SOLUBILITY OF ORGANIC COMPOUNDS

EXPERIMENTAL PROCEDURE

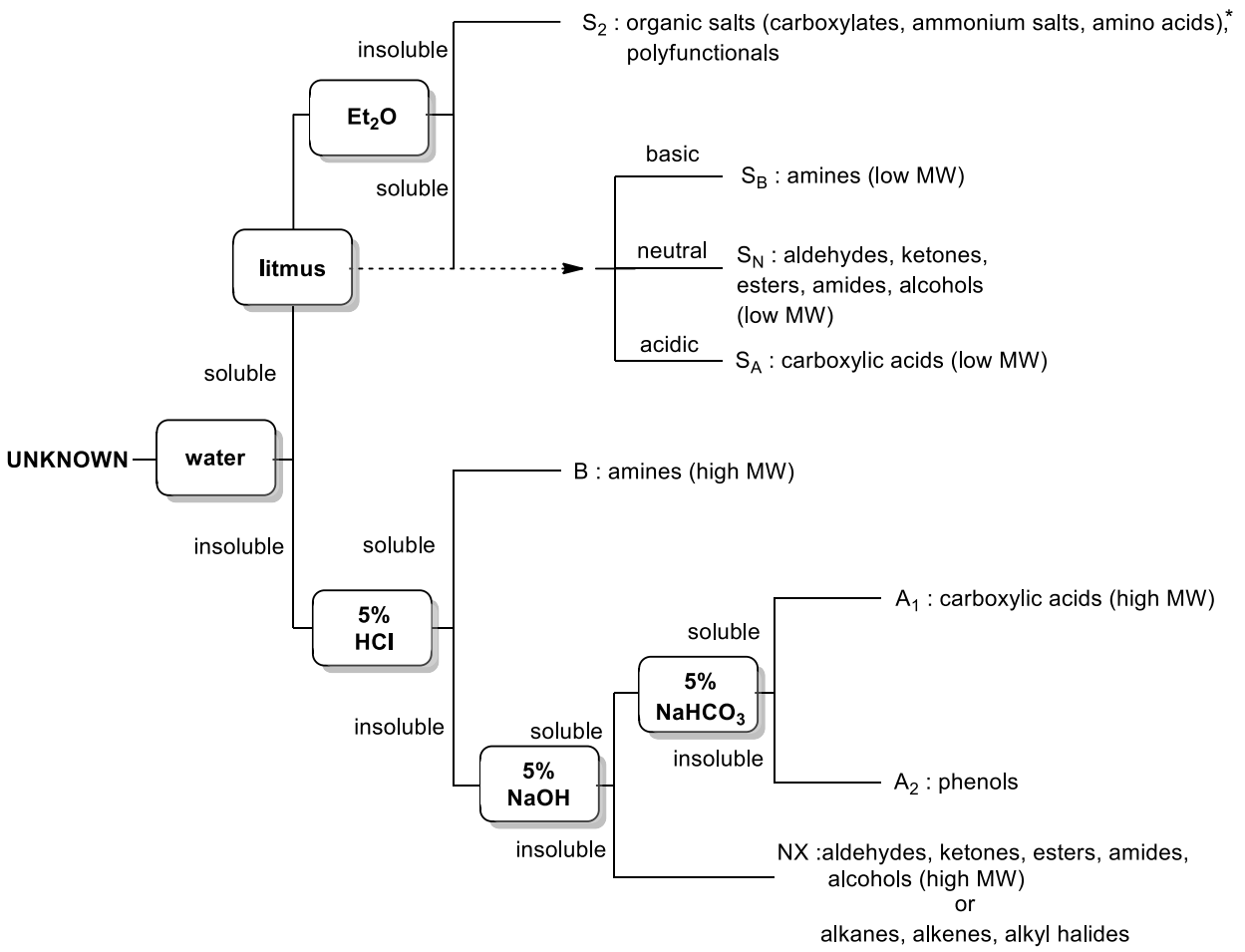
- **Diethyl ether is highly flammable. MAKE SURE there are NO FLAMES nearby when using it.**
- **Aqueous sodium hydroxide is corrosive.**
- **Hydrochloric acid is a skin irritant.**
- **Treat the test sample chemicals with caution. Avoid inhaling their vapours and avoid contact with eyes, skin and clothing.**

You will be working in pairs for this experiment, each pair is required to test the solubility of each of the seven unknown organic solids (A-G) based on the solubility class flow chart.

Organic Unknown Solids	Solvent Systems
benzamide benzoic acid glycine naphthalene sodium benzoate thymol (also known as 2-isopropyl-5-methylphenol) p-toluidine (also known as 4-methylaniline)	water 5% $NaHCO_3$ 5% NaOH 5% HCl diethyl ether

Put a small amount of the organic unknown solid to be tested onto a weighing paper. If needed, carefully crush the sample with a spatula or a glass rod so that it is finely ground. Using a small spatula, scoop about 5mm of the test solid (about 0.1g) onto the tip of the spatula and drop it into a clean test tube containing about 3mL of the appropriate solvent system (starting with water as per the flow chart). Closely observe what happens as the solid comes into contact with the surface of the liquid. Without agitating the tube, look for the appearance of Schlieren lines in the solution around the solid material. The presence of Schlieren lines is due to change in the refractive index of the solution and indicates that something is dissolving. The presence of colour in the solvent also indicates that the solid is dissolving. If the solid hasn't dissolved, then gently mix the tube contents by agitating and / or swirling the test tube. If you don't observe any of the above signs, then the compound is **insoluble**. Record your observations for the unknown in the solvent system based on the result, then follow the appropriate branch in the solubility flow chart (see below) and in a clean test tube, prepare for the next step. Once you have completed the tests for a particular unknown, empty and clean the test tubes and proceed to the next unknown until you have completed the set **A-G**.

Using your results, assign each of the unknown solids to the appropriate solubility class.



Flow diagram for solubility tests

CLEAN UP

Organic liquids go in the organic waste container (red label) in the waste fumehood.

Aqueous solutions go in the aqueous waste container (large drum) at the waste station.

Any solid chemical samples go into the solid waste container in the waste fumehood.

Make sure to clean up and wipe down your work areas and put away any equipment you have used.

REPORT

Before writing any Chem 351 laboratory report, we strongly recommend that you review section 8 in the introductory section of the student laboratory manual that discusses how to write reports and/or from "writing reports" on the course website. Students often don't get the grades they would like because they make errors that are addressed in that section of the manual. These are avoidable errors.

The report for this experiment is to be completed in the simple template provided including answering the questions. Remember that more is not necessarily better. It is important to be **accurate** and **concise** rather than verbose and vague. Proper English should be used, and it should be written by you and in your own words.