

**Report Guideline for Experiment #5 (Detergent Experiment)**

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

**(I) Pre-lab Guideline**

(I) Introduction

(II) Procedure in Flowchart Format & reference of procedure

(III) MSDS information (**refer to the MSDS handout for details**)

The following chemicals will require you to use the MSDS database on the Web (see Lecture Syllabus):

**HCl (3M), NaOH (0.5M) and Phosphoric acid (H<sub>3</sub>PO<sub>4</sub>) (1M)**

**Note: In MSDS, select the site that gives you the MSDS information closest to the concentration listed above for each individual chemical.**

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

**(Printouts directly from the Web pages will NOT be accepted!!)**

- (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**)

(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 table with the rest of the prelab)**

**Report Guideline for Assignment 5 (Detergent Experiment)**

**Post-lab MUST be written inside your lab notebook (with the exception of graphs)**

**(II) Post-lab Guideline**

**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 data tables (including the color change of the universal indicator) from your prelab to the postlab report (see p.65-66)
- specify the unknown detergent label on your report (i.e. unknown C or unknown T)

**(B) Data and Error Analysis (MUST SHOW ALL WORK FOR FULL CREDIT)**

- calculate the % ashes left in the detergent  
(i.e.  $100\% * (\text{weight of ashes} / \text{weight of sample detergent})$ )
- determine the volume of NaOH required to titrate one equivalent of the  $\text{H}_2\text{PO}_4^-$   
(refer to the chemical reaction shown on p.64)
- calculate the equivalents of hydroxide that are required to titrate one equivalent of  $\text{H}_2\text{PO}_4^-$   
(this is the same as the number of equivalents of  $\text{H}^+$  transferred in the reaction (p.64))
- determine the **equivalent weight** of  $\text{H}_2\text{PO}_4^-$
- using the equivalent weight of  $\text{H}_2\text{PO}_4^-$  and the equivalents of  $\text{H}^+$  transferred in the reaction, calculate the amount (in grams) of  $\text{H}_2\text{PO}_4^-$  in your detergent sample
- calculate the weight (in grams) of the detergent that can be attributed to phosphate ( $\text{PO}_4^{3-}$ )
- determine the % phosphate in the original detergent sample
- determine the % STPP in the detergent sample

**(C) Conclusions**

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