



Lab Manual

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Old Lab Sinks Operation

(sink432C & black utility sink)

1.0 Title

Old Lab Sinks Operation

2.0 Purpose

This document has specific information about wet sink 432C and the black utility sink.

3.0 Scope

This chapter focuses on the primary use of sink 432C.

4.0 Applicable Documents

[Revision History](#)

5.0 Definitions & Process Terminology

N/A

6.0 Safety

Face shields, aprons, and chemical-resistant gloves must be worn at all times when working with chemicals and rinsing empty chemical bottles.

7.0 Statistical/Process Data

N/A

8.0 Available Process, Gases, Process Notes

8.1 Black Utility Sink General Information

The black utility sink is used primarily to rinse out empty chemical bottles that have contained acetone, methanol, 2-propanol, ethanol, or photoresist developers. This sink is acid-resistant and is constructed of a ceramic-like material. It is sensitive to impact or shock, such as exposure to liquid nitrogen (LN) and may fracture if mistreated. Do not pour LN into this sink! The water available at this sink is city water.

8.2 Sink 432C General Information

All water available above the deck of sink432C is ultra-pure DI water. This sink consists of a fixed sink, a gooseneck faucet, a DI water deck hose, an aspirator/plenum flush on a manually operated timer, and an N2 gun. There is a large work surface area at this sink; you will find hot plates and an ultrasonic cleaner placed there for your use. Be sure not to place flammable solvents directly on the hot plates.

Beneath sink432C you will find an acid storage drawer containing the following chemicals: nitric acid, ammonium hydroxide, sulphuric acid, acetic acid, gold etch, and hydrochloric acid. Each of the bins in this drawer is labeled and has room for one bottle only. Please check this drawer for an opened bottle before bringing a new, unopened bottle into the Microlab. There are also several unlabeled bins for personal use chemical bottle storage. These bottles must be labeled with a green **Approved Special Chemical Sticker** with your name, date, and the name of the chemical. These stickers are available at the front desk in the Microlab office. Review the Microlab Chemical Hygiene Plan ([Chapter 1.2](#) - Safety Rules and Procedures) for the correct

procedure to have a personal special chemical approved by Microlab staff. To the right of sink432C there is an additional cabinet for storing acids, primarily personal use chemicals and the VLSI Sink7 Silicon Etch. Opened bottles of ammonium fluoride, and BHF's are also stored here.

On the top deck of sink432C to the left there is an organic waste collection bottle for photoresist plus acetone. The waste bottle has a closed-top funnel in place.

8.3 Heated Aqua Regia Etching

**** Heated aqua regia may only be prepared at sink432c using the custom quartz etch dish with vented cap connected to the sink aspirator hose. ****

Dilute aqua regia at 30°C etches Pt at approx 35 A/min.

For a typical 2000 - 4000 Å film this is 1-2 hour etch time.

The diluted formulation was specifically developed to minimize attack of photoresist and decrease fuming.

Dilute aqua regia = 3 : 1 : 2 37% HCl : 70% HNO₃ : DI water

Standard aqua regia = 3:1 37% HCl : 70% HNO₃

Either of these solutions at room temp may be prepared at sink432a or sink432c.

Several lab members use a heated (>50°C) aqua regia soln to etch thick platinum films with a high etch rate. Heated aqua regia develops significant amounts of volatile nitrosyl chloride (NOCl). NOCl has an irritating odor and an extremely low olfactory threshold. Re-entrainment of minute quantities of NOCl by the Cory Hall air handling system can result in distribution of non-hazardous but immediately detectable quantities of NOCl. To prevent escape of volatile products from heated aqua regia, the Microlab has fabricated a custom etch bath with vented lid which connects to the sink432c aspirator. Heated aqua regia etching may only be performed using this equipment. Labmembers are welcome to submit requests for improvement/modification of this equipment.

9.0 Equipment Operation

9.1 Sink432C

All lab glassware cleaning should be done at this sink. Please review [Chapter 2.1](#) for detailed cleaning procedures. Be sure to use only DI water for the washing and rinsing of labware, glass or otherwise.

Both the gooseneck faucet at the right side of the sink plus the deck hose mounted on the same side of the sink dispense DI water. The DI water flow is activated by the turning its knob. The Microlab stocks Nova Clean Soap, which is a concentrated, Microlab-safe for cleaning labware. This soap is stored in the cabinet beneath the black utility sink; it comes in a one-gallon plastic bottle. For ease of use, plastic squirt bottles of Nova Clean are kept on the deck of each sink in this room.

The lid of the funnel must be flipped up before pouring the waste into the bottle. Do not fill this bottle to overflowing- when the liquid is to the shoulder of the bottle it should be changed out. Obtain an empty H2O2 bottle with a vented cap from the blue recycle bin in the rear corner of Rm. 432B. Exchange bottles. The full bottle should be loosely capped, then using a bottle carrier, taken to room 432B to be properly labeled for disposal. Pressure-sensitive labels for these bottles are on a roll in a dispenser on top of the yellow **Chemicals for Disposal** cabinet. The waste log clipboard is also located on the top of this cabinet. The labeled bottle may then be placed inside this cabinet. Note: if this cabinet is full, please notify the front desk in the Microlab office. In the meantime, you may leave your properly labeled bottle at sink432C, to the rear of the fume hood until more space is made available in the cabinet.

To dispense of water-miscible acids and solvents, please use the manually operated aspirator/plenum flush at this sink. The timer control is found at the front panel of the sink. Be careful not to mix solvents with acids when aspirating as this is a potentially explosive combination.

When you have emptied a chemical bottle, whether plastic or glass, bring it to this room (Rm. 432C) to rinse. Use a safety carrier if the bottle is glass. Rinse the bottle three times then either scratch the label or **X** it to indicate that it has been rinsed. There is a can opener for scratching the label hanging on a chain at the face shield and apron rack next to the black utility sink. Markers for X-ing out the label can be found in a glass beaker at this sink as well. Be sure to wear a face shield and chemical-resistant gloves when rinsing chemical bottles. Bottles that contained acetone, methanol, 2-Propanol, ethanol, or photoresist developers should be rinsed out at the black utility sink. Bottles which have contained acids or chlorinated solvents should be rinsed at sink432C, as it is a certified fume hood and will prevent exposure to volatile compounds while rinsing the bottles. If you are ever unsure which sink to use, then use sink432C. There are separate plastic trashcans for disposal of these bottles after they are rinsed. These cans are situated against the wall by the windows in the passageway between rooms 432B and C. There are two disposal cans for plastic bottles and one for glass.

9.2 Black Utility Sink

The black utility sink in Rm. 432C is acid-resistant and is constructed of a ceramic-like material. It is sensitive to impact or shock such as exposure to LN and may fracture if mistreated. Do not pour LN into this sink! The water available at this sink is city water only. Underneath this sink is where the Microlab-safe **Nova Clean** soap is stored.

9.3 Cleanup

Please leave the work surfaces of both these sinks as you would like to find it: wipe down and dry all work surfaces with the Teri-towels that can be found in the plastic orange dispenser on the windowsill at the black utility sink. Do not leave empty chemical bottles on the floor areas surrounding the sinks; empty chemical bottles must be rinsed and disposed of properly. Hint: if you empty it, rinse it!

If you need to leave a chemical process in place, there are process ID tags in a dispenser mounted at sink432C. Return all opened, but not empty, chemical bottles to its appropriate bin.

10.0 Troubleshooting Guidelines

N/A

11.0 Figures & Schematics

N/A

12.0 Appendices

N/A