NAME _____ PREF ____ SECTION SC_____ DATE _____

EXPERIMENT 36: SOLUBILITY OF POLAR AND NON-POLAR COMPOUNDS

Equipment: 3 test tubes, rack and stoppers.
Materials: sugar, paradichlorobenzene, $Al_2(SO_4)_3$, heptane, splints, iodine crystals.

In this experiment you will see how bonding in a compound can affect solubility.

A. Half-fill each of three test tubes with water. Using an amount of solid that will fit on the end of a splint, place sugar in the first test tube, paradichlorobenzene (PDB) in the second, and aluminum sulfate in the third. Cover each with a clean stopper and shake for a moment.

1. Enter your observations and equations in the following Table:

Test Tube #	Solvent	Solute	Dissolved?	Equation
1	H_2O	sugar		
2	H_2O	PDB		
3	H_2O	$Al_2(SO_4)_3$		

2a. What bonds hold neighboring sugar molecules to each other in a crystal of sugar?

2b. Is water able to break these bonds?

2c. Explain.

3a. What bonds hold aluminum ions to neighboring sulfate ions in a crystal of aluminum sulfate?

3b. Is water able to break these bonds?

3c. Explain.

4a. What bonds hold neighboring PDB molecules to each other in a crystal of PDB?

4b. Is water able to break these bonds?

4c. Explain.

B. **Repeat Part A using heptane as the solvent.**

5. **Explain your results in the format of questions 2, 3, and 4 above.**

Test Tube #	Solvent	Solute	Dissolved?	Equation
1	heptane	sugar		
2	heptane	PDB		
3	heptane	$Al_2(SO_4)_3$		

C. **Fill 1/3 of a clean and dry test tube with water. Carefully pour in an equal volume of heptane. What do you observe? Explain, using the ideas of bonding as above.**

6. **Cover the test tube and shake it. What happens as the contents are allowed to stand after shaking? Explain?**

D. Put one large crystal of iodine in a test tube 1/3 filled with water. Cover and shake vigorously until some of the iodine dissolves (compare solution color to that of a test tube containing water only -- against a white background). DECANT the solution into a clean test tube, add 2 to 3 mL of heptane, cover and shake. What did you observe? Explain.