

Tufts Micro/Nano Fab – Chemical List **updated 7/19/18**

Name	Major Hazards	Container	Disposal
Isopropanol	Highly Flammable	Incompatible with ABS plastic. Compatible with most other containers including glass, high density polyethylene (HDPE), polypropylene (PP), nylon and Teflon (PTFE).	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Acetone	Highly Flammable	Incompatible with ABS plastic, nitrile (Buna N), PVC, polyurethane, PVDF, and most rubbers. Glass, metals, high density polyethylene (HDPE), polypropylene (PP), nylon and Teflon (PTFE) are all fine.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Methanol	Highly Flammable	Incompatible with ABS plastic and polyurethane. Other plastics (HDPE, PP, PTFE) and glass are all fine.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Tridecafluoro-1,1,2,2-Tetrahydrooctyl-1-Trichlorosilane (Silanizing Agent)	Reacts with water to release hydrogen chloride gas. Corrosive. Causes burns and irritation.	Not much information available. Restrict to DRY glass, polypropylene, polyethylene, and polymethylpentene containers.	Allow to fully evaporate away in hood.
Hydrofluoric Acid	Extremely hazardous to health. Both acute and chronic health hazards. Can cause death. Etches glass (no glass containers!!!)	Attacks glass! Attacks many metals and some plastics! Only use high density polyethylene (HDPE), Teflon (PTFE), or polymethylpentene (PMP). Will slowly attack stainless steel tweezers.	HF waste. NOT a glass bottle!! Must be disposed off in a high density polyethylene (HDPE) container!!
SU8-2002, 2025, 2050, 2100, etc	No major health hazards.	Not known to attack any common containers.	Solvent and photoresist waste.
Sylgard 184 (Dow Corning PDMS)	No major health hazards.	Not known to attack any common containers.	Solvent and photoresist waste.
Potassium Hydroxide Pellets (solid, pure)	Will cause acute burns if contacts skin.	Not compatible with glass!! Reacts with some metals and polyurethane. Use stainless steel containers for heated etching. Otherwise, use polypropylene or polyethylene.	KOH waste. Use a polyethylene or polypropylene container for disposal.

Name	Major Hazards	Container	Disposal
Sulfuric Acid	Acute burns to skin and eyes. Severe respiratory irritant. Can get very hot when reacting with water, hydrogen peroxide, or any base.	Use glass containers for processing.	Piranha (Sulfuric/Hydrogen Peroxide solution) waste (glass bottle).
Hydrogen Peroxide	Acute burns to skin and eyes.	Use glass containers for processing. High density polyethylene (HDPE) or glass is fine for storage or disposal.	Piranha (Sulfuric/Hydrogen Peroxide solution) waste (glass bottle) if mixed with sulfuric acid. Otherwise, hydrogen peroxide waste (HDPE bottle).
MCC Primer 80/20 (propylene glycol monomethyl ether acetate 80%, HMDS 20%)	Flammable. Vapors can be harmful (headache, anesthesia). Severe skin/eye irritant.	Compatible with glass containers.	Solvent/photoresist waste. (HDPE or glass bottle)
SU-8 Developer (PM-acetate, propylene glycol monomethyl ether acetate)	Flammable. Vapors can be harmful (headache, anesthesia).	Compatible with glass and high density polyethylene (HDPE) containers.	Solvent/photoresist waste. (HDPE or glass bottle)
Nitric Acid	Acute burns to skin and eyes. Severe respiratory irritant. Can get very hot when reacting with water, or any base.	Compatible with glass containers.	Nitric acid waste (glass bottle). <i>Note: when mixed with HF and Acetic Acid for HNA etching, the resulting solution should be disposed of in HF waste (HDPE).</i>
Glacial Acetic Acid	Acute burns to skin and eyes. Severe respiratory irritant. Can get very hot when reacting with water, or any base.	Compatible with glass and high density polyethylene (HDPE) containers.	Acetic acid waste (high density polyethylene (HDPE) bottle). <i>Note: when mixed with HF and Nitric Acid for HNA etching, the resulting solution should be disposed of in HF waste (HDPE).</i>
Ultra Etch NP 13:2 (Buffered HF Etch, a mix of NH ₃ F, HF, surfactant and water)	Contains HF: extremely hazardous to health! Both acute and chronic health hazards. Can cause death. Etches glass (no glass containers!!!)	Attacks glass! Compatible with high density polyethylene (HDPE), polymethylpentene (PMP), and Teflon (PTFE) containers.	HF waste. NOT a glass bottle!! Must be disposed of in a high density polyethylene (HDPE) container!!

Name	Major Hazards	Container	Disposal
Remover 1165. & Remover PG: Organic solvent solution for removing DQN resists. Contains 95-99% N-methyl-2-pyrrolidine	Flammable. (Flash point 88°C). At temperatures about 80 °C, a spark or open flame will ignite the fumes. Contact with skin or eyes will cause irritation or burns. Avoid breathing vapors.	Compatible with HDPE and glass.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
MF CD 26 Metal Ion Free (MIF) Developer for Shipley and Rohm & Haas positive DQN resists. Contains tetramethyl ammonium hydroxide (TMAH) at a 2.4% level in water.	This is an alkaline, mildly corrosive liquid. It also has neurotoxic effects and can be absorbed through the skin. It will cause burns and irritation if it contacts your skin or eyes. Avoid breathing vapors. Exposure to large quantities could cause loss of consciousness.	Compatible with HDPE and glass.	Alkaline (base) TMAH developer waste. (HDPE or glass bottle).
SPR220 and S1813 Photoresist (Rohm & Haas). These are positive DQN resists containing Diazoquinone photosensitizer, Novolak resin, and solvents: ethyl lactate, anisole, and n-amyl acetate.	Contact with skin or eyes will cause irritation. Liquid is combustible (it will burn... although it is not highly flammable).	Compatible with HDPE and glass.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Transene TFA Gold Etchant Contains Iodine (poison). (Iodine Complex, Potassium Iodide and Water)	Severe respiratory irritant. Also a severe skin and eye irritant. Do not breath vapors. In case of skin or eye exposure, flush with water. Wash skin with soap.	Compatible with glass, HDPE, and Polypropylene. After 3 years, iodine may diffuse through HDPE and PP.	Gold etch waste (Iodine and Potassium Iodide). Use glass or HDPE bottle. Store in base cabinet. Solid trash in acid/base trash.
Transene Chromium Etchant 1020 (Ceric Ammonium Nitrate, Nitric Acid <6%)	May cause irritation and burns to skin, eyes, and respiratory tract.	Compatible with glass, HDPE and polypropylene.	Chromium etch waste (Ceric Ammonium Nitrate and Nitric Acid). Use HDPE or glass bottle. Store in acid cabinet. Solid trash in acid/base trash.

Name	Major Hazards	Container	Disposal
<p>HD-4100 Photodefineable Polyimide:</p> <p>A polyimide photoresist containing 30-60% n-Methylpyrrolidone and 30-60% photosensitive Polyimide Resin with solvents.</p>	<p>Skin, eye, and respiratory tract minor irritant. Not an unusual fire hazard.</p>	<p>Compatible with HDPE and glass.</p>	<p>Solvent and photoresist waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.) Solid waste in photoresist/solvent waste.</p>
<p>PA-400R Polyimide Rinse solution:</p> <p>95-100% Propylene Glycol Monomethyl Ether Acetate (PM Acetate... the same thing as SU8 Developer)</p>	<p>Flammable. Vapors can be harmful (headache, anesthesia).</p>	<p>Compatible with HDPE and glass.</p>	<p>Solvent and photoresist waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.) Solid waste in photoresist/solvent waste.</p>
<p>PA-401D Polyimide Developer:</p> <p>>60% Cyclopentanone</p>	<p>Highly flammable (flash point 94°F). Severe skin, eye, and respiratory irritant. Can cause skin burns, difficulty breathing.</p>	<p>Compatible with HDPE and glass.</p>	<p>Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)</p>
<p>A-174 Silane Adhesion Promoter (>98% Gamma- Methacryloxypropyltri- methoxysilane)</p>	<p>Mild to moderate skin, eye, and respiratory irritant. Combustible liquid, but not overly flammable (226 °F flashpoint).</p>	<p>Compatible with HDPE and glass.</p>	<p>Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)</p>
<p>Micro90 Parylene Microsoap</p>	<p>Mild skin and eye irritant. Not flammable.</p>	<p>Compatible with HDPE and glass.</p>	<p>If a waste bottle is needed (unlikely) put it in it's own HDPE bottle and label it MicroSoap Waste; this is a non-hazardous waste according to federal hazardous waste regulations.</p>
<p>Parylene C Dimer and Polymer</p>	<p>Solid powder material. Not hazardous.</p>	<p>Compatible with HDPE and glass.</p>	<p>Can dispose of in general trash. Not a hazardous waste.</p>

Bacteriorhodopsin (BR)	Minor skin and eye irritant.	Compatible with all plastic and glass containers.	Non-hazardous solid waste (small amounts... BR should only be used in small amounts, < 100 mL)
3-(1-pyridinio) propane sulfonate (PPS)	Minor skin and eye irritant.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
Polyvinylalcohol (PVA)	Minor skin and eye irritant.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
PI-2610 Polyimide	Minor skin and eye irritant.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
PI-2611 Polyimide	Minor skin and eye irritant.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
VM-651 Adhesion Promoter (for PI-2610)	Skin and eye irritant. May cause burns to skin. Can cause permanent eye damage.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
PMMA 495C, 950C, etc (PolyMethylMethacrylate) – an ebeam photoresist dissolved in Monochlorobenzene	Highly flammable. Extreme eye, skin, and respiratory irritant. Inhalation can cause central nervous system damage.	Compatible with all plastic and glass containers.	Mixed solvent waste. Make sure to add this name to the chemical hazard tag, it is not on the pre-printed tags.
Aluminum Etchant Type A (Transene) – contains phosphoric acid (40-80%), nitric acid (1-5%), acetic acid (3-20%)	Contact can cause severe burns. Moderately irritating to the the eyes, skin, and mucous membranes. Moderately toxic.	Avoid contact with metals, strong bases, and combustible organics. Compatible with HDPE and glass.	May be combined with hydrofluoric acid, nitric acid, and/or acetic acid waste. Use an HDPE or glass bottle.

Carbon Nanotubes	No known health hazards. May irritate the eyes, mucous membranes, and respiratory tract.	Compatible with all containers.	Non hazardous waste.
Copper (II) Sulfate	Moderate eye and skin irritant and burn agent. Digestive and respiratory tract irritation and burns. Chronic exposure may cause blood, liver and kidney damage.	Compatible with glass, HPDE, and steel.	Copper sulfate / sulfuric acid waste (HDPE bottle).
AZ400K Developer	Severe eye irritant. Alkaline solution.	Compatible with HDPE and glass containers.	Alkaline waste – mix with MFCD26 developer and KOH.
AZ 9200 series photoresists	Eye and skin irritant. Combustible with a flash point of 104°F.	Compatible with HDPE and glass containers.	Mixed photoresist/solvent waste.
Transene Copper Etchant APS-100 (Ammonium Persulfate 15-20%, Water 80-85%)	Minor eye and skin irritant. Will decompose to form oxygen and oxides of sulfur and nitrogen if heated or if mixed with acids or reducing agents.	Compatible with HDPE and glass containers.	Ammonium Persulfate waste. DO NOT MIX WITH ACID WASTE, BASE WASTE, OR ORGANIC SOLVENT WASTE.
Ammonium Hydroxide	Very hazardous in case of skin, eye, or respiratory contact. Skin contact produces burns. Inhalation produces severe respiratory irritation.	Compatible with HDPE and glass containers.	Base waste. Often mixed with hydrogen peroxide in RCA clean. Can mix waste with potassium hydroxide (KOH) and/or TMAH (in MFCD26 developer). Do NOT mix with acids.
Rhodamine B (water soluble dye)	Minor eye/skin/respiratory irritant. Not flammable. Not acutely toxic.	Compatible with all plastic and glass containers.	Rhodamine B/Stilbene 420/Silk Fibroin waste. Use glass or HDPE bottle.
Stilbene 420 (water soluble dye)	Minor eye/skin/respiratory irritant. Not flammable. Not acutely toxic.	Compatible with all plastic and glass containers.	Rhodamine B/Stilbene 420/Silk Fibroin waste. Use glass or HDPE bottle.

Hydrochloric Acid	Acute burns to skin and eyes. Severe respiratory irritant. Can get very hot when reacting with water, or any base.	Compatible with glass and HDPE containers.	Hydrochloric acid waste. Use an HDPE or glass bottle. Can mix with Nitric Acid. Do NOT mix with Sulfuric Acid, any organic material, or any base.
T-9039 Polyimide Thinner (Propylene Glycol Monomethyl Ether (PGME) 30-60%, n-methylpyrrolidone (NMP) 30-60%)	Minor skin, eye, and respiratory irritant.	Compatible with glass and HDPE.	Mixed solvent and photoresist waste.
Surpass 3000/4000 Adhesion Promoter (DI water 95%, proprietary cationic organic surface agent 5%)	Minor skin, eye, and respiratory irritant.	Compatible with glass and HDPE.	Mixed solvent and photoresist waste.
Technic Nickel Sulfamate Plating Solution (Nickel Sulfamate 20-35%, Nickel bromide 0.5-1.5%, Boric Acid 1-3%)	Minor skin irritation (“nickel itch”), burns to eyes. <u>Carcinogenic</u> . Not readily absorbed through skin.	Compatible with glass and HDPE.	Nickel sulfamate waste (HDPE or glass bottle).
Technic Copper FB Bath Plating Solution (Sulfuric Acid 15-20%, Copper Sulfate 5-10%, Chloride ions)	Irritation and burns to skin, severe burns to eyes. Irritating to respiratory tract. Not readily absorbed through skin.	Compatible with glass and HDPE.	Copper sulfate/sulfuric acid waste. Can mix with Technic FB copper brightener. HDPE bottle.
Techni Copper FB Brightener (proprietary contents)	May cause slight, temporary irritation of eyes, skin and respiratory tract. Not readily absorbed through skin.	Compatible with glass and HDPE.	Copper sulfate/sulfuric acid waste. HDPE bottle.
Transene Titanium Etch TFTN (20-30% Hydrochloric Acid 70-80% water)	Acute burns to skin and eyes. Severe respiratory irritant. Can get very hot when reacting with water, or any base.	Compatible with glass and HDPE containers.	Hydrochloric acid waste. Use an HDPE or glass bottle. Can mix with Nitric Acid. Do NOT mix with Sulfuric Acid, any organic material, or any base.
Microchem Omnicoat (70-90% Cyclopentanone, 10-20% PGME)	Highly flammable (flash point 94°F). Severe skin, eye, and respiratory irritant. Can cause skin burns, difficulty breathing.	Compatible with HDPE and glass.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)

Microchem LOR Resists (65-90% Cyclopentanone, 10-15% PGME, 1-20% polyaliphatic imide copolymer)	Highly flammable (flash point 94°F). Severe skin, eye, and respiratory irritant. Can cause skin burns, difficulty breathing.	Compatible with HDPE and glass.	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Phosphoric Acid	Liquid & vapors are serious health hazards and can cause severe burns. Corrosive to metals	Compatible with HDPE and glass	Use separate phosphoric acid waste container – incompatible with fluorides, sulphides and metals
Dichloromethane	Extremely hazardous to health if swallowed. Possible carcinogen	Incompatible with ABS plastic. Compatible with most other containers including glass, high density polyethylene (HDPE), polypropylene (PP), nylon and Teflon (PTFE).	Solvent waste. Compatible with acetone, IPA, methanol, PM acetate, HMDS, Remover 1165. (HDPE or glass bottle.)
Sucrose	No known hazards	No incompatibilities	Solid waste should be placed in the General Trash bins. Liquid waste in the dilute Acid/Base waste jug
Polycaprolactone (PCL)	No known hazards	No incompatibilities	Solid waste should be placed in the Solvent Waste bins. Liquid waste in the Solvent waste jug
3-trichlorosilyl propyl methacrylate	Reacts violently with water. Should be stored between 2-8C, dessicated	Compatible with HDPE	Liquid waste – dedicated waste jug labeled “silicon membrane activation waste.” Solid waste – solid solvent waste bin

Heptane	Highly flammable liquid and vapor. Maybe fatal if swallowed, skin irritant, may cause drowsiness/dizziness	Compatible with HDPE	Liquid waste – dedicated waste jug labeled “silicon membrane activation waste.” Solid waste – solid solvent waste bin
Carbon Tetrachloride	Carcinogenic, toxic via ingestion or skin absorption	Compatible with HDPE	Liquid waste – dedicated waste jug labeled “silicon membrane activation waste.” Solid waste – solid solvent waste bin
Hexane	Flammable, irritant, target organ effect, teratogen	Compatible with HDPE	Liquid waste – dedicated waste jug labeled “silicon membrane activation waste.” Solid waste – solid solvent waste bin
NRR-001 Negative resist remover	Flammable, may cause severe skin burns and eye damage. Rinse with IPA not water	Compatible with HDPE	Liquid acid waste. Not compatible with bases
PRR-5.4	May cause severe skin burns and eye damage. Toxic if swallowed	Compatible with HDPE	Liquid base waste. Not compatible with acids or metals
Triton X-100	Harmful if swallowed, serious eye irritation, mild skin irritation, toxic to aquatic life	Compatible with HDPE	Liquid solvent waste
Barrium Ferrite (Barium Iron Oxide)	Low toxicity, low irritation level (Acute Toxicity Level 4, > 5000 mg/kg LD50) Toxic if swallowed. Small particles may generate airborne dust. Avoid breathing dust.	Compatible with HDPE, glass.	Mix with solvent waste stream. Add “barium ferrite” to the waste tag.
Strontium Ferrite (Strontium Iron Oxide)	Serious eye irritant. Powder/dust can cause serious eye irritation. Rinse with water for several minutes if exposed. Skin and respiratory irritant.	Compatible with HDPE, glass.	Mix with solvent waste stream. Add “strontium ferrite” to the waste tag.
Ethanol	Highly flammable liquid/vapor. Wear PPE.	Compatible with HDPE, glass	Mix with solvent waste stream, add “ethanol” to the waste tag

Aluminum Etchant Type D (phosphoric, acetic, Sodium-M-Nitrobenzene Sulfonate)	Corrosive to eyes and skin. May cause blindness if it gets in your eyes. Vapors are corrosive to mucous membranes and respiratory tract. Wear full PPE, always work in fume hood.	Compatible with HDPE and glass	May be mixed with other acid wastes – Nitric, Acetic, HF, HNA and Cr etchant
Silver Nitrate (.100M)	Causes severe skin burns and eye damage. May be carcinogenic. Toxic to aquatic life with long lasting effects.	Compatible with HDPE and glass	Has its own dedicated waste stream
Spin On Glass NDG 5000/7000 (contains tetraethyl orthosilicate, ethyl acetate and Isopropyl alcohol)	Combustible liquid and vapor. Skin, eye and inhalation irritant. Repeated or prolonged contact can produce organ damage	Compatible with HDPE and glass	May be added to the solvent waste stream
AZ Developer (Sodium metasilicate 1%)	Mild alkaline solution. Mild skin and eye irritant.	Compatible with HDPE and glass.	May be added to the alkaline developer waste stream (HDPE bottle) mixed with KOH, NaOH, potassium borates, TMAH and other alkaline chemistries.
Alfa Aesar 44215 Electroless Nickel Plating Solution (contains nickel salts, possibly ammonium salts, acidic solution)	Acidic solution. Skin and eye burns. Contains nickel compounds. Possible carcinogen. Toxic to aquatic life.	Compatible with HDPE and glass	Add to electroplating waste (compatible with sulfuric acid, nickel, copper and ammonium sulfates/sulfamates and salts)
Uyemura MCT-14 copper activation for electroless nickel (contains 10% sulfuric acid)	10% sulfuric acid. Skin and eye burns.	Compatible with HDPE and glass	Add to mixed acid waste or electroplating waste.
Uyemura NPR-18CM electroless nickel plating solution (contains nickel sulfate 0.3-0.6%, ammonium salts 2-5%)	Contains nickel and ammonium salts. Possible carcinogen. Toxic to aquatic life.	Compatible with HDPE and glass	Add to electroplating waste (compatible with sulfuric acid, nickel, copper and ammonium sulfates/sulfamates and salts)
Elevate Gold 7990 RTU – Gold plating solution (contains sodium and sodium gold sulfites)	Prolonged contact may cause dermatitis	Compatible with HDPE and glass	Add to electroplating waste

1-Dodecanethiol	Severely corrosive to eyes and skin.	Compatible with HDPE and glass	May be mixed with other solvent waste – acetone, ethanol, isopropanol, etc
Poly(vinylidene fluoride) PVDF	Not hazardous.	Solid pellets	Solvent waste
N,N-Dimethylformamide (DMF)	Chronic health effects. Liver damage. Can be absorbed through skin. May cause birth defects. Flammable.	Compatible with glass and HDPE.	Solvent waste
Nickel Etchant TFB (contains Nitric acid and potassium perfluoroalkyl sulfonate)	Highly irritant to mucous membranes and skin	Compatible with glass and HDPE	Do not mix with other wastes, it is its own waste stream
Nickel Etchant TFG (contains Thiourea, sodium n-nitrobenzene sulfonate and sulfuric acid)	Vapors may irritate skin, eyes and mucous membranes. Inhalation may cause coughing, chest pain or nose and throat irritation. Exposure may result in chronic health effects	Compatible with glass and HDPE	Do not mix with other wastes, it is its own waste stream
Compressed gasses Ar, N2, O2, CF4, SF6, H2, CH4	H2 and CH4 are attached to Professor Jiang's furnace		No waste generated
Vacuum Pump Oils - Hydrocarbon type – Edwards19 for example Perfluoropolyether (PFPE) type – Fomblin 25/6	Avoid prolonged contact to skin. Hydrocarbons are flammable	Compatible with glass or HDPE	Separate jug for each type. PFPE returned to vacuum service provider for filtering and reclamation