

Cleaning of glassware

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1 Introduction

A Chemistry Student approached the Master and asked, “Master, how do I archive enlightenment in Chemistry?” The Master replied, “Wash your glassware.”¹

In this document I try to give a simple set of guidelines for cleaning equipment used in the lab. The main emphasis will be on cleaning glassware. A good review of cleaning glassware can be found at: http://chemlab.truman.edu/Miscellaneous_files/Cleaning.htm

2 “Normal cleaning” of glassware

After use glassware should be rinsed. Any stubborn contaminants should be removed as quickly as possible. If you have marked the vessel with felt pen you should remove the markings with acetone or ethanol. Place the glassware in the plastic box labelled “Dirty glassware” in lab KII-223, or wash it yourself if you need it at once.

If the plastic box with dirty glassware is getting full you should put it in the dishwasher in lab KII-219. Ask for help if you do not know how to use it (instructions for normal operation of the dishwasher are posted on the dishwasher). After the dishwasher is finished the clean glassware should be put back in place (most of the glassware is stored in KII-223).

All glassware you find in the cupboards and drawers have been washed in the dishwasher. In some cases that might be sufficiently clean for your purpose. If you require cleaner glassware you must do it yourself.

A note concerning pipettes. Pipettes are not washed properly in the dishwasher. Rinse them as soon as you have finished with an appropriate solution. Gunn Trorill Wikdahl can lend you a special vessel for soaking pipettes and advise you how best to clean them.

3 “Thorough cleaning” of glassware

If you need your glassware cleaner than what you get from the dishwasher you must choose the cleaning method most suited and clean the glassware accordingly. Rinsing the glassware with distilled water might be sufficient. Remember, water will not bead on clean glassware, it will wet the glass evenly.

3.1 The hydrogen peroxide cleaning bath

Boiling the glassware in the hydrogen peroxide cleaning bath should remove most organic contaminants. But remember: *Volumetric equipment should never be boiled!* See section 3.2 for tips on cleaning equipment that can not be boiled.

¹From: http://chemlab.truman.edu/Miscellaneous_files/Cleaning.htm

Only glassware that is cleaned in the dishwasher or thoroughly by hand and is free of all visible contaminants should be cleaned in the hydrogen peroxide bath. Putting dirty glassware in the bath might contaminate other peoples glassware. Furthermore no metal equipment should be put in the bath, also be careful with plastic equipment. Platinum is especially bad as it catalyses the decomposition of hydrogen peroxide, thus deactivating the cleaning bath. Equipment contaminated with silicon oil is strictly forbidden in the bath used to clean electrochemical cells!

The hydrogen peroxide bath works by oxidising organic impurities. You will therefore be able to see small gas bubbles clinging to the glassware. When you no longer see bubbles on the glassware you can assume it is clean. Use a glass rod or plastic tweezers to remove glassware from the bath.

The procedure for cleaning glassware in the hydrogen peroxide bath is:

- Rinse the glassware with distilled water and place it in the bath
- Bring the bath to a boil, let the glassware simmer until you no longer see bubbles on it
- Remove the glassware and rinse it with distilled water several times
- Dry it if necessary (for example in the heating cabinet at 105 °C)

If the hydrogen peroxide bath needs replacing do as follows: First deactivate the old bath by boiling it with some platinum in it. When you no longer see oxygen evolution on the platinum it can be pored out (dilute with tap water). Mix the new bath from 1 part hydrogen peroxide (30 wt%) and 3 parts distilled water. Add about 1 volum% concentrated sulphuric acid.

3.2 Soaking in sulphuric acid

Glassware that can not be cleaned in the hydrogen peroxide bath can be cleaned by soaking it in sulphuric acid. Simply rinse the glassware with distilled water, then fill it or submerge it in 10 wt% sulphuric acid (be carfull whilst preparing the sulphuric acid solution, the solution will get hot when you dilute the concentrated acid). Lett it soak over night. Then dispose of, or reuse, the sulphuric acid (in the acid waste container) and rince the glassware with distilled water.

3.3 The chromic acid bath and aqua regia bath

The chromic acid bath is a mix of CrO_3 in concentrated sulphuric acid, whilst the aqua regia bath is made of 1 part concentrated nitric acid (HNO_3) and 3 parts concentrated hydrochloric acid (HCl). In both cases the glassware is soaked in the bath and rinsed with distilled water afterwards. Think twice before using and ask for help if you uncertain.

4 Some final suggestions

- If something is amiss—do something about it!
- If we have run out of something—order more, or tell the person responsible for the room (“rommansvarlig”).
- Keep the doors of the fume hods closed as much as possible. If they are open the suction in the other fume hods will not be as good.
- Try to keep the labs as tidy as possible. A messy lab can be dangerous and it does not improve the accuracy and efficiency of our work.

- If you are uncertain about something—ask someone!
- All glassware containing solutions or other chemicals must be marked if they are left unattended in the lab. Mark them with the contents, the date and your name, or else it may disappear