

# 7 • How Do Atoms Stick Together

## PRACTICE TEST

### Recognize the Type of Bonding

- Predict the type of bonding formed by the following pairs of atoms from their position on the periodic table.
  - LiI                      metallic / ionic / covalent
  - NO                        metallic / ionic / covalent
  - ICl                        metallic / ionic / covalent
  - SnPb                     metallic / ionic / covalent
  - CuO                      metallic / ionic / covalent
- Use the chart of electronegativity values to state whether each bond is ionic, nonpolar covalent, or polar covalent.
  - Rb – N                    \_\_\_\_\_
  - As – Cl                    \_\_\_\_\_
  - Na – At                    \_\_\_\_\_
  - Cl – Br                    \_\_\_\_\_

### Ionic Bonding

- Draw Lewis electron dot symbols for:

N		$N^{3-}$	
O		$O^{2-}$	
F		$F^-$	
Ne			
Na		$Na^+$	
Mg		$Mg^{2+}$	
Al		$Al^{3+}$	

- When K reacts with  $F_2$ , the compound \_\_\_\_\_ is formed.  
K, \_\_\_\_\_ (gains/loses) \_\_\_\_\_ electron(s) while F, \_\_\_\_\_ (gains/loses) \_\_\_\_\_ electron(s).
- Cl will be isoelectronic with the noble gas, \_\_\_\_\_, when it \_\_\_\_\_ (gains / loses)  $1 e^-$ .

### Lewis Structures

- Add dots to the element symbols below to show the Lewis electron dot symbols for the following and state the bonding capacity.

Li	Be	B	C	N	O	F	Ne

- Draw Lewis structures for the following molecules:
  - $H_2O$                     \_\_\_\_\_
  - $CH_4$                     \_\_\_\_\_
  - $PCl_3$                     \_\_\_\_\_
  - LiH                      \_\_\_\_\_
  - $H_2S$                     \_\_\_\_\_
  - $BF_3$                     \_\_\_\_\_
  - $C_2H_4$                     \_\_\_\_\_
  - $CO_2$                     \_\_\_\_\_

8. Draw the Lewis structure for hydrogen peroxide,  $\text{H}_2\text{O}_2$ ,  $\text{H}-\text{O}-\text{O}-\text{H}$ . The molecule contains:  
 \_\_\_ # shared (bonding) pairs of electrons and  
 \_\_\_ # unshared (lone) pairs of electrons.

9. Given the following Lewis structures, state the shape of the molecules. Use information from the video, the textbook (Section 15-6), and the shapes chart on page 409.

Molecule:	$\text{AlH}_3$	$\text{SiF}_4$	$\text{NH}_3$	$\text{H}_2\text{Te}$	$\text{HCl}$
Lewis Structure:					
Steric #:					
Shape:					
Polar / Nonpolar?:					

10. What type of IMF (intermolecular force) is associated with each of the following **molecules**:

Molecule:	$\text{AlH}_3$	$\text{HF}$	$\text{NH}_3$	$\text{H}_2\text{S}$	$\text{Ar}$
IMF:	London dispersion Dipole-dipole H-bonding	London dispersion Dipole-dipole H-bonding	London dispersion Dipole-dipole H-bonding	London dispersion Dipole-dipole H-bonding	London dispersion Dipole-dipole H-bonding

**For Reference:**

Electronegativity Values																
1 H 2.1																
3 Li 1.0	4 Be 1.5															
11 Na 1.0	12 Mg 1.2															
19 K 0.9	20 Ca 1.0	21 Sc 1.3	22 Ti 1.4	23 V 1.5	24 Cr 1.6	25 Mn 1.6	26 Fe 1.7	27 Co 1.7	28 Ni 1.8	29 Cu 1.8	30 Zn 1.6	31 Ga 1.7	32 Ge 1.9	33 As 2.1	34 Se 2.4	35 Br 2.8
37 Rb 0.9	38 Sr 1.0	39 Y 1.2	40 Zr 1.3	41 Nb 1.5	42 Mo 1.6	43 Tc 1.7	44 Ru 1.8	45 Rh 1.8	46 Pd 1.8	47 Ag 1.6	48 Cd 1.6	49 In 1.6	50 Sn 1.8	51 Sb 1.9	52 Te 2.1	53 I 2.5
55 Cs 0.8	56 Ba 1.0	57 La 1.1	72 Hf 1.3	73 Ta 1.4	74 W 1.5	75 Re 1.7	76 Os 1.9	77 Ir 1.9	78 Pt 1.8	79 Au 1.9	80 Hg 1.7	81 Tl 1.6	82 Pb 1.7	83 Bi 1.8	84 Po 1.9	85 At 2.1
87 Fr 0.8	88 Ra 1.0	89 Ac 1.1														