WRITING AN ABSTRACT

Introduction

The *abstract* is a very special way of communicating the results of laboratory investigations. Scientific journals include abstracts of the papers included in the journal. All scientific meetings publish abstracts of the papers presented at the meetings. *Chemical Abstracts* and *Biological Abstracts* collect and publish abstracts from numerous journals in large, computer searchable databases. Abstracts are the distilled essence of a body of work. They communicate what the authors did, how they did it, and what their results were, all in the most clear, compact possible writing. Many Chem II laboratory Instructors require abstracts as part of the laboratory report. The comments and examples below will help you learn how to write a good abstract.

The Abstract

The abstract is a carefully written summary statement of your experimental work. You should write the abstract only after you have performed the experiment and after you have written everything else about the experiment in your laboratory notebook. It is essential that you understand that the abstract is *not* a purpose statement, and it is *not* a conclusion. It is a carefully and concisely written statement containing the essence of what you did in the laboratory and what you found. Coupled with a carefully written title, the abstract ought to be the only thing someone would need to read to understand what you did in the laboratory.

Sample Abstracts

1. Here is an example from an experiment we once used in Chem II. Notice that you know practically everything about this experiment just from reading the abstract. Minor details like reaction time, solvent quantities, and procedural details (the solvent was dried over anhydrous calcium chloride for 25 minutes) are omitted. Major details like mass of product, melting points, and literature melting points (so the reader can see that what you got was nearly pure) are included.

Caffeine was extracted from 23 grams of tea by boiling in water. The resulting solution was extracted with dichloromethane. The dichloromethane solution was dried and the solvent was distilled yielding 0.075 grams of crude caffeine. The caffeine was crystallized from acetone/hexane yielding 0.054 g of product, a pale yellow, crystalline solid melting between 232 and 235°C (lit. mp 235-236°C). The % recovery was 0.23% of the weight of the dry tea.

2. Here is an example of an abstract from an experiment we perform in Chem III. Notice again that the abstract stands as an independent whole. This experiment was more than a synthesis. Students were trying to see which position on a benzene ring received the nitro- group. Thus, the abstract includes comments reflecting the students understanding of the synthesis/analysis purposes of the experiment.

Methyl <u>m</u>-nitrobenzoate was synthesized by microscale techniques using methyl benzoate as substrate and a mixture of nitric and sulfuric acids as the nitrating agent at a temperature of 15°C. The product was a pale yellow solid melting at 74°C (lit.

78°C)and weighing 123 mg (Yield 80% of theoretical). Infrared spectroscopy confirmed the presence of the ester and nitro-groups, and meta substitution.

3. The section in this manual on writing a laboratory notebook contains two sample experiments. The following are titles and abstracts that were written to accompany the reports of these experiments. Notice the critical role of both the title and the first sentence in communicating the purpose of the experiment by clearly saying what was done.

Experiment 3- Separation of Spinach Leaf Pigments by Thin Layer Chromatography

The pigments in green spinach leaves were separated by TLC. The leaves were crushed and extracted into a mixed petroleum ether-ethanol solvent. The extract was dried and TLC plates were spotted with the mixture and developed with chloroform. Five distinct spots were noted, green Chlorophyll b (R_f 0.19), three yellow xanthophylls, (R_f 0.43, 0.51 and 0.59) and orange carotene (R_f 0.81).

Experiment 7-Synthesis of Cyclohexene from Cyclohexanol.

Cyclohexene was synthesized by the sulfuric acid catalyzed dehydration of cyclohexanol. The product was distilled from the boiling reaction mixture, dried and redistilled yielding 2.7 grams of product (66% of theoretical), a pungent colorless liquid boiling between 80 and 84°C (lit. 81°C). The product decolorized a bromine solution and produced a precipitate with potassium permanganate solution. These tests confirm the presence of a double bond in the product.

Now, go back and re-read the first sentence of each of these abstracts. Notice that the first sentence, like the title, can stand by itself as a summary of each of the experiments.