**Intermolecular Forces and Evaporation Rates**

**Introduction**

Intermolecular forces of attraction (IMFs) are the forces between molecules which determine the properties of substances. (List the three IMFs and discuss relative strengths). Discuss three physical properties and how they vary with different IMFs operative in a substance.

**Procedure/Observations**

1. Obtain 4 pieces of filter paper, one rubber band and a bulb thermeter.
2. Attach the filter paper to the end of the thermometer at the bulb with a rubber band . Dip into the test tube containing the compound to be studied (acetone, hexane, water and ethanol). When temperature is stabilized record the temperature while the paper on the thermometer is still submerged in the liquid. This is the measurement for time = 0.0 min.
3. Start time when you pull thermometer out of the liquid. Note: if there is a big drop hanging from the paper when you remove, touch the drop to the side of the test tube to get rid of it.
4. Record the temperature with the correct significant figures every thirty seconds for 8 min.
5. Repeat for the other three liquids.

**Data**

**Table 1: Rate of cooling due to evaporation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time elapsed (min) | Acetone (T C) | Hexane T (C ) | Water T ( C) | Ethanol T ( C) |
| 0.0 |  |  |  |  |
| 0.5 |  |  |  |  |
| 1.0 |  |  |  |  |
|  |  |  |  |  |
| 2.0 |  |  |  |  |
|  |  |  |  |  |
| 3.0 |  |  |  |  |
|  |  |  |  |  |
| 4.0 |  |  |  |  |
|  |  |  |  |  |
| 5.0 |  |  |  |  |
|  |  |  |  |  |
| 6.0 |  |  |  |  |
|  |  |  |  |  |
| 7.0 |  |  |  |  |
|  |  |  |  |  |
| 8.0 |  |  |  |  |

**Data Analysis** - Graph your data (4 smooth curve graphs, one for each substance) Temp (y), time (x). Label each graph and provide key.

Draw the line structure for each of the compounds.

**Conclusion** - Rank the 4 liquids in order of least IMF to greatest. Give evidence for your ranking. Think about how the change in temperature is related to the IMFs.