

Report Guidelines for Assignment #5 (Detergent Analysis)

The pre-lab report is due at the beginning of the lab section. Refer to your laboratory syllabus for the due date of the post-lab report. Pre-lab and Post-lab reports **MUST** be written inside your lab notebook (with the exception of graphs)

(I) On-line Technique Videos & Resources For This Experiment

Click on the title below to download the video (require [Real Player](#))

- (1) [Laboratory Safety](#) (this video was shown on the first day of the lab)
- (2) [Use of a Buret](#)

If you have trouble downloading the videos, go to the following Web site and click on the appropriate title to download the video.

<http://oid.ucla.edu/Webcast/Chemistry/>

[Theory on pH Meter](#)

[Theory of Acid-Base Indicators](#)

[Soap & Detergent Chemistry](#)

(II) Pre-lab Report Guidelines

- (I) Introduction
- (II) Procedure in Flowchart Format & reference of procedure
- (III) MSDS information (refer to the **MSDS handout for details**) for the following chemicals

HCl (3M), NaOH (0.5M) and Phosphoric acid (H₃PO₄) (1M)

Note: Select the MSDS resource site that gives you the MSDS information closest to the concentration listed above for each individual chemical. You may have to convert the concentration units on MSDS before you decide which site to use since sometimes the unit may be reported as w/v%.

You should record the following MSDS information in your notebook for the chemicals listed above.

Printouts directly from Web pages will NOT be accepted for grading.

Important: Reference the site (i.e. write down the URL address) that you used for each of the chemical.

- (a) Product Name
- (b) Chemical Formula
- (c) Formula Weight
- (d) Melting Point, Boiling Point and Density
- (e) Health Hazard Data (**summarize in your own words**)
- (f) Spill and Disposal procedures (**summarize in your own words**)

Report Guidelines for Assignment #5 (Detergent Analysis)**(II) Pre-lab Report Guidelines (Continued)**

- (IV) Complete all the study questions # 1-3 on page 64. Follow instructions on p.64 (under "Pre-lab assignment") of your lab manual. **(Make sure that you separate the blank data tables from the rest of the pre-lab report)**

IMPORTANT: Make sure that you show ALL YOUR WORK for any numerical calculations. Show all the units when working on pH calculation questions.

Report Guidelines for Assignment 5 (Detergent Experiment)**Post-lab Reports MUST be written inside your lab notebook****(II) Post-lab Report Guidelines****This is a GROUP report (i.e. ONE REPORT PER GROUP)****(A) Data**

- write the responsibility of each group member during the experiment and in writing this report
- recopy completed experimental data tables (including the color change of the universal indicator) into the post-lab report (see p.65-66)
- specify the unknown detergent label on your report (e.g. unknown C or unknown T)

(B) Data and Error Analysis (YOU MUST SHOW ALL YOUR WORK)

Review the lecture guide for the topic on equivalent weight BEFORE answering the following questions.

- calculate the % ash left in the detergent
(i.e. $100\% * (\text{weight of ash} / \text{weight of sample detergent})$)
- determine the volume of NaOH required to titrate H_2PO_4^- to HPO_4^{2-}
(refer to the chemical reaction shown on p.64)
- calculate the **equivalents** of hydroxide that are required to titrate the sample of H_2PO_4^- to HPO_4^{2-}
(this is the number of equivalents of H^+ transferred in the reaction (p.64))
- determine the **theoretical equivalent weight** of H_2PO_4^- in the titration reaction
- using the theoretical equivalent weight of H_2PO_4^- and the equivalents of H^+ transferred in the reaction, calculate the amount (in grams) of H_2PO_4^- in your detergent sample
- calculate the weight (in grams) of the detergent that can be attributed to phosphate (PO_4^{3-})
- determine the % phosphate in the original detergent sample
- determine the % STPP in the detergent sample

(C) Conclusions

- summarize your results
- compare the % phosphate in detergent with the % ash. What can you conclude? Explain.