Experiment 2: Solubility

How molecular structure can be used to predict solubility and miscibility. Why some mixtures will separate into heterogenous matter and others will form solutions.

We will be doing parts A through E of this experiment. We will not be doing part F.

Preparations

Read: Experiment 02 - Solubility (page 12)
Technique 05 - Measurement
Technique 10 - Solubility

Do: Prepare your lab notebook:
- State experiment objectives (for each part assigned)
- List materials used w/ properties (solvents used in previous experiments do not need to be repeated)
- Make a procedures bullet list (for each part assigned)

Intended Learning Outcomes

* Know that alkanes generally have the lowest mp, bp, viscosity and hardness of substances with equal molar mass.
* Know that alkanes generally have the least solubility in water of substances with equal molar mass.
* Know that the physical properties of alkanes are mostly due to their inability to participate in dipole-dipole and hydrogen bonding intermolecular forces.
* Know alkanes and other substances unable to participate in dipole-dipole and hydrogen bonding intermolecular forces tend to be soluble (or miscible) in each other.
* Know adding a carbonyl group to an alkane makes it a ketone or aldehyde,
* Know carbonyl groups increase the polarity of a substance and allow it be a hydrogen bond receiver with substances (like water and alcohols) which are hydrogen bond donors.
* Know adding a hydroxy group to an alkane makes it an alcohol.
* Know hydroxy groups allow a substance to be both a hydrogen bond donor and receiver.
* Predict the relative physical properties of substances (mp, bp, viscosity and hardness) of two substance by whether their molecular structures contains carbonyls or hydroxy groups.
* Predict in which solvent a substance will have greater solubility (or miscibility) by whether the molecular structures of solvent and solute contains carbonyls or hydroxy groups.

Report

Prepare a report for this experiment according to this experiments report description for the parts we accomplished. Include the questions with answers for this experiment, except any your instructor tells you to omit.