

Unit 3 Honors Chemistry HW Packet: Bonding and IMF's

Name: _____ Period: _____ Date: _____

Ionic Bonding

1) Circle the properties that are true for ionic bonds

2 or more metals	share electrons	high melting point	transfer electrons
conductors as a solid	metal and nonmetal	low melting point	electrolytes

2) Write the compound that form from the following elements:

a. Calcium and nitrogen _____
b. Magnesium and sulfur _____
c. Phosphorus and lithium _____

d. Iron (+3) and nitrate _____
e. Hydroxide and zinc _____
f. Strontium and phosphate _____

3) Draw the Lewis dot diagram for the following:

a. Al_2O_3

b. Ag_2S

c. Calcium and bromine

Ionic Bonding (Criss-Cross Method)

Directions: Write the formulas of the compounds produced from the listed ions.

	F^-	CO_3^{-2}	OH^-	PO_4^{-3}	SO_4^{-2}	NO_3^-
Li^+						
NH_4^+						
Ca^{+2}						
Fe^{+3}						
Fe^{+2}						
H^+						
Co^{+3}						
Zn^{+2}						
K^+						
Al^{+3}						
Mg^{+2}						

Bonding: Covalent, Metallic and Ionic

1) From the choices below, circle the characteristics that are true for covalent bonds.

Good conductors	share electrons	low boiling point	2 or more nonmetals
High boiling point	metal and nonmetals	sea of electrons	made of metals

2) Classify the following compounds as ionic, covalent, both (compound containing a polyatomic ion), or metallic. **If it is covalent, draw a Lewis dot diagram for the compound.**

a. CaCl_2 _____

k. MgO _____

b. CO_2 _____

l. NH_4Cl _____

c. H_2O _____

m. Ag _____

d. BaSO_4 _____

n. HCl _____

e. K_2O _____

o. KI _____

f. NaF _____

p. NaOH _____

g. Na_2CO_3 _____

q. NO_2 _____

h. CH_4 _____

r. AlPO_4 _____

i. SO_3 _____

s. FeCl_3 _____

j. LiBr _____

t. N_2O_3 _____

Shapes of Molecules

Directions: Draw the **Lewis dot structure** for each of the compounds below. Then, using the VSEPR Theory, **name and sketch the shape** of the following molecules.

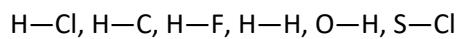
1. O ₂	7. HF
2. H ₂ O	8. CH ₃ OH
3. CO ₂	9. H ₂ S
4. NH ₃	10. CF ₄
5. CH ₄	11. CHCl ₃
6. SO ₃	12. N ₂

Polarity of Bonds

Directions: Determine the type of bond (ionic, polar covalent, or non-polar covalent) that will form between atoms of the following elements and show the polarity of the bond if it is polar covalent.

1. Mg and Br
2. C and S
3. K and S
4. O and P
5. H and N
6. S and O
7. F and F

Directions: Arrange the following covalent bonds in order of polarity, naming the most polar bond first.

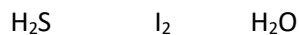


More Polarity Practice

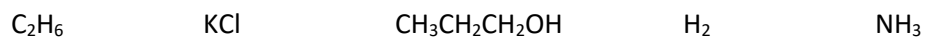
Molecule	Lewis Structure	Shape name and bond angle	Polarity? If yes, redraw with dipoles	Strongest IMF present
PCl_3				
NH_3				
H_2O				
CaO				
H_2S				
HCl				
Br_2				

Intermolecular Forces

1. Rank the following compounds from weakest intermolecular forces to strongest. Justify your answers.



2. Circle all of the species below that can form a hydrogen bond in its pure form. Explain why the other species couldn't form a hydrogen bond.



3. List **all** the types of IMF's that would occur in each of the following. If there is more than one IMF, **circle the strongest one**.

- a. CH_3CF_3
- b. CCl_4
- c. BrF
- d. $(\text{CH}_3)_3\text{N}$
- e. PCl_5
- f. PCl_3
- g. H_2O
- h. NH_3
- i. CO_2

4. List the intermolecular forces in order of decreasing strength.

5. How are intermolecular forces different from intramolecular forces (bonds)? **Be specific**