TRL Acid and Solvent Wet Processing
Rules and Guidelines

Purpose: General rules and guidelines for wet chemical processing in TRL.
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Introduction

The TRL facility at MTL has several different fume hoods and wet benches for chemical processing of different materials. Solvent processing and photolithography development are done in the photo-wet benches in the two photolithography rooms of TRL. Acid and base processing are done in the acid-hood and GreenFlo hood in the TRL ballroom and hallway areas. Users should be familiar with the MTL Chemical Hygiene Plan, the MTL Safety Quiz (EHS), General Chemical Hygiene Training (EHS), HF Safety Training (EHS), and Managing Hazardous Waste Training (EHS) as well as the individual tool SOPs for these wet benches. For training or questions please see MTL Staff.

Safety

Acid protective gear MUST be worn when working at the acid-hood or GreenFlo hood and when transporting or handling chemicals. An acid-proof apron, sleeve guards, Trionic gloves (atop the standard gowning vinyl cleanroom gloves), and a face shield worn over safety glasses, are all required. ALWAYS know the location of the nearest eye wash and safety shower.

Solvent protective gear must be worn when working at the photo-wet-l, photo-wet-r, photo-wet-Au, and Solvent-noAu wet stations. Yellow Trionic gloves atop the standard gowning vinyl cleanroom gloves and safety glasses are required.

MSDS sheets for all chemicals can be found in the yellow binders on the 2nd and 4th floors near the elevators or online. Users should review and be familiar with the appropriate MSDS before using these chemicals.

In case of chemical exposure, call for help to the person nearest you and tell them to call for assistance. While you are speaking to the person nearest you, get to the nearest shower or eyewash as fast as possible. Immediately remove all contaminated clothing and flush or rinse the exposed area with water for 15 minutes; exposures to HF should be rinsed for 5 minutes followed by application of Calgonate Gel. Immediately after treatment report to MIT Medical for examination by a physician. In emergency situations you can call 100 for MIT police from any campus landline, or 617-253-1212 from a cell phone and request an ambulance for transportation.

The chemicals used in the acid-hood are all dangerous to touch or inhale. HF acid is especially hazardous. An insidious aspect of HF burns is that there may not be any discomfort until long after exposure. These burns are extremely serious and may

result in bone tissue damage. If you suspect exposure to HF, flush the area well for 5 minutes and be sure to work under and around your fingernails, then apply calcium gluconate liberally to exposed area. Immediately after treatment report to MIT Medical for examination by a physician. Remember, HF may not produce any burning sensation until after it has already done damage.

Contamination Control

Contamination control is critically important to the success of research at MTL. It is important to understand and respect the control protocols that MTL has in place. You should know which color-coded category your samples fit into and use the appropriate labware (tweezers, carriers and beakers) for your samples. The Process Technology Committee (PTC) will approve your process and help you to identify the category that your samples fit into; it is important to strictly adhere to the approved process. If changes are required then a new request should be submitted to the PTC for approval. The broad definitions of the color-coded categories are listed below, for questions please contact MTL Staff or the PTC.

- **Brown**: TRL diffusion, RCA station
- **Green**: Standard non-metal CMOS processing (silicon, silicon dioxide, silicon nitride)
- **Blue**: CMOS compatible metal processing (aluminum, titanium, TiN, tungsten, etc.)
- **Red:** Gold contaminated or III-V processing (all non-CMOS metals, GaAs, InP, GaP, etc.)
- **Yellow:** Post KOH or Post CMP processing (potassium or sodium contamination)
- **Purple:** SU8 process, limited to SU8 hood and oven only

Rules and Guidelines

- No fabwipes in ANY wet station at any time.
- Avoid leaving chemicals unattended in any wet station. If you must leave a chemical unattended then it must clearly be labeled with:
    - User name
    - Chemical contents of the container
    - Date and time expected to return
    - Phone number or extension
- Always use open bottles of chemicals first
- When you use the last of a chemical please call the MTL Chemical Cell Phone (857-998-1916) to request new bottles.
- Always clean up after yourself. Rinse all labware and return it to the proper shelf. Return tweezers to their racks. Throw all used fabwipes in the trash.

Photo Room Specific Rules and Guidelines

- Never heat solvents directly on a hotplate. Volatile chemicals such as acetone, methanol, isopropanol and others should always be heated indirectly in a water bath.
- Change solvent waste bottles when they are full. Waste bottle locations are in the SU-8 hood and below the deck in photo-wet-left
    - An alarm will trigger when the photo-wet solvent bottle is full. Remove the deck and lift the spout from the waste bottle. Cap and remove the waste bottle and replace it with a new, empty waste bottle. Replace the spout into the bottle (may require some maneuvering to stop the alarm) and replace the decking.
    - Solvent waste bottles must be labeled. Tags are available below the HMDS oven. Please fill out your name and the date the container is FILLED before moving the waste bottle to the passthrough.
- Liftoff or dismount wafers should be labeled and placed out of the way. Liftoff should take less than 24 hours, please check the sample daily and re-label with a new date if additional time is needed.
- Ultrasonic baths should be unplugged, cleaned and put away when you are finished.
- Rinse labware when you are finished and return it to the appropriate rack.

Acidhood Specific Rules and Guidelines

- Always use the appropriate personal protective equipment (PPE) when working at the acidhoods or transporting chemicals. Proper order for donning PPE is:
    1. Apron
    2. Face Mask
    3. Purple Arm Sleeves
    4. Yellow Trionic Gloves
- PPE should be REMOVED when not working at the acidhoods or RCA station. This includes using the phone to call for chemicals or using the computer to engage in CORAL. Proper order for removing PPE is:
    1. Yellow Trionic Gloves
    2. Purple Arm Sleeves
    3. Face Mask
    4. Apron
- The quick-dump rinsers (QDR) in both acid-hood and GreenFlo hood are for CMOS compatible samples only (green or blue categories).
- The chemical cart should be used to transport all acids and bases to and from the acidhoods. Chemicals should never be stored on the cart. The cart should be returned to the passthrough area when it is not in use.
- Always rinse samples and labware thoroughly before removing them from the acidhoods and returning them to the shelves.
- Etchants and solutions that contain Hydrofluoric Acid (HF, BOE, etc) should be processed in Teflon beakers.

- Solutions may only be heated on hotplates with quartz or pyrex labware (no Teflon or polymer beakers).
- Never pour chemical directly from the large gallon bottles into a graduated cylinder. An intermediate beaker should be used when measuring precise amounts of a liquid.
- Never dump acid solutions directly down the drain, always use the aspirators to dispose of acids and bases.