ChE 529 Polymer Experimental Methods University of Rhode Island
Professor Greenfield

Lab Report guide

The goal of each of your lab reports is to communicate the following:

- what measurements you made in the lab,
- how the instrument actually makes the measurements (in other words, precisely what is measured and how),
- what direct results you obtained from those measurements,
- how an analysis conveys additional results about your system
  (in other words, to do and to show the data analysis),
- if physical expectations for the experiment were met, and why or why not,
- what sources of noise were present in the experiment, and which of your results are most affected by noise.

This information should be communicated in a written style, with the text being supplemented with tables, figures, and equations as necessary to convey your points. The report doesn't need to be overly long. A terse report is fine as long as it conveys the important points and their implications. (Note that my assignment writing does *not* convey a terse style.)

Using handwritten notes and pages to add to a typed report is fine for this class. In the long term (i.e. after graduation), the format of your results will depend on the intent of the experiment. For research that you are publishing, everything will eventually be typed into a formal journal manuscript. For short-term problem solving, a presentation at a meeting may be the main communication mechanism, with followup documentation in a memo, report, or email.

In general, figures that make the trends in your measurements clear to see are much more convincing than a table or (especially) written text. Choose axes that accentuate your point. For data that should follow an exponential relationship $y = Ae^{-kx}$, use a semi-log plot so the graph will be linear. For trends such as $y = Ae^{-k/T}$, use an Arrhenius plot ($\ln y$ vs. $1/T$); clarity is why Arrhenius chose those axes. The most clear relationship to see in a plot (by far) is linear vs. non-linear. Comparing two curves (such as experiment vs. model) is a distant second.

In your data analysis, make sure that you are clear about what was varied and how the measured response compares to what you would expect from an appropriate underlying theory. For example, are FTIR peaks in the expected locations, and are the expected peaks present? How does the relaxation time change with scattering angle, and does that match the expected relationship from light scattering theory?

Each lab report will have experiment-specific questions to answer and analyses to perform. Those will be described in separate handouts or within the experiment description.