <sup>2+</sup>	38	36	+2	Cation
Oxygen	O <sup>2-</sup>	8	10	-2	Anion
Magnesium	Mg <sup>2+</sup>	12	10	+2	Cation
Aluminum	Al <sup>3+</sup>	13	10	+3	Cation
Selenium	Se <sup>2-</sup>	34	36	-2	Anion
Lithium	Li <sup>+</sup>	3	2	+1	Cation
Rubidium	Rb <sup>+</sup>	37	36	+1	Cation
Chlorine	Cl <sup>-</sup>	17	18	-1	Anion

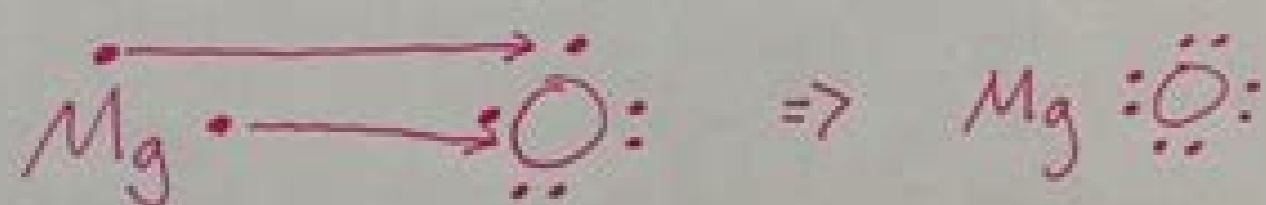
2. An ionic bond is formed between what two types of atoms?

Metal & nonmetal

3. A covalent bond is formed between what two types of atoms?

Nonmetal & Nonmetal

4. Draw the bond(s) that will form between Mg and O.



5. What is the formula for the compound formed in question #4?

MgO

### Chemical Bonding Review Worksheet

1. Which part of the atom is responsible for chemical bonding?  
\_\_\_\_\_
2. What are valence electrons (be specific)?  
\_\_\_\_\_
3. How many valence electrons do most atoms need to have a complete outer shell and be happy? \_\_\_\_\_
4. Which two elements only need two valence electrons to be happy?  
\_\_\_\_\_
5. Why do the elements you named in #4 only need two valence electrons?  
\_\_\_\_\_
6. How many valence electrons do elements in Group 1, the Alkali Metals, have?  
\_\_\_\_\_
7. How many valence electrons do elements in Group 2, the Alkaline Earth Metals, have?  
\_\_\_\_\_
8. What is an ion?  
\_\_\_\_\_
9. If an element gives away an electron, will it form a positive ion or a negative ion?  
\_\_\_\_\_
10. If an element gains an electron, will it form a positive ion or a negative ion?  
\_\_\_\_\_
11. What is the difference in a cation and an anion?  
\_\_\_\_\_
12. How do ionic bonds form?  
\_\_\_\_\_
13. How do covalent bonds form?  
\_\_\_\_\_
14. Bond the following atoms. Determine if they are ionic or covalent, circle your choice. Show the valence electrons and how they are either shared between the atoms or how they are transferred between atoms. Then write the chemical formula in the space provided.

Ionic or covalent	Ionic or covalent
C            Cl	Mg            Cl
Formula _____	Formula _____



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