**AP Chemistry Review**

**Wkst - Unit 6 Bonding**

1. Use the principles of bonding and molecular structure to explain the following statements.
   1. The boiling point of argon is -186°C, whereas the boiling point of neon is -246°C.
   2. Solid sodium melts at 98 °C, but solid potassium melts at 64°C.
   3. More energy is required to break up a CaO(s) crystal into ions than to break up a KF(s) crystal into ions.
   4. Molten KF conducts electricity, but solid KF does not.
2. The carbonate ion CO3-2 is formed when carbon dioxide, CO2 reacts with slightly basic cold water.
   * 1. Draw the Lewis electron dot structure for the carbonate ion. Include resonance forms if they apply.
     2. Draw the Lewis electron dot structure for carbon dioxide.
   1. Describe the hybridization of carbon in the carbonate ion.
      1. Describe the relative lengths of the three C-O bonds in the carbonate ion.
      2. Compare the average length of the C-O bonds in the carbonate ion to the average length of the C-O bonds in carbon dioxide

|  |  |  |  |
| --- | --- | --- | --- |
| Substance | Boiling point (°C) | Bond Length (A) | Bond Strength (kcal/mole) |
| H2 | -253 | 0.75 | 104.2 |
| N2 | -196 | 1.10 | 226.8 |
| O2 | -182 | 121 | 118.9 |
| Cl2 | -34 | 1.99 | 58.0 |

* 1. Explain the differences in the properties given in the table above for each of the following pairs.
     1. The bond strengths of N2 and O2
     2. The bond lengths of H2 and Cl2
     3. The boiling points of O2 and Cl2
  2. Use the principles of molecular bonding to explain why H2 and O2 are gases at room temperature, while H2O is a liquid at room temperature.

1. H2S, SO4 -2, XeF2 , ICl4 **-**
   1. Draw a Lewis electron dot diagram for each of the molecules listed above.
   2. Use the valence shell electron-pair repulsion (VSEPR) model to predict the geometry of each of the molecules.
2. Use the principles of bonding and molecular structure to explain the following statements.
   1. The angle between the N-F bonds in NF3, is smaller than the angle between the B-F bonds in BF3.
   2. I2(s) is insoluble in water, but it is soluble in carbon tetrachloride.
   3. Diamond is one of the hardest substances on Earth.
   4. HCI has a lower boiling point than either HF or HBr.