

IMRAD Guideline

TITLE PAGE

Experiment Title
Name
Date of Laboratory Experiment
Abstract

ABSTRACT (Include on Title Page)

This is a concise statement identifying the experiment or investigation and perhaps the method or apparatus. It should include the numerical results of the experiment. An abstract is typically 50 to 150 words long. Be brief. Two examples follow:

"The electronic spectra and molecular complex spectra of the methoxybenzenes are reported and compared to Hückel molecular orbital calculations. Some related work with 1,2-dioxymethylenebenzene and derivatives is also reported."

"Synthesis of the first pericyanoolefin, tetracyanoethylene is described. Tetracyanoethylene has been found to undergo a variety of reactions, including addition, replacement and cyclization reactions, to give dyes, strong acids and heterocyclic compounds."

INTRODUCTION

A short summary of relevant theory and important chemical equations. Put the investigation into perspective for the reader. Anything the reader should know to understand the report should be explained in this section. This section lays the foundation, and explains WHY the experiment was done.

EXPERIMENTAL METHODS

The details of the experiment are found here. It may include three subsections; chemicals, methods, and instrumentation. If chemicals are listed, they should be identified by purity and manufacturer. Methods should detail how the experiment was done in such a way that the reader could repeat the experiment, although it should NOT include recipes for each solution. It is sufficient to give concentrations. The instruments that were used should be described and identified by make and model. It is not necessary to explain how to use the instruments, although a diagram is sometimes suitable. Focus on how the experiment was done. Include your observations of what you saw happen or change. The material should generally be chronological and written in the past tense. (See Lehman, J.W., *Writing a Laboratory Report*, page 803, or Pavia et al, *Laboratory Reports*, page 28)

RESULTS AND DISCUSSION

Here the actual results are presented and discussed. Only list the final data from the experiment. If possible, compare results with theoretical values, published works, or known values. Tables, figures, and graphs should be in this section. Never begin the section with a table. Each

table should have a heading, each figure and graph a title, and each axis a label (with units). All measurements should be to the proper number of significant figures, and should have units. This is not the place to show calculations. Include error calculations.

$$\% \text{ Yield} = \frac{\text{actual yield of product}}{\text{theoretical yield}} \times 100$$

CONCLUSIONS

What do the data from this experiment mean? Are the results valid? What errors are apparent? Are any of the assumptions made in the introduction invalid? How could the experiment be modified or improved? What other experiments could be done to test or validate this work?

ACKNOWLEDGEMENTS

List other lab assistants and their respective contributions

REFERENCES (If applicable)

List references that you used other than the laboratory manual. The first¹ reference below is for a textbook. The second² reference is for a journal.

¹ J. Leonard, B. Lygo, and G. Proctor, *Advanced Practical Organic Chemistry*, Blackie Academic and Professional, Chapman and Hall, 1995.

² A.B. Smith and C.D. Jones, *J. Chem. Educ.*, **51**, 1111 (1974).

APPENDICES

Hard copies of computer output. Handwritten calculations, etc.

FOR FURTHER INFORMATION

¹ *Handbook for Authors of Papers in the Journals of the American Chemical Society*, American Chemical Society Publications, Washington, D.C. 1967.

² L.F. Fieser and M. Fieser, *Style Guide for Chemists*, Reinhold, New York, 1960.

³ F.H. Rhodes, *Technical Report Writing*, McGraw-Hill, New York, 1961.

⁴ Robert A. Day, *How to Write and Publish a Scientific Paper*, 3rd Edition, Oryx Press, Phoenix, New York, 1988.

⁵ John R. Taylor, *An Introduction to Error Analysis*, University Science Books, Oxford University Press, Mill Valley, California, 1982.

⁶ Mary Helen Briscoe, *Preparing Scientific Illustrations*, 2nd Edition, Springer-Verlag, New York, 1996

The Scientific Method

Title	What's it called?
Author	Who did it?
Date	When did you do it?
Introduction	Why are you doing it?
Methods	How did you do it?
Results/Discussion	What did you find out? (errors)
Conclusion	What does it mean? (limitations)