**Bonding Review – Unit 2**

Unit 2 Review Part 1 Review - Bonding

1. Define Ionic and Covalent Bonding. List the typical physical properties of ionic & covalent compounds?

|  |  |  |
| --- | --- | --- |
|  | Definition | Physical Properties |
| Ionic Bonding |  |  |
| Covalent Bonding |  |  |

2. Based on the type of elements identify each as ionic or covalent:

a) CO2, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b) NaCl, \_\_\_\_\_\_\_\_\_\_\_\_\_

c) FeCl2, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ d) CCl4, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) Al2SO3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Using difference in electronegativities (🛆E.N.). Classify as ionic, non-polar covalent, or polar covalent.

|  |  |  |
| --- | --- | --- |
|  | (🛆E.N.) | Type of bond |
| H2 |  |  |
| CH4 |  |  |
| LiF |  |  |
| H2O |  |  |

3. Illustrate the **ionic bonding** between **Mg** and **P** using both Lewis diagrams.

4. Use Lewis diagrams and structures to show the **covalent bonding** between O + Cl, P + H, N + N. Indicate on your drawings if any of the bonds are polar.

|  |  |  |
| --- | --- | --- |
| Element involved in bond | Structural Diagram | Type of Bonding |
| Ex. Carbon and oxygen | Formula:  Name: |  |
| O + Cl | Formula:  Name: |  |
| P + H, | Formula:  Name: |  |
| N + N | Formula:  Name: |  |

1. Ms. Warner discovers a blue solid under an old cupboard in the chemistry lab. As a responsible chemist, she simply cannot throw it out. The identity of the substance needs to be known before it can be disposed – correctly, so she decides to do some tests on it.

|  |  |
| --- | --- |
| Test | Observation |

1. From the observations made, indicate one chemical and one physical property that were discovered about the solid.
2. From the observations, what type of substance was the blue solid? Defend your choice. Be as specific as possible.

|  |  |
| --- | --- |
| 1. (a)  hits substance with hammer 2. (b)  places solid into H2O 3. (c)  heats solid in test tube with flame | * breaks into smaller crystals; hard little pieces   -dissolves into the solution; able to conduct electricity  (solution turns light bulb on)   * -changes colour (blackens) and releases a gas; gas makes limewater turn milky   -has a very high melting point, >500oC |

c. Explain what allows this compound to act as an electrolyte when dissolved in solution.

1. Complete Table 1. Look up the melting point for each compound and calculate the difference in electronegativities.

 Table 1. Compounds formed between lithium and the halogens

|  |  |  |
| --- | --- | --- |
| Compound | Melting point | Difference in electronegativity |
| LiF |  |  |
| LiCl |  |  |
| LiBr |  |  |
| LiI |  |  |

1. Explain the trend in melting point for these compounds. What does this indicate about the strength of the ionic bond?

b) How does the strength of the ionic bond relate to the difference in electronegativity between the elements forming the bond?

1. Even though coal-burning power plants have survived through the years with many objections, the environmental problems that they are responsible for are real. Coal contains sulfur compounds, meaning the combustion of coal produces sulfur dioxide, SO2(g).
   1. Sulfur dioxide released to the atmosphere reacts further with oxygen to form sulfur trioxide gas. Give the balanced equation for this reaction. Indicate the type of chemical reaction.
   2. Sulfur trioxide gas reacts with water vapour producing sulfuric acid. Give the balanced equation for this reaction. Indicate the type of chemical reaction.
   3. Explain why the burning of coal has been an environmental concern.
2. Two inert electrodes have been immersed into an aqueous solution containing copper(II) chloride. The electrodes are then connected to a power supply and the apparatus is moved into a fume hood. As the power supply is steadily increased, bubbles begin to form at one of the electrodes creating an unpleasant odour. The other electrode has a brownish-pink solid forming on it, and over time the blue colour of the solution fades.
   1. Write a word equation representing the reaction that is taking place.
   2. Give the balanced chemical equation for the reaction. Indicate the type of chemical reaction.
3. A clear, colourless solution was left in an unlabeled beaker on the chemistry bench from the previous day’s experiment. The classes had used two solutions yesterday: aqueous hydrochloric acid and aqueous silver nitrate. The identity of the solution would be determined through simple diagnostic tests.  The solution turned blue litmus paper red and when a piece of zinc was placed in a test tube with the solution, bubbles began to form on the surface of the metal. The gas that formed was then exposed to a lit splint and created a small ‘pop’ noise.
   1. List one physical property of the solution and one chemical property of the solution.
   2. Write a word equation representing the reaction of the solution with zinc.
   3. Give the balanced chemical equation for the reaction. Indicate the type of chemical reaction.
   4. What results would have been expected from the diagnostic tests if the identity of the solution was actually aqueous silver nitrate?