**Summative 5.1, 5.2 Study Guide – Bond Properties, Lewis Structures & Polarity**

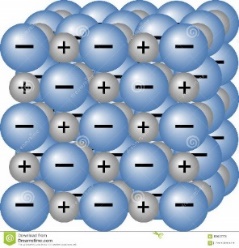
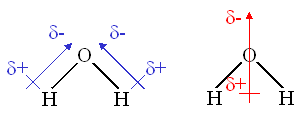
1. Classify the following compounds as ionic (I), covalent (C), metallic (M)

CaCl2 I CO2 C Ni M

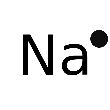
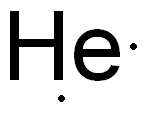
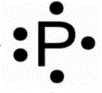
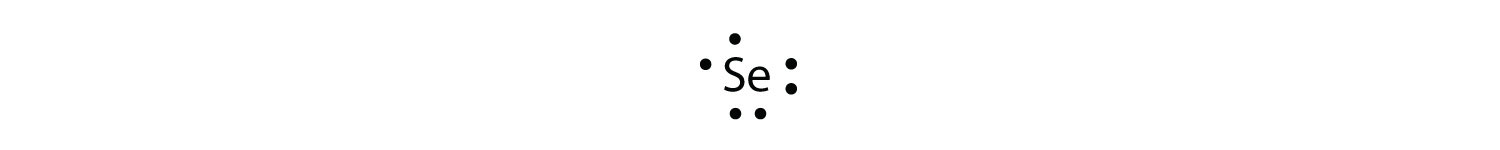
H2O C K2O I NaF I Fe M CH4 C SO3 C LiBr I MgO I P2O5 C

HCl I (hydrogen acts a metal in this case) KI I N2O3 C

1. Identify whether the following are examples of Ionic - I, Covalent (Polar or Nonpolar) – PC or NPC, or Metallic Bonds - M.
   1. Also known as an electrolyte \_\_\_\_ionic\_\_\_\_\_\_\_\_\_
   2. Has a low melting point \_\_covalent (P and NP)\_\_\_\_\_
   3. Both bonded atoms have high electronegativities NPC(if diff less than 0.5), PC if between 0.5 and 2.1
   4. Electronegativity of first atom = 0.7, Electronegativity of second atom = 2.7 \_\_\_PC\_\_
   5. Does not conduct electricity \_\_\_Covalent (P and NP)\_\_\_\_
   6. Electrons are shared unequally \_\_PC\_\_\_\_\_\_\_\_
   7. Also known as an alloy \_\_\_\_Metallic\_\_\_
   8. Electronegativity of first atom = 0.7, Electronegativity of second atom = 0.5 \_\_\_NPC\_\_\_
   9. Bond Diagram looks like \_\_\_\_Metallic\_\_\_
   10. Example molecule looks like \_\_ionic\_\_ k. Example molecule looks like \_\_PC\_\_

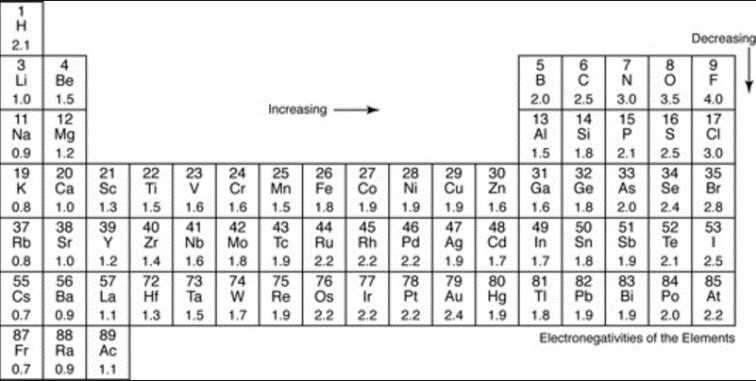
 

1. What is electronegativity? How badly an atom wants an electron (its ability to attract and keep electrons)
2. How do electronegativity values help us determine the type of bond created? If the values are close, it’s an sharing (both strong – covalent, both weak – metallic), if they are very far apart, one element is so “strong” it’s just going to take the electron from the other one (ionic)
3. For each of the following sets of elements, identify the element expected to be most electronegative (EN) and which is expected to be least electronegative (EN).
   1. K, Sc, Ca most EN= \_\_Sc\_\_\_ least EN=\_\_K\_\_
   2. Br, F, At most EN= \_\_F\_\_\_ least EN=\_\_\_At\_\_\_
   3. C, O, N most EN= \_\_O\_\_\_ least EN=\_\_C\_\_\_\_
4. Draw the lewis dot diagram for the following elements:
   1. Na b. Cl c. He d. P e. Se

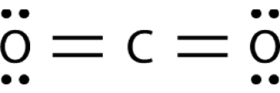
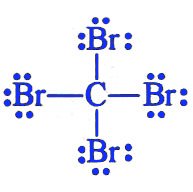
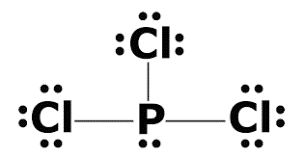
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| --- | --- | --- | --- |
| **Molecule** | **Electronegativity Values** | **Difference in Electronegativity** | **Bond Type** |
| **H – Cl** | H: 2.1 Cl: 3.0 | 0.9 | Polar Covalent |
| **H – H** | H: 2.1 H: 2.1 | 0 | NP Covalent |
| **H - I** | H: 2.1 I: 2.5 | 0.4 | NP Covalent |
| **Cl - Cl** | Cl: 3.0 Cl: 3.0 | 0 | NP Covalent |
| **C – O** | C: 2.5 O: 3.0 | 0.5 | NP Covalent |

1. For each of the following molecules to the right, determine if it is covalent, polar covalent, or ionic. Show your work by listing the electronegativities of each element in the bond. (use the table to the right)

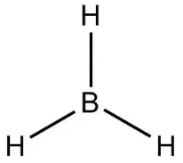
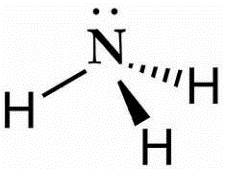


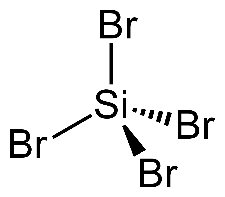
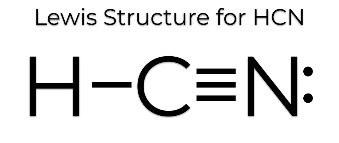
1. Draw Lewis Structures for the following molecules.

SF2 CO2 CBr4 PCl3

* 1. Which is more polar – CO2 or PCl3 – Why? PCl3 because it is asymmetrical. CO2 is a symmetrical molecule so it is nonpolar.

1. For each of the following pairs of molecules, determine which is most polar and explain your reason for making this choice:
   1. boron trihydride (BH3) OR ammonia (NH3)

NH3 because it is not symmetrical.

* 1. silicon tetrabromide (SiBr4) OR HCN

HCN because it is not symmetrical.

1. Which element(s) can have fewer than 8 and still be stable/happy? \_H\_ \_He\_ \_B\_
2. Which element(s) can have more? \_P\_ \_S\_