6.3: THE HOW- HOW WAS THE EXPERIMENT PERFORMED?

Section 3: Relevant Structures or Reaction scheme

(1) General: Depending on the experiment, you should either supply structural formulas of the compounds you investigated, or provide a reaction scheme for a synthesis. Structural formulas should incorporate standard bond angles and can be hand-drawn. Usually the required structures are the compounds you investigated and listed in the purpose, or the reactants and the products you obtained through a chemical synthesis. Solvents are typically not required, nor are drying agents or other work-up compounds.

(2) Things to watch out for: Make sure that you provide structural, and not molecular formulae An example of the latter would be $C_6H_{12}O_6$ for glucose. Molecular formulas have their place in organic chemistry, but are relatively useless for your report, as they do not provide any clarity in which bonds have been formed or broken. Take care to draw your formulae thatobey standard drawing conventions, i.e. with correct bond-angles, and/or correct atom hybridization. If you are drawing a reaction, draw molecules in the correct order: reactants on the left side of the reaction arrow, products on the right. Reagents, catalysts, solvents, and other important reaction conditions are drawn above and below the arrow.

Section 4: procedure

(1) General: The procedure should encompass the core of the actions performed in the experimentation. It should contain the essential information as well as your exact measurements. The procedure must be written in past tense, and other verb forms such as present tense, or imperative form, must be avoided. You should assume that the reader has an extensive chemistry background, and is reading your procedure in order to learn how to repeat the experiment (note: the procedural format used in the lab manual is far too detailed for this reader). A challenging part of the procedure is to omit unnecessary details and focus on the necessities, see below for specific examples.

(2) Things to watch out for: Do not explain the reason for why anything is done in the procedure. That means that you might have added an acid to precipitate a product, but the reason for this action, is not appropriate. Furthermore, many actions that a chemist performs as part of an experiment should not be mentioned in the procedure. An example: before I can swirl a round bottom flask I must loosen the clamp, but the clamp adjustment should not be in the procedure because it follows logically. Likewise, I close the stop-cock on my separatory funnel before I pour materials into the funnel, but there is no need to mention this, or any of the other details on how I handled the funnel. A trained chemist will know how to handle a separatory funnel during a liquid-liquid extraction.

(3) Some examples:

Bad (explanations): Na_2SO_4 was added because it is a drying agent and therefore removes water from the crude reaction mixture.

Bad (wordy, imprecise): The distillation apparatus was assembled the way we have learned before and the reaction mixture was heated on a sand bath on a jack and the sand bath was set to approximately 350°C. When I heated the mixture, it turned milky white, like a beautiful pearl that had been ground up and it smelled gross. I got a fraction boiling at 95-98°C that I think was the product but I'm not sure.

Good: Acetic acid (1 mL) and ethanol (1 mL) were mixed in a round bottom flask and heated to reflux.

Good: The reaction mixture was gravity filtered and the solvent removed using rotary evaporation.