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Wet Bench Training

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Wet Bench Training

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Safety Equipment

Required Apparel...

- *Safety Glasses*
- *Long Pants*
- *Full Shoes, Leather Recommended (No Sandals!)*

To Be Used Whenever Processing Chemicals...

- Vinyl Apron
- Face Shield
- Trionic Gloves

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Lab Supplies

In Cabinets #1 and #39 by Gowning Area...

- Hazardous Waste Jugs
- Cleanroom Wipes
- Vinyl Aprons
- Face Shields
- Trionic Gloves
- Many Other Supplies

These items are usually stocked on the wire racks near the wet benches – but can be replenished from these cabinets at any time.

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Hazardous Waste Disposal

Hazardous Waste Jugs...

- Name, Date, Contents, Ratios
- Leave cap slightly loose with H_2O_2

In-Sink Acid Disposal...

- *See "Acid Draining Procedure" posted at benches with permanent acid tanks.*
- *See "Flushing Acids in Bay 1 & Bay3" at benches for list of acceptable acids. In general, all clear acids except HCL.*

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Hazardous Waste Carts

- Located by gowning area
- Top of Cart – Hazardous Waste Jugs
- Bottom of Cart – Empty Chemical Containers; rinse 3X with water and mark with an "X" on bottle and cap before placing on cart.

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Waste Receptacles

- Receptacles labeled "Trash Only — No Hazardous Materials" are regular trash. It is acceptable to put acid and base wipes in them, but wipes must be rinsed with DI water prior to disposal.
- Solvent Wipes — collected as hazardous waste. For solvent wipes only.
- Photoresist Wipes — collected as hazardous waste. For wipes with photoresist on them.
- Broken Wafer and Glass — regular trash. Any 'sharp' that is chemically inert may be placed here.

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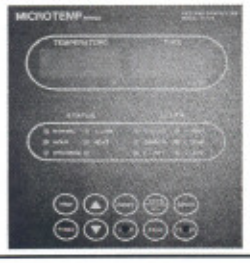
Chemical Baths / Beakers

- Heated Chemical Bath Controller — press "Power"• to turn on controller. Press "Hold"• to take off hold and actively heat the bath. Heat LED will light when heat is being applied.



- Beakers — Use labels located on wire racks. Name, Date, Contents, Ratios. No need to label lid.

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Rinse Baths

- DI Rinse Bath Controller — Press "Start"• to begin 3 cycle rinse. Note, it may be necessary to press "Stop/Reset"• once prior to pressing "Start" to initiate the cycle. To drain water manually, press "Open"•.

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Chemical Storage

BAY 1:
Oxidizer Cabinet
Base Cabinet
Acid Cabinet

BAY 2:
Flammable Cabinet
Fume Hood Cupboards
"wb-resist" Cupboards
"wb-solvents" Tray

BAY 3:
Oxidizer Cabinet
Base Cabinet
Acid Cabinet
"wb-etch" Cupboards

BAY 4:
"wb-koh" Drawers
"wb-maskmaking" Cupboards

AREA 1:
Hazardous Waste Cabinet

AREA 2:
Flammable Cabinet
Acid Cabinet

CHASE 4:
Flammable Cabinets 1-3
Base Cabinet 1
Acid Cabinets 1-2
Oxidizer Cabinet

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Chemical Inventory

ACIDS:
Acetic Acid
Ammonium Fluoride
Buffered Oxide Etch 10:1
Ferric Chloride
Fluoroboric Acid
Hydrochloric Acid
Hydrofluoric Acid (49%)
Nitric Acid
Phosphoric Acid
Sulfuric Acid

BASES:
Ammonium Hydroxide
Potassium Hydroxide

OXIDIZERS:
Hydrogen Peroxide

ORGANIC SOLVENTS:
Acetone
Dichloromethane
Chlorobenzene
Isopropanol
Methanol
N-methyl 2-pyrrolidone
Stoddard solvent
Toluene
Trichloroethylene

PHOTORESIST PRIMER:
HMDS

POSITIVE PHOTORESISTS, THIN:
Shipley's 1805
Shipley's 1813
Shipley's 1818

POSITIVE PHOTORESISTS, THICK:
Shipley's 1045
Shipley's 1075
AZ's 9260

NEGATIVE PHOTORESIST, THIN:
Futurrex

IMAGE REVERSAL PHOTORESIST, THIN:
AZ's 5214

PHOTORESIST DEVELOPERS:
Shipley's 351
Shipley's MF-319
Shipley's MF-CD-26
AZ's 400K
1-Methoxy-2-propanol ("PM Acetate" for SU-8)

PHOTORESIST STRIPPER:
J.T. Baker's PRS-1000 (for positive PR)
Shipley's 1165 (for PMGI)

METAL ETCHANTS, PRE-MIXED:
J.T. Baker Al Etchant
Cyantek CR-12S Cr Etchant
Acton GE-8 Au Etchant

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Bay Designations

- Bay 1 — No metal processing in the wet benches or with the wafer handling equipment. No PECVD films, Pyrex glass, or KOH contaminated wafers.
- Bay 2 — No acids whatsoever. Processing in this bay is limited to solvents, polymers, and mild bases in the form of developers.
- Bay 3 — Primarily acid etching of metals. Metal, PECVD, Pyrex, and KOH processing okay here.
- Bay 4 — Primarily KOH etching of silicon, electroplating of PR, and staff-only mask processing.

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Wet Bench Designations

BAY 1:
wb-hf
wb-rca
wb-gen-1
srd-2

CHASE 1:
srd-1

BAY 2:
wb-resist
wb-sol
srd-3

BAY 3:
wb-etch
unnamed srd

BAY 4:
wb-koh
wb-maskmaking

AREA 1:
wb-maint

AREA 2:
wb-gen-2
srd-4

Note1: These are the Coral names. They have been used to save space and to familiarize users with their proper names.

Note 2: "wb" = Wet Bench
"srd" = Spin Rinser Dryer

Note 3: At this time there is no charge associated with any of the wb's or srd's in the lab. They do not need to be enabled in Coral to be operated. All users who have received Wet Bench training are qualified under the category "wb-hf".

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RCA Clean Process

(see wb-rca for more specific instructions)
(you will need to be shown the NH_4OH aspirator)

STEP 1:
removal of residual organic contaminates — 80 °C, 15 min followed by DI rinse
$H_2O : NH_4OH : H_2O_2$ 5 : 1 : 1 (3200 ml : 640 ml : 640 ml)

STEP 2:
removal of hydrous oxide formed during step 1 — room temp, 15 sec. followed by DI rinse
H2O : HF 10 : 1 (5500 ml : 550 ml)

STEP 3:
desorption of remaining ionic contaminates — 80 °C, 15 min followed by DI rinse
H2O : HCL : H2O2 6 : 1 : 1 (3360 ml : 560 ml : 560 ml)

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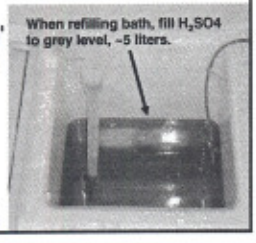
'Piranha' Clean Process

- 'Piranha' clean consists of 10 parts H_2SO_4 to 1 part H_2O_2. When the bath is re-used, the 1 part H_2O_2 is added again to the bath. This is referred to as 'spiking' the bath. Spike the bath with about 500 ml H_2O_2.
- The set point of the bath is 120 °C. A new mixture won't require any heating.
- Typical clean time is 10 min.



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KOH Si Etching Process

(see wb-koh for more specific information on etch rate as a function of temp. and concentration)
(You will need to be shown how to drain the KOH bath into the 5 gal. Haz. Waste Jug in Chase 3.)

- A typical etch process might consist of a 45% KOH solution @ 80 °C with an etch rate of 55 µm/hour.
- For faster etch rates, 80 to 140 µm/hour, a 20 to 25% solution may be used from 80 to 90 °C.
- 'Out of the Bottle' KOH is at a 45% concentration.
- Only the bath on the right of the bench is for General Use. Change bath label to note Name, Date, Contents, Concentration.

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Aqua Regia Process

- Aqua Regia (HCL and Nitric Acid mixtures) should only be performed in Bay 3's Etch Wet Bench in a Pyrex beaker on top of a hot plate. Place the beaker on the right-hand side of the wet bench and close the two right-most sashes to contain the fumes.

- Aqua regia emits chlorine gas. It is important to keep this contained within the wet bench to avoid harmful exposure to the gas, and to prevent avoidable lab evacuations.