

Purpose: To describe proper keeping of lab notebooks.

Responsible: Each person who performs work in the lab must record his or her actions in a notebook, as described below.

## Assignment

Notebooks may be assigned to an individual, group, or a series of persons. Each notebook will have a designation, and a logbook will be kept with the persons to whom it was assigned and their signatures. Upon completion of the notebook, or termination of employment, the notebook will be returned to the company archives. The notebooks will be assigned to individuals and are labeled with the individual's three-letter initials. They will be issued alphabetically. At the end of the alphabet will start double letters, e. g. :AA, AB, AC, etc.

## Storage of Notebooks

Notebooks are important records and documents of potentially substantial value. While in use, the notebook must be kept in a secure place away from harm. It must not be close enough to chemical operations to be exposed to vapors or splashes. At the end of the day, it should be stored out of sight in a drawer, preferably not in the lab. When completed, or when termination of the assigned employee occurs, the notebook should be stored off site in a fire-proof cabinet.

## Basic Format of the Notebook

Each page is to be used for one experiment only. (i.e. Multiple different experiments do not appear on same page. The obvious exception to this is a collection of experiments as part of a study.) The date should be on the top right corner. If the experiment is continued from a previous page write: "continued from p \_\_\_\_" on the top left corner. Since simultaneous experiments often interweave among pages in a notebook, and these pages are often photocopied, this is an important detail. Next, an equation showing the intended experiment is shown, including any pertinent literature reference.

The intended reagents are now given, either in tabular form or a list. For each reagent the following information must be given:

Name (including percent purity, if known)

Manufacturer

Lot number

Formula weight

Weight

Moles

Number of equivalents, and in relation to which material, if pertinent.

Next follows the experimental procedure, starting with a description of the apparatus used. Then in detail describe everything that was done. This should include dilutions, sequence of addition, resulting temperatures, observations (“precipitate formed”), volumes of solvent, type of filter paper used, etc. The ability to reproduce results depends upon the detail provided. Besides the procedures include any analytical detail such as:

**TLC** Provide a hand-drawn picture of the TLC or a photocopy glued in, along with the solvent system, type of plate, adsorbent, manufacturer, and method of visualization.

**HPLC** Provide a glued-in copy of any pertinent HPLC. (Only representative or relevant HPLC’s need be included). Provide also: solvent system and gradient program, length and type of column, flow rate, and wavelength of detector.

**GC** Include temperature program, type and length of column, and detector type.

**NMR, IR, etc** Obtain a photo reduced copy, and glue it into the book with rubber cement. Make sure it is labeled with proper identification prior to photo reduction.

Always use rubber cement, and not water-based glues for cementing data into a notebook. The water-based glues wet the paper and cause it to crinkle. Use the rubber cement with adequate ventilation.

Include any pertinent physical forms of identification. All solids should have a melting point range reported.

### **Labeling**

When an experiment is running, it should be labeled with the lab notebook identifier letters and number, and the page number on which it was started. For example: OBI-A-34 would stand for the experiment on page 34 of book OBI-A. This can be written on a string tag and hung on the flask, or written directly on the glass with a felt-tip marker.

Every time the experiment comes to a point where a material is isolated, whether it is a solution or a solid (this excludes discarded materials, such as washes), it is given an identification number. These are of the format XXXYN-n, where XXXY is the book (The XXX stands for the initials of the person, Y for the alphabet book), N is the *current* page, and -n is the sequentially assigned number of the material as it appears on the page. Every time a material is manipulated (for instance, recrystallized, distilled, etc.), it is assigned a new number. Thus the origin of any material can be quickly found by

using the identifier number. This format was chosen because it is most compatible with saving NMR files.

### **Continuation**

Only rarely does one get an entire experiment on one page. Always leave approximately one inch on the bottom of the page free of text. If you need to continue on another page, on the bottom right, write: "Continued on p \_\_\_\_". Make sure that on the top left of the continued page you write: "Continued from p \_\_\_\_".

### **Completeness**

Be sure to complete the recording of experiments that have been started. If a reaction is abandoned or aborted indicate why. Do not just leave half of an experimental hanging.

### **Signing and Witnessing**

Your notebook is much more than just a record: it is a document. It documents that certain work was done, and is critical to obtaining a patent. It only exists as a usable document if it is properly dated, signed, and witnessed in a timely manner. This must be done on every page. Allow one inch free of text on the bottom of each page and write: Signed:\_\_\_\_\_ date and Witnessed:\_\_\_\_\_date. The holder(s) of the notebook must sign. The witness may be any other person who is not a potential inventor.

### **Conclusions, ideas**

Some experiments give no reaction, others create foaming tarry volcanoes, but most give some measure of what the experimenter sought. Be sure to document what happened! The failures are what point us to the right direction. If you have thoughts about what happened and why, be sure to write them down. The notebook is the proper place to do this. There is no grade on this, and no harm done if your ideas are wrong. Your thoughts will guide the next person who attempts to repeat your work.

When the intended product has been isolated, include method of isolation, purification, weight, and percent yield, along with the usual characterization.

The notebook is also the place to record your ideas outside of the context of a specific experiment. Make sure that they are also signed, dated, and witnessed.

**Neatness**

Neatness impacts the notebook's importance as a document and a record. If it is illegible, its value becomes severely undermined. Be as neat as possible. Do not write in a hurried scrawl. *NEVER obliterate or erase anything!!!!* White-out is absolutely forbidden! When a mistake is made, strike through the mistake with a single line, so that the original entry is readable, but obviously corrected. Initial and date the correction. Keep in mind that you are generating a document that lawyers may someday pore over.

**Repetition**

It is frequently the case that experiments are repeated identically. In this case, the original experiment may be given reference after the equation, and no further entry for the method need be given, provided no significant changes were made. However, all data generated, as well as weight of product, yield, and characterization must be included.