



Chemical Safety in an Organic Chemistry Lab

Integrating Safety Practices into Complex Processes

Presented by Zackary Herbst (they/them)

Common Safety Issues in Organic Chemistry Labs



Common Safety Issues in Organic Chemistry Labs

- Chemical Management
 - Storage
 - Usage



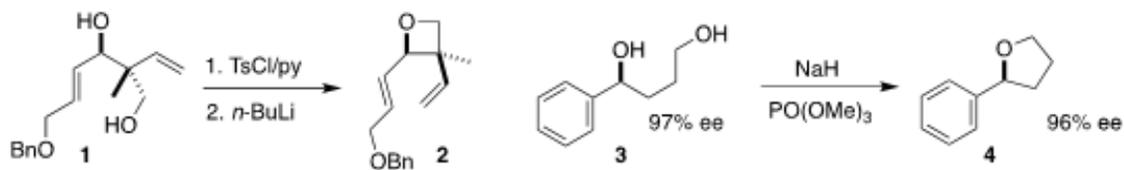
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 - Storage
 - Usage
- Unattended/Overnight reactions



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- New processes are common



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- New processes are common
- Managing Accumulation

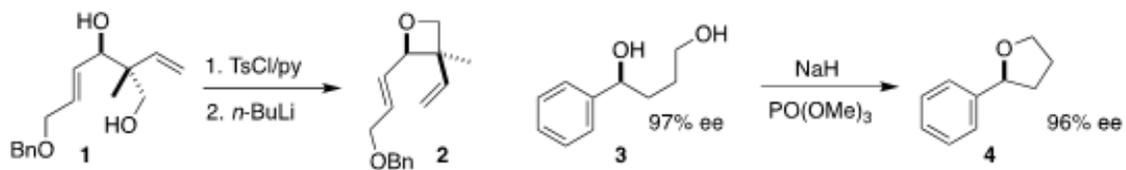


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Common Safety Issues in Organic Chemistry Labs

Chemical Management

- Storage
- Usage
- Unattended/Overnight reactions
- ~~New processes are common~~
- Managing Accumulation

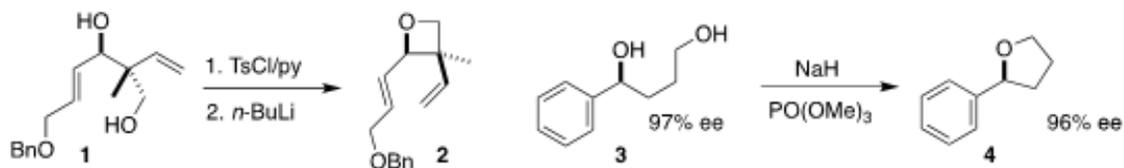


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Addressing Chemical Storage & Accumulation



Project: Flammables Refrigerators

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- Storage of volatile chemicals: “Cancer Fridge”



Project: Flammables Refrigerators

- Storage of volatile chemicals: “Cancer Fridge”
- Some >30 years old and duplicates



Project: Flammables Refrigerators

- Storage of volatile chemicals: “Cancer Fridge”
- Some >30 years old and duplicates
- Difficult to find materials



Project: Flammables Refrigerators **Solutions**



Project: Flammables Refrigerators **Solutions**

- Reduce the Number of Chemicals Stored

Project: Flammables Refrigerators Solutions

	A	B	C	D	E	F	G	H	I
274	KEEP FOR SURE	38078-09-0	Diethylaminosulfur trifluoride	5G	2013	Never opened??	CHB418A Freeze Big Bin (general)		A00301499
275	KEEP FOR SURE	38078-09-0	Diethylaminosulfur trifluoride	25G	2018		CHB413 Fridge Bin 14 (C4)		A00357602
276	hamid said throw out	38078-09-0	(Diethylamino)sulfur trifluoride	25G	2019	Date wrong - bottle is VERY OLD	CHB413 Fridge Unmarked (Thro		A00367846
277	KEEP FOR SURE	38078-09-0	(Diethylamino)sulfur trifluoride	25G	2019		CHB413 Freezer		A00367846
278	KEEP FOR SURE	38222-83-2	2,6-Di-tert-butyl-4-methylpyridine	10G	2015		CHB418A Refrig Door 2nd Top Ri		A00330871
279	KEEP FOR SURE	38899-05-07	D-Glucosamine 2-sulfate sodium	1G			CHB413 Fridge Bin 1 (C1 & C2)		
280	KEEP FOR SURE	391-82-2	4-Chloro-7-fluoroquinoline	1G	2017		CHB418A Refrig Door Top Left		A00345303
281	KEEP FOR SURE	39539-66-7	4-Methyl-1-piperazinecarbonyl chloride	1G	2012	(spec date 2010)	CHB413 Fridge Bin 18		A00285428
282	KEEP FOR SURE	39637-74-6	(1S)-(-)-Camphanic chloride	1G	2014		CHB418A Refrig 2nd from top C9		A00316117
283	Throw out	39684-80-5	2-(Boc-amino)ethyl bromide	500MG	2003	Marked as discarded 2009? we have 1G from 2007 and 2011	CHB418A Refrig Top Shelf		A00179923
284	KEEP FOR SURE	39684-80-5	2-(BOC-amino)ethyl bromide	1G	2007	Disposed of in 2014?	CHB418A Freeze Big Bin (general)		A00227364
285	KEEP FOR SURE	39684-80-5	2-(Boc-amino)ethyl bromide	1G	2011	NOT IN INVENTORY	CHB413 Freezer		A00254115
286	>20 years old	39718-32-6	2,5-Difluorophenyl isocyanate	1G?	1997?		CHB418A Freeze Isocyanates Box		
287	>20 years old	39920-37-1	2,6-Dichlorophenyl isocyanate	1G	1997	Disposed in 2007?	CHB418A Freeze Isocyanates Box		A00106655
288	KEEP FOR SURE	39968-33-7	1-Hydroxy-7-azabenzotriazole	1G	2003		CHB413 Fridge Bin 15 (C5)		A00174361
289	KEEP FOR SURE	3999-38-0	2-Methylpyridine borane complex solution	5G	2017		CHB413 Fridge Bin 18		A00348720
290	KEEP FOR SURE	40054-01-01	6-Bromomethyl-2-pyridinemethanol	1G	2003		CHB418A Refrig Top Shelf		A00180589
291	KEEP FOR SURE	40377-41-1	N-(4-Aminophenyl)acetamide	250MG		Chemical looks brown??	CHB413 Fridge Bin 18		
292	KEEP FOR SURE	40397-95-3	2-Chloro-4-nitrophenyl isocyanate	25G	2018		CHB418A Refrig Door Top Left		A00357603
293	>20 years old	40398-01-04	2-Chloro-6-methylphenyl isocyanate	1G	1997	Disposed in 2007?	CHB418A Freeze Isocyanates Box		A00106672
294	>20 years old	404-71-7	3-Fluorophenyl isocyanate	5G	1997	older than labelled	CHB418A Freeze Isocyanates Box		A00364968
295	>20 years old	404-71-7	3-Fluorophenyl isocyanate		1997?	MISSING ORIGINAL LABEL (1997?)	CHB418A Freeze Isocyanates Box		
296	>20 years old	4111-54-0	Lithium diisopropylamide	100ML	1992		CHB418A Refrig 2nd from top C9		B0000022620
297	KEEP FOR SURE	4111-54-0	Lithium diisopropylamide solution	100ML	2011		CHB418A Refrig Door 2nd Top Ri		A00256604
298		4111-54-0	Lithium diisopropylamide 2.0M heptane/THF	100ML	2011	Discarded 2011??	CHB418A Refrig Very Bottom She		A00275594
299	>20 years old	41195-90-8	2,3-Dichlorophenyl isocyanate	1G	1997		CHB418A Freeze Isocyanates Box		A00106652
300	KEEP FOR SURE	4163-60-4	B-D-Galactose-pentaacetate	25G	2010	Discarded in 2012??	CHB418A Refrig 2nd from botton		A00265043
301	>20 years old	41840-28-2	tert-Butyl S-(4,6-dimethylpyrimidin-2-yl)thiocarbonate	10G	1992	Discarded in 2012??	CHB418A Refrig 2nd from top C9		B0000022870
302	KEEP FOR SURE	41840-28-2	O-Tert-Butyl S-(4,6-dimethylpyrimidin-2-yl)thiocarbonate	10G	2011	THIS LOOKS OLDER	CHB418A Refrig 2nd from top C9		A00259797
303	KEEP FOR SURE	420-04-02	Cyanamide	25G	2014		CHB413 Fridge Bin 2 (C1 & C2)		A00316063
304	Throw out	420-37-1	Trimethyloxonium tetrafluoroborate	10G	2006	We have 8 bottles	CHB413 Fridge In a bottle with c		A00209297
305	Throw out	420-37-1	Trimethyloxonium	10G	2006	Disposed of in 2007?	CHB418A Freeze Big Bin (general)		A00210805
306	Throw out	420-37-1	Trimethyloxonium tetrafluoroborate	10G	2008		CHB418A Freeze Big Bin (general)		A00237326
307	Throw out	420-37-1	Trimethyloxonium tetrafluoroborate	10G	2010	We have 8 bottles	CHB413 Fridge Bin 9 (C3)		A00280529
308	Throw out	420-37-1	Trimethyloxonium tetrafluoroborate	10G	2010	We have 8 bottles	CHB413 Fridge Bin 9 (C3)		A00280528

Project: Flammables Refrigerators Solutions

- Reduce the Number of Chemicals Stored
- Use Sealed 2^o Containers to Reduce Exposure Risk



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Project: Flammables Refrigerators **Solutions**

- Reduce the Number of Chemicals Stored
- Use Sealed 2^o Containers to Reduce Exposure Risk
- Create a System for Organization



Project: Flam

- Reduce the Number
- Use Sealed 2^o Con
- Create a System fo

Code	Material ID	Material Name	Quantity	Year	Notes
C9-1	A00269850	C9 C9H8N2O7 74124-79-1			
C12	A00272450	C8 C8Cl2N2O2 84-58-2			
C13	A00274050	C13 C13H10O 1203-68-5			
with	A00274108	C0 NH3 7664-41-7			
C456-1	A00275594	C6 C6H14N4 4111-54-0	25G	2011	
C12/1	A00278060	C12 C12H24Br 132705-51-2	10G	2011	
C8-2	A00280175	C7 C7H10O3 10472-24-9	1G	2011	Discarded in 2012??
C7-1	A00281511	C7 C7H10BC 380430-57-9	500ML	2011	
C11-1	A00283183	C11 C11H9Br 939-26-4	100ML	2011	Discarded 2011??
C7-1	A00283501	C7 C7H5BrF3 191602-54-7	5G	2009	Discarded in 2012??
C9-1	A00284789	C9 C9H18NO 2564-83-2	25G	2010	
C8-2	A00289215	C8 C8H10BC 78887-39-5	1G	2012	
bottom	A00290109	C0 H2O2 7722-84-1	5G	2012	
C14/C15-1	A00291058	C14 C14H12O 451-40-1	5G	2012	
C9-1	A00291221	C9 C9H6O2 637-44-5	1G	2012	
C8-1	A00294306	C8 C8H7Cl 1073-67-2	500ML	2012	Discarded in 2014??
can	A00298082	C4 C4H9Li 109-72-8	25G	2012	
C9-1	A00304188	C9 C9H7NO 1074-88-0	5G	2012	
C12/13-1	A00305663	C12 C12H10N3 26386-88-9	10G	2012	
C3-1	A00307999	C3 C3H5BrZn 126403-68-7	100ML	2013	Still in the can
C9-1	A00308001	C3 C3H7BrZn 77047-87-1	1G	2013	
C4-1	A00308002	C4 C4H9BrZn 126403-67-6	100G	2013	
C20+1	A00308120	C28 C28H36Cl3 106256-81-9	100G	2013	
door	A00308257	C4 C4H9BrZn 126403-67-6	50ML	2013	Discarded in 2014??
C7-1	A00308259	C3 C3H7BrZn 77047-87-1	50ML	2013	
C7-1	A00308256	C3 C3H7BrZn 77047-87-1	1G	2013	
C10-1	A00311713	C10 C10H22N2 51644-96-3	1G	2014	Discarded in 2014??
C8-1	A00312529	C8 C8H7NS 614-69-7	25ML	2014	Discarded in 2014??
bottom	A00313271	C0 H2O2 7722-84-1	50ML	2014	
C7-1	A00313290	C7 C7H4CINS 2740-81-0	1G	2014	
C7-1	A00313291	C7 C7H4CINS 2392-68-9	10G	2014	Says N-Benzylglycine ethyl ester in inventory?? Discarded 2014
C6-1	A00313568	C8 C8HSNO2S 113504-93-1	100ML	2014	Old Peroxide
C10-1	A00313569	C10 C10H11NS 89007-45-4	5G	2014	
C8-1	A00313570	C8 C8H3ClF3 23163-86-2	5G	2014	
C8-1	A00313571	C8 C8H7NS 622-78-6	1G	2014	
C9-1	A00313572	C9 C9H3F6NS 23165-29-9	1G	2014	
C9-1	A00313573	C9 C9H10NS 2131-64-8	1G	2014	
C7-1	A00313585	C7 C7H3ClFNS 137724-66-4	5G	2014	
C7-1	A00313586	C7 C7H3ClFNS 247170-25-8	5G	2014	
A00313586	C7 C7H3ClFNS 247170-25-8		5G	2014	
C0-1	A00313752	C0 NH3 7664-41-7	1G	2014	
C8-1	A00313959	C8 C8H6CINS 3694-58-4	4G	2014	
C8-1	A00315237	C8 C8H7NOS 3125-64-2	100ML	2014	
C9-1	A00315296	C9 C9H7NOS 3125-71-1	1G	2014	
C9-1	A00315297	C9 C9H7NOS 2131-57-9	10G	2014	
C9-1/1	A00315298	C8 C8H5NO2S 2131-62-6	5G	2014	
C7-1	A00315330	C9 C9H9NO2S 33904-03-9	5G	2014	
C7-1	A00315981	C7 C7H3Cl2NE 6590-96-1	5G	2014	
C9-1	A00315982	C9 C9H9NO2S 33904-04-0	5G	2014	
C4-1	A00316054	C11 C11H20Br 158407-04-6	10G	2014	
2274	A00316112	C18 C18H33Cl 112-77-6	10G	2014	
Jar	A00316113	C12 C12H28Sn 688-73-3	1G	2014	
A00316114	A00316114	C12 C12H28Sn 688-73-3	1G	2014	
16-19	A00316115	C19 C19H15NO 82911-69-1	50G	2014	In dessicant
20+1	A00316116	C72 C72H60P4 14221-01-3	50G	2014	In dessicant
		C72 C72H60P4 14221-01-3	5G	2014	
		C72 C72H60P4 14221-01-3	10G	2014	

B0000022620 688-73-3 tributyltin hydride 500G for navin C6-2
 C9-2 A00114748
 C9-2 A00114747
 Keep Ann 274,100-bottom

→ take out of can

Project: Flammables Refrigerators Solutions

CHB413 Chemical Refrigerator Inventory by CAS#
Last updated November 2019, ZMH

CAS #	Compound Name	Amount	Shelf	Bin #	Lot No.
100-21-8	Potassium 2-cyanovaldic acid	50	2004	Bin 7 (C2)	A001744
1344-78-8	Diethylene	50	2004	Bin 10 (C4)	A001745
1344-54-2	Diethylene glycol dimethyl ether	10	2004	Bin 5 (C3)	A001746
106-49-1	Allyl bromide	1000	2001	Bin 5 (C3)	A001747
1073-28-21	1-Bromo-2-fluoroethane (Ambuol)	50	Bin 10 (C4)		
104-43-3	Hexamethyl phosphoramide	1000	2002	Bin 5 (C3)	A001748
104-43-3	Hexamethyl phosphoramide	100	2002	Bin 10 (C4)	A001749
107-01-5	Propyl chloroacetate	100	2001	Bin 8 (C2)	A001750
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001751
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001752
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001753
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001754
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001755
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001756
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001757
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001758
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001759
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001760
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001761
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001762
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001763
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001764
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001765
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001766
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001767
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001768
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001769
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001770
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001771
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001772
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001773
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001774
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001775
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001776
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001777
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001778
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001779
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001780
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001781
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001782
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001783
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001784
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001785
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001786
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001787
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001788
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001789
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001790
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001791
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001792
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001793
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001794
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001795
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001796
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001797
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001798
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001799
107-01-7	Butyl chloroacetate	1000	2001	Bin 8 (C2)	A001800

SAFETY INSTRUCTIONS
See manufacturer insert for safe storage requirements of caustic and acidic materials.

NO FOOD OR DRINK



Project: Flammables Refrigerators **Solutions**

- Reduce the Number of Chemicals Stored
- Use Sealed 2^o Containers to Reduce Exposure Risk
- Create a System for Organization





Project: Particularly Hazardous Substances

Criteria for designating Particularly Hazardous Substances

EH&S classifies chemicals in [MyChem](#) based on the Fire Code, the Globally Harmonized System for Classification and Labeling (GHS), the [National Institutes of Health List of Antineoplastic and Other Hazardous Drug in a Healthcare Setting](#) and the [FH&S Reproductive and Developmental Chemical List](#).

Criteria	Fire Code	GHS (Class, Hazard Category, Route)
Carcinogen	Not tracked	Carcinogenicity, Category 1A or 1B
Reproductive toxin	Not Tracked	Reproductive Toxicity, Category 1A or 1B
High acute toxicity	Highly Toxic Highly Toxic	Acute toxicity, Category 1 or 2, Inhalation or Dermal Acute toxicity, Category 1, Oral Specific Target Organ Toxicity - Single Exposure, Category 1 Skin Sensitizer, Category 1A Respiratory Sensitization, Category 1A
Reactive	Oxidizer, Class 3 or 4 Water Reactive, Class 3	Oxidizing Liquids, Category 1 Oxidizing Solids, Category 1 Substances, which in contact with water, emit flammable gases, Category 1 or 2
Explosive/unstable	Explosive Division 1.1, 1.2, or 1.3 Water Reactive, Class 3 Flammable Solid, Pyrophoric Flammable Solid, Pyrophoric Unstable(Reactive), Class 3 and 4 Organic Peroxides, Class UD or Class I	Explosives, Divisions 1.1, 1.2 or 1.3 Unstable explosive Reacts violently with water In contact with water liberates toxic gas Explosive when dry Explosive with or without air contact Self-reactive substances, Type A-F Self-reactive substances and mixtures, Type A-F Organic Peroxides Type A or B Self-heating substances, Category 1

Project: Particularly Hazardous Substances

- Large number of PHS (>600)

Project: Particularly Hazardous Substances

- Large number of PHS (>600)
- Each require customized SOPs and training

Project: Particu

- Large number of PHS
- Each require custom

CAS	Chemical Name	Flammable Liquid	Flammable Solid	Flammable Gas	Pyrophoric	Oxidizing	Acute Oral Toxicity	Acute Inhalation Toxicity	Acute Dermal Toxicity	Corrosive	Skin Irritation	Eye Irritation	Serious Eye Damage	Respiratory Sensitisation	Skin Sensitisation	Germ Cell Mutagenicity	Carcinogen	Reproductive	Specific target organ toxicity - single exposure	Specific target organ toxicity - multiple exposures	Risk of Aspiration	Gas Under Pressure	Special Notes
100-00-5	1-CHLORO-4-NITROBENZENE, 99%																						
100-01-6	4-NITROANILINE																						
100-16-3	4-NITROPHENYLHYDRAZINE						3	3	3														
10022-31-8	BARIUM NITRATE						3	3	3														
10025-65-7	PLATINUM(II) CHLORIDE	2					4	4	4							2	2						
10025-69-1	TIN(II) CHLORIDE DIHYDRATE						2	4	4		2	2a										2	
10025-87-3	PHOSPHORUS DIBYDRATE						2	4	4			2a										2	
10025-13-8	PHOSPHORUS DIOXYCHLORIDE																					3	
10025-24-1	COBALT SULFATE PENTACHLORIDE									1b			1	1			1b						
100-28-7	4-NITROPHENYL ISOCYANATE						2	2				1	1										
1003-03-8	CYCLOPENTYLAMINE						4	2		1a				1	2			2		3			
1003-32-3	5-THIAZOLECARBOXALDEHYDE						4	4				1										2	
10034-93-2	HYDRAZINE SULFATE	2					4	4					1	1								1	
100-42-5	STYRENE						2	4		2	2a						1b	1b				2	
10043-35-3	BORIC ACID	3					4			2	2a							3					
10043-35-3	BORIC ACID SOLUTION (3 G/100 ML) FOR THE DETERMINATION OF TVB IN FISH AND FISH PRODUCTS ACC. TO 95/149/EC (TITRATION METHOD)						3	3	3	1a													
100-43-6	4-VINYLPYRIDINE									2	2a												
100-44-7	BENZYL CHLORIDE																2	2				1	
10048-65-0	SODIUM ARSENATE, HEPTAHYDRATE	3															1b						
100-52-7	BENZALDEHYDE	4					3		1b								1b						
100-53-8	BENZYL MERCAPTAN						4	3			1		1										
100-63-0	PHENYLHYDRAZINE	4					3	3		2		1		1	1b	1b							
10070-92-5	PYRIMIDINE-5-CARBOXALDEHYDE	4					4	2	4	2												3	2
100-85-6	BENZYLTRIMETHYLAMMONIUM HYDROXIDE SOLUTION						3	3	3														
100-97-0	HEXAMETHYLENETETRAMINE	2								2	2a												
10101-97-0	NICKEL(II) SULFATE HEXAHYDRATE						3	3	3	1b				1	2	1b							
10101-98-1	NICKEL(II) SULFATE HEPTAHYDRATE																						
10102-44-0	NITROGEN DIOXIDE									1													
10108-64-2	CADMIUM CHLORIDE ANHYDROUS ACS REAGENT						4	4		2			1					1					
101-79-1	4-(4-CHLOROPHENOXY)ANILINE						4	4				1	1	2	1a	1b							
102-08-9	N,N-DIPHENYLTHIOUREA						3	2	1b			1	1	1	2	1b	1b					1	
10217-52-4	HYDRAZINE HYDRATE						4															1	
102561-43-3	2-ISOPROPYL-6-METHYLPHENYL ISOCYANATE						2			2				1b	1b	1b							x
102-82-9	TRIBUTYLAMINE						3	3	3	1b												1	
10294-33-4	BORON TRIBROMIDE	4					4	4		1												3	
		4					4	1	2														
							2	2		1a													

LIST OF PARTICULARLY HAZARDOUS MATERIALS
 Updated 15 March 2019 by Zackary Herbst
 See SOP for Health Hazard Category Definitions

- SOP: MAKING DMSO STOCKS
- SOP: HAMILTON SYRINGE USE
- SOP: MILLIO WATER SYSTEM
- SOP: GELBAR
- SOPS BY CAS No.
- GELB LAB (MAR'19)
- PHS LIST
- SOP: SOLVENT DRIER

CAS	Chemical Name	Flammable Liquid	Flammable Solid	Flammable Gas	Pyrophoric	Oxidizing	Acute Oral Toxicity	Acute Inhalation Toxicity	Acute Dermal Toxicity	Corrosive	Skin Irritation	Eye Irritation	Serious Eye Damage	Respiratory Sensitisation	Skin Sensitisation	Germ Cell Mutagenicity	Carcinogen	Reproductive	Specific target organ toxicity - single exposure	Specific target organ toxicity - multiple exposures	Risk of Aspiration	Gas Under Pressure	Special Notes
100-00-5	1-CHLORO-4-NITROBENZENE, 99%						3	3	3							2	2			2			
100-01-6	4-NITROANILINE						3	3	3											2			
100-16-3	4-NITROPHENYLHYDRAZINE		2				4		4		2	2a			1				3				
10022-31-8	BARIUM NITRATE					2	4	4				2a					1b						
10025-65-7	PLATINUM(II) CHLORIDE													1	1								
10025-69-1	TIN (II) CHLORIDE DIHYDRATE									1b			1		1	2		2	3	2			
10025-87-3	PHOSPHORUS OXYCHLORIDE						2	2		1a			1							1			
10026-13-8	PHOSPHORUS PENTACHLORIDE						4	2		1b			1							2			
10026-24-1	COBALT SULFATE HYDRATE						4							1	1		1b	1b					
100-28-7	4-NITROPHENYL ISOCYANATE						4	4			2	2a		1					3				
1003-03-8	CYCLOPENTYLAMINE	2					2	4			2				1								
1003-32-3	5-THIAZOLECARBOXALDEHYDE						4					2a			1								
10034-93-2	HYDRAZINE SULFATE						3	3	3	1a			1		1		1b						
100-42-5	STYRENE	3						4			2	2a				2		2		1			
10043-35-3	BORIC ACID																	1b					
10043-35-3	BORIC ACID SOLUTION (3 G/100 ML) FOR THE DETERMINATION OF TVB IN FISH AND FISH PRODUCTS ACC. TO 95/149/EC (TITRATION METHOD)																	1b					



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W ENVIRONMENTAL HEALTH & SAFETY
UNIVERSITY of WASHINGTON

Standard Operating Procedure

Corrosives

Section 1 – Lab-Specific Information

Chemical(s) covered by this SOP:	See List of Particularly Hazardous Materials
Building/Room(s) covered by this SOP:	CHB411A, CHB413A, CHB417A
Department:	Department of Chemistry
Principal Investigator Name:	Michael H. Gelb
Principal Investigator Signature:	

Health Hazard Category Definitions

- May be Corrosive to Metals: Corrosive to metals
- Corrosive – Health Hazard Category "1a, 1b, 1c": Causes severe skin irritation
- Skin Irritation – Health Hazard Category "2": Causes skin irritation
- Skin Irritation – Health Hazard Category "3": Causes mild skin irritation
- Serious Eye Damage – Health Hazard Category "1": Causes serious eye irritation
- Eye Irritation – Health Hazard Category "2a": Causes serious eye irritation
- Eye Irritation – Health Hazard Category "2b": Causes eye irritation
- Respiratory Sensitization – Health Hazard Category "1": Causes respiratory sensitization
- Skin Sensitization – Health Hazard Category "1": May cause skin sensitization

Important Definitions

- Acid: Any chemical compound which, when dissolved in water, produces hydrogen ions (H⁺)
- Mineral Acid: A compound having atoms of hydrogen, phosphorus, and maybe oxygen. Sulfuric acid (H₂SO₄) and phosphoric acid (H₃PO₄) are mineral acids.
- Organic Acid: An organic compound with acidic properties. Acetic acid (CH₃COOH) and Formic acid (HCOOH) are organic acids.
- Base: Any chemical compound which, when dissolved in water, produces hydroxide ions (OH⁻)

Corrosives

W ENVIRONMENTAL HEALTH & SAFETY
UNIVERSITY of WASHINGTON

Standard Operating Procedure

Acutely Toxic Materials, Reproductive Toxic Materials, Target Organ Toxics, and Carcinogens

Section 1 – Lab-Specific Information

Chemical(s) covered by this SOP:	See List of Particularly Hazardous Materials
Building/Room(s) covered by this SOP:	CHB411A, CHB413, CHB413A, CHB417A
Department:	Department of Chemistry
Principal Investigator Name:	Michael H. Gelb
Principal Investigator Signature:	

Health Hazard Category Definitions

- Acute Oral, Inhalation, or Dermal Toxicity – Health Hazard Category "1, 2": Fatal if swallowed, inhaled, or comes into contact with skin
- Acute Oral, Inhalation, or Dermal Toxicity – Health Hazard Category "3": Toxic if swallowed, inhaled, or comes into contact with skin
- Acute Oral, Inhalation, or Dermal Toxicity – Health Hazard Category "4": Harmful if swallowed, inhaled, or comes into contact with skin
- Reproductive Toxicity – Health Hazard Category "1a, 1b": May damage fertility or the unborn child
- Reproductive Toxicity – Health Hazard Category "2": Suspected of damaging fertility or the unborn child
- Specific Target Organ Toxicity – Health Hazard Category "3": See SDS of substance for target organ information. Examples, Respiratory tract irritation, narcotic effects, etc.
- Specific Target Organ Toxicity – Health Hazard Category "2": See SDS of substance for target organ information. May cause damage to organs in single or multiple exposures.
- Specific Target Organ Toxicity – Health Hazard Category "1": See SDS of substance for target organ information. Causes damage to organs in single or multiple exposures.
- Carcinogenicity – Health Hazard Category "1a, 1b": May cause cancer.
- Carcinogenicity – Health Hazard Category "2": Suspected of causing cancer.
- Germ Cell Mutagenicity – Health Hazard Category "1a, 1b": May cause genetic defects.
- Germ Cell Mutagenicity – Health Hazard Category "2": Suspected of causing genetic defects.
- Risk of Aspiration – Health Hazard Category "1": May be fatal if swallowed and enters airways.
- Risk of Aspiration – Health Hazard Category "2": May be harmful if swallowed and enters airways.

Acutely Toxic Materials

1

Date: 3/15/2019

W ENVIRONMENTAL HEALTH & SAFETY
UNIVERSITY of WASHINGTON

Standard Operating Procedure

Flammable Solids

Section 1 – Lab-Specific Information

Chemical(s) covered by this SOP:	See List of Particularly Hazardous Materials
Building/Room(s) covered by this SOP:	CHB411A, CHB413, CHB413A, CHB417A
Department:	Department of Chemistry
Principal Investigator Name:	Michael H. Gelb
Principal Investigator Signature:	

Health Hazard Category Definitions

- Flammable Solids – Health Hazard Category "1, 2": Flammable Solid.
- Flammable Solids – Health Hazard Category "1": Catches fire spontaneously if exposed to air.
- Flammable Solids – Health Hazard Category "2": Combustible, or may cause or contribute to a fire through friction.
- Flammable Solids – Health Hazard Category "3": Heating may cause a fire or explosion. See SDS for Hazard Category.
- Flammable Solids – Health Hazard Category "4": Heating may cause a fire or explosion. See SDS for Hazard Category.
- Flammable Solids – Health Hazard Category "5": Heating may cause a fire or explosion. See SDS for Hazard Category.

Personal Protective Equipment (PPE)

Work with flammable solids should be conducted in a properly functioning chemical fume hood approved for use by EH&S. Properly engineered ventilation is required for flammable solids. Therefore, consultation with EH&S is recommended. Wash hands before breaks and immediately after work.

Removal technique to avoid any skin contact. Nitrile gloves are recommended. **NOTE:** Consult with your preferred EH&S personnel.

1 of 18

SOP: SOLVENT DRYER

Date: 3/15/2019

D

**Standard Operating Procedures for
2-Chloro-5-nitroaniline (CAS: 63980-30-3)**

#1 Process (if applicable)	2-Chloro-5-nitroaniline is a reagent used in reactions.			
#2 Chemicals and Hazards	2-Chloro-5-nitroaniline. Potentially fatal in contact with skin.			
#3 Personal Protective Equipment (PPE)	Use face shield and safety glasses, worn outside of hood or when appropriate respirator cartridges. Use nitrile rubber gloves.			
#4 Environmental/Ventilation Controls	Eyewash fountains and showers should be provided in proximity required by EH&S. Handling of chemical substance should be done in an operating fume hood. In case of insufficient ventilation, wear suitable respirator equipment.			
#5 Special Handling Procedures & Storage Requirements	Keep tightly closed and in a dry, well-ventilated place. STORE LOCKED UP.			
#6 Spill and Accident Procedures	If spilled, sweep and shovel with waste disposal.			
#7 Waste Disposal	Label with hazardous waste lab Chemical Collection Request or Routine Pickup request, both available on the EH&S website.			
#8 Special Precautions for Animal Use (if applicable)	n/a			
<table border="1"> <tr> <td rowspan="2">Particularly hazardous substance involved?</td> <td><input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory</td> </tr> <tr> <td><input type="checkbox"/> NO: Blocks #9 to #11 are Optional.</td> </tr> </table>		Particularly hazardous substance involved?	<input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory	<input type="checkbox"/> NO: Blocks #9 to #11 are Optional.
Particularly hazardous substance involved?	<input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory			
	<input type="checkbox"/> NO: Blocks #9 to #11 are Optional.			
#9 Approval Required	Users must receive specific physical and health hazard information and safe laboratory work practices training from their supervisor. Representative breathing zone air sampling shall be taken to ensure that exposures do not exceed regulated levels. (Contact EH&S for additional information.)			
#10 Decontamination	If swallowed, immediately call a POISON CENTER/doctor. If on skin, immediately remove contaminated clothing and shower for 15 minutes. If inhaled, remove person to fresh air. If in eyes, cautiously rinse with 15 min, removing contacts. Immediately call a POISON CENTER/doctor.			
#11 Designated Area	Rooms 417A, 413, 413A, 411A			
Name: Zackary M Herbst				
Signature: _____				

**Standard Operating Procedures for
Cyclopentylamine (CAS: 1003-03-8)**

#1 Process (if applicable)	Cyclopentylamine is a reagent used in organic synthesis and other chemical reactions.			
#2 Chemicals and Hazards	Cyclopentylamine. Highly flammable liquid and vapour. Fatal if swallowed. Harmful if inhaled. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage.			
#3 Personal Protective Equipment (PPE)	Use tightly fitting safety goggles, an 8-inch minimum face shield, complete suit protecting against chemicals and fire retardant clothing. When used outside of hood or when appropriate, use full-face respirator with multi-purpose combination respirator cartridges. Use nitrile rubber gloves.			
#4 Environmental/Ventilation Controls	Eyewash fountains and showers should be provided in proximity required by EH&S. Handling of chemical substance should be done in an operating fume hood. In case of insufficient ventilation, wear suitable respiratory equipment.			
#5 Special Handling Procedures & Storage Requirements	Store tightly closed in a dry and well-ventilated place. STORE LOCKED UP.			
#6 Spill and Accident Procedures	If spilled, contain spillage and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in labelled container for waste disposal. DO NOT FLUSH WITH WATER.			
#7 Waste Disposal	Label with hazardous waste label, accumulate according to requirements, and send in Chemical Collection Request or Routine Pickup request, both available on the EH&S website.			
#8 Special Precautions for Animal Use (if applicable)	n/a			
<table border="1"> <tr> <td rowspan="2">Particularly hazardous substance involved?</td> <td><input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory</td> </tr> <tr> <td><input type="checkbox"/> NO: Blocks #9 to #11 are Optional.</td> </tr> </table>		Particularly hazardous substance involved?	<input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory	<input type="checkbox"/> NO: Blocks #9 to #11 are Optional.
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#10 Decontamination	If swallowed, immediately call a POISON CENTER/doctor. If on skin, immediately remove contaminated clothing and shower for 15 minutes. If inhaled, remove person to fresh air. If in eyes, cautiously rinse with 15 min, removing contacts. Immediately call a POISON CENTER/doctor.			
#11 Designated Area	Rooms 417A, 413, 413A, 411A			
Name: Zackary M Herbst				
Signature: _____				

**Standard Operating Procedures for
3-Bromonaphthalen-2-ol (CAS: 63980-30-3)**

#1 Process (if applicable)	3-Bromonaphthalen-2-ol is a reagent used in organic synthesis and other chemical reactions.			
#2 Chemicals and Hazards	3-Bromonaphthalen-2-ol. Causes serious skin irritation/corrosion. Causes serious eye damage. May cause respiratory irritation.			
#3 Personal Protective Equipment (PPE)	Use tightly fitting safety goggles, complete suit protecting against chemicals. Outside of fume hood, wear full-face respirator with N100 cartridges. Handle with nitrile rubber gloves.			
#4 Environmental/Ventilation Controls	Eyewash fountains and showers should be provided in proximity required by EH&S. Handling of chemical substance should be done in an operating fume hood. In case of insufficient ventilation, wear suitable respiratory equipment.			
#5 Special Handling Procedures & Storage Requirements	Keep container tightly closed and in a dry and well-ventilated place.			
#6 Spill and Accident Procedures	If spilled, sweep and shovel without creating dust and place in labelled container for waste disposal.			
#7 Waste Disposal	Label with hazardous waste label, accumulate according to requirements, and send in Chemical Collection Request or Routine Pickup request, both available on the EH&S website.			
#8 Special Precautions for Animal Use (if applicable)	n/a			
<table border="1"> <tr> <td rowspan="2">Particularly hazardous substance involved?</td> <td><input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory</td> </tr> <tr> <td><input type="checkbox"/> NO: Blocks #9 to #11 are Optional.</td> </tr> </table>		Particularly hazardous substance involved?	<input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory	<input type="checkbox"/> NO: Blocks #9 to #11 are Optional.
Particularly hazardous substance involved?	<input checked="" type="checkbox"/> YES: Blocks #9 to #11 are Mandatory			
	<input type="checkbox"/> NO: Blocks #9 to #11 are Optional.			
#9 Approval Required	Users must receive specific physical and health hazard information and safe laboratory work practices training from their supervisor. Representative breathing zone air sampling shall be taken to ensure that exposures do not exceed regulated levels. (Contact EH&S for additional information.)			
#10 Decontamination	If swallowed, immediately call a POISON CENTER/doctor. If on skin, immediately remove contaminated clothing and shower for 15 minutes. If inhaled, remove person to fresh air. If in eyes, cautiously rinse with 15 min, removing contacts. Immediately call a POISON CENTER/doctor.			
#11 Designated Area	Rooms 417A, 413, 413A, 411A			
Name: Zackary M Herbst				
Signature: _____				

Common Safety Issues in Organic Chemistry Labs

- Chemical Management
 - Storage
 - Usage
- Unattended/Overnight reactions
- New processes are common
- Managing Accumulation

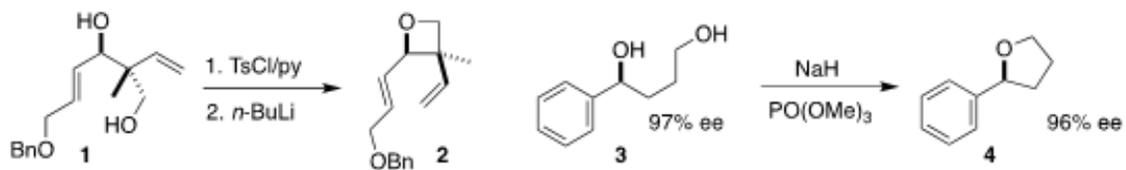


Photo Credit: <http://orgsyn.org/>



Unattended Reactions and Safety Assessments



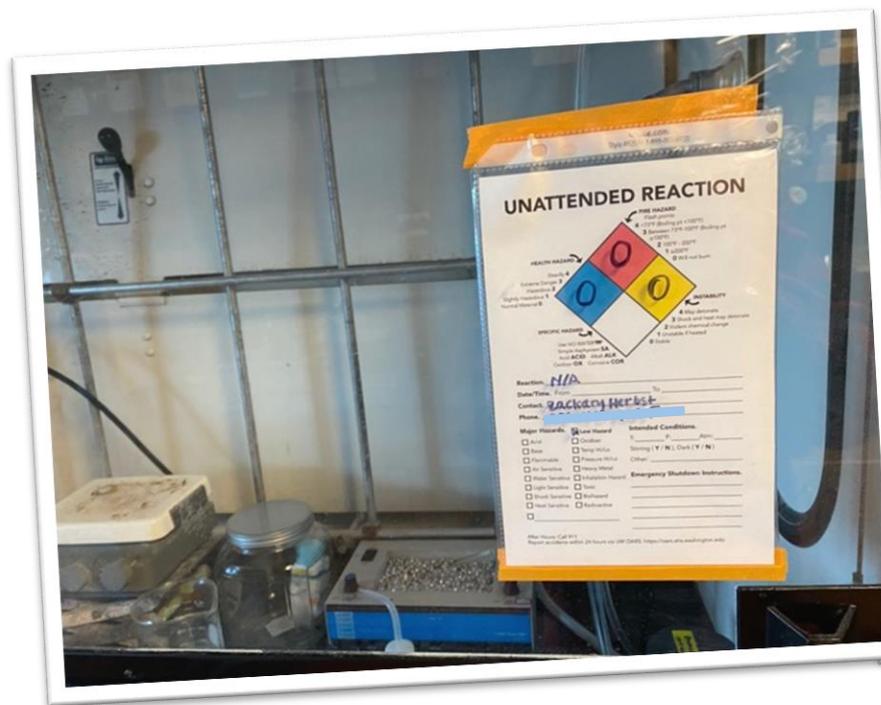
In Progress: Unattended Reactions

In Progress: Unattended Reactions

- Hazard Signs

In Progress: Unattended Reactions

- Hazard Signs



UNATTENDED REACTION

FIRE HAZARD
Flash points:
4 <73°F (Boiling pt <100°F)
3 Between 73°F-100°F (Boiling pt ≥100°F)
2 100°F - 200°F
1 ≥200°F
0 Will not burn

HEALTH HAZARD
Deadly 4
Extreme Danger 3
Hazardous 2
Slightly Hazardous 1
Normal Material 0

INSTABILITY
4 May detonate
3 Shock and heat may detonate
2 Violent chemical change
1 Unstable if heated
0 Stable

SPECIFIC HAZARD
Use NO WATER **W**
Simple Asphyxiant **SA**
Acid **ACID** Alkali **ALK**
Oxidizer **OX** Corrosive **COR**

Reaction: _____
Date/Time: From _____ To _____
Contact: _____ Phone: _____
Major Hazards: Acid Base Flammable Air Sensitive Water Sensitive Light Sensitive Shock Sensitive Heat Sensitive _____
 Low Hazard Oxidizer Temp Hi/Lo Pressure Hi/Lo Inhalation Hazard Toxic Biohazard Radioactive _____
Intended Conditions: T: _____ P: _____ Atm: _____
Stirring (Y/N), Dark (Y/N)
Other: _____
Emergency Shutdown Instructions: _____
After Hours: Call 911
Report accidents within 24 hours via UW OARS: <https://oars.ehs.washington.edu>

In Progress: Unattended Reactions

- Hazard Signs
- Risk Assessments



UNATTENDED REACTION

HEALTH HAZARD

Deadly 4
Extreme Danger 3
Hazardous 2
Slightly Hazardous 1
Normal Material 0

SPECIFIC HAZARD

Use NO WATER **W**
Simple Asphyxiant **SA**
Acid **ACID** Alkali **ALK**
Oxidizer **OX** Corrosive **COR**

FIRE HAZARD

Flash points:
4 <73°F (Boiling pt <100°F)
3 Between 73°F-100°F (Boiling pt ≥100°F)
2 100°F - 200°F
1 ≥200°F
0 Will not burn

INSTABILITY

4 May detonate
3 Shock and heat may detonate
2 Violent chemical change
1 Unstable if heated
0 Stable

Reaction. _____

Date/Time. From _____ To _____

Contact. _____

Phone. _____

Major Hazards.

<input type="checkbox"/> Acid	<input type="checkbox"/> Oxidizer
<input type="checkbox"/> Base	<input type="checkbox"/> Temp Hi/Lo
<input type="checkbox"/> Flammable	<input type="checkbox"/> Pressure Hi/Lo
<input type="checkbox"/> Air Sensitive	<input type="checkbox"/> Heavy Metal
<input type="checkbox"/> Water Sensitive	<input type="checkbox"/> Inhalation Hazard
<input type="checkbox"/> Light Sensitive	<input type="checkbox"/> Toxic
<input type="checkbox"/> Shock Sensitive	<input type="checkbox"/> Biohazard
<input type="checkbox"/> Heat Sensitive	<input type="checkbox"/> Radioactive
<input type="checkbox"/> _____	

Intended Conditions.

T: _____ P: _____ Atm: _____

Stirring (Y / N), Dark (Y / N)

Other: _____

Emergency Shutdown Instructions.

After Hours: Call 911
Report accidents within 24 hours via UW OARS: <https://oars.ehs.washington.edu>

In Progress: Unattended Reactions



ELSEVIER

Journal of Hazardous Materials 115 (2004) 63–70

Journal of
Hazardous
Materials

www.elsevier.com/locate/jhazmat

Chemical reactivity assessments in R&D

David Leggett*

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Suite 3, Marina del Rey, CA 90292-6443 USA*

Available online 1 July 2004

In Progress: Unattended

- Hazard Signs
- Risk Assessments

Table 3
Reactions having a high hazard potential

Reaction	Example of concern
Curtius rearrangements	Use of acyl azides, nitrous acid or hydrazine.
Decarboxylation	Removal -COOH with CO ₂ evolution-possibly
Diazotizations	Especially if followed by reduction to the hy
	-NH ₂ with -H
Displacements	Uses oxalyl chloride to displace -OH. (CO ₂
Epoxidations	Epoxides are high energy strained rings
Esterification	When using oxalyl chloride
Friedel Crafts (AlCl ₃)	Friedel Crafts reactions and their quenches
Grignard reactions	Reactions require an activation period and
Hydrolysis	Hydrolysis of a cyano to an amide oxidati
Metallations	Uses <i>n</i> -BuLi, <i>t</i> -BuLi, LDA, NaHMDS
Nitrations	Uses nitric acid and strong acids like sulf
	exothermic. The potential for thermal run
	Use of Jones reagent [K ₂ Cr ₂ O ₇ /H ₂ SO ₄],
Oxidations	Use of sodium periodate
	sodium periodate
Peptide formations	Use of HOBT (1-hydroxybenzotriazole h
Quenches	When PCl ₅ or POCl ₃ have been used
Reductions	Any nitro compound or high energy fu
	HCl or acetic acid, hydrazine in causti
	CH ₃ OH or C ₆ H ₁₂
Sulfonation	Sulfonation of an amine to form sulfo

Table 2
Chemical properties and their role in preliminary hazard evaluation

Concern	MSDS Section	Significance to chemical
Stability/reactivity	10	Does the particular chem Are there any highly toxi special handling?
Toxicity/exposure	3, 4, 8, 11, 15	
NFPA/HMIS ratings	3	The NFPA and HMIS rat Specific incompatibilities information does not guar
Incompatibilities	7	
Spill clean-up	6, 13, 15	Information about recomm careful if sawdust is planr many chemicals and supps
Personal protective equipment (PPE) required	8	Specific details are provid 8 with the toxicity and exp to be handled.
Specific hazard		
Oxidizer/reducer	10	Special precautions are nee (e.g. NaBH ₄ /MeOH).
Pyrophoric	10	Solids, liquids or gases that 130 °F.
Polymerizes	10	Do any reactants polymeriz inhibitor is removed?
Reacts explosively	10	Does the particular chemica moderate temperatures?
Inhibitor required	7, 10	See "Polymerizes".
Impact/friction sensitive	10	Impact or friction sensitivity inhibitors and catalysts. The Material may be liquid only
Temperature control needed	7, 10	Small temperature changes n See Tables 5, 6 and 7 for ex groupings.
Sensitive to heat	7, 10	
High hazard reaction or functional group	10	
Water reactive	10	Many classes of organic and example, acyl chlorides and r extremely rapidly (HCl and H Bretherick [7] and CCPS [8] which are often impact sensi
Peroxide former	10	

1 Run Ref #	_____ / _____	2. Synthesis Type:	_____	3. Date	_____
4. Description:	_____		5. End Use:	_____	
7. Physical Properties	6. Chemicals to be used – Sample, Reactants, Solvents				
B Pt / M Pt / VP @ 20 °C	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____
FI Pt / AI / MIE	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____	_____ / _____ / _____
LEL / UEL	_____ / _____	_____ / _____	_____ / _____	_____ / _____	_____ / _____
Dust Explosion Severity	_____	_____	_____	_____	_____
8. Chemical Overview					
Stability/Reactivity	_____	_____	_____	_____	_____
Toxicity/Exposure	_____	_____	_____	_____	_____
NFPA/HMIS Ratings	_____	_____	_____	_____	_____
Incompatibilities	_____	_____	_____	_____	_____
Spill Clean-up Material	_____	_____	_____	_____	_____
PPE Required	_____	_____	_____	_____	_____
Specific Hazard (Note 1)	_____	_____	_____	_____	_____
9. Function in synthesis					
10. MDS Sheet Reviewed	Signed: _____	Date: _____			
11. Classified as a Non-Routine Operation (check relevant categories)					
High toxicity / Low exposure limits	<input type="checkbox"/>	Chemical Handled (Air/water sensitive, Corrosive)	<input type="checkbox"/>		
Flammability (FI Pt < 10 °C; LFL < 10%)	<input type="checkbox"/>	Extreme Reaction Temperature (> 150 °C; < -30 °C)	<input type="checkbox"/>		
Flammability (AI < 200 °C; MIE < 0.5mJ)	<input type="checkbox"/>	High Temperature Feed (> 50 °C)	<input type="checkbox"/>		
High Hazard Reaction or Functional Group	<input type="checkbox"/>	High Pressure Reaction (> 10 bar)	<input type="checkbox"/>		
High/moderate hazard reaction performed ≤ 2 times	<input type="checkbox"/>	High Pressure Feed (> 2 bar)	<input type="checkbox"/>		
12. Potential Hazard Level	Routine: Y <input type="checkbox"/> N <input type="checkbox"/>	Non-Routine: Y <input type="checkbox"/> N <input type="checkbox"/>			
13. Synthesis by	Name: _____	Sign: _____	Date: _____		
14. Hazard Review by	Name: _____	Sign: _____	Date: _____		
15. Non-Routine Hazard Review	Schedule Date : _____	Date Completed : _____			
Note 1: Enter as many codes as needed to describe the Special Hazard: RDX – Oxidizer/Reducer; PYR – Pyrophoric; POL – Polymerizes; EXP – Reacts explosively; HS – Sensitive to heat; WAT – Water reactive; PER – Peroxide former; INH – Inhibitor required; IMP – Impact/friction sensitive; TCN – Temperature control needed; GRP – Functional group					
Instructions for Use of Form					
Use this form as a check-list and review of potential hazards involved in the synthesis. Each section requires responses, as detailed below:					
1. Reference number 2. Technique 3. Date filled out 4. Describe Synthesis 5. Product end-use 6. List each chemical used in the run – use a new form as needed; 7. Physical properties – use MSD sheet, Saxes, Merck Index and "Sources of Ignition" (Bond) 8. Summarize listed properties as available from reference materials, mostly MSD sheets 9. Function of each chemical in the synthesis, ie reactant, solvent, catalyst, etc. 10. MSDS reviewer, when; 11. What led to a Non-Routine classification? Check all appropriate boxes 12. What is the assessed potential hazard – Routine or Non-Routine 13. Who will perform the synthesis; when? 14. This hazard review; when? 15. If Non-Routine, when is detailed hazard review scheduled; when completed? Non-Routine hazard review notes must accompany this form with risk reduction recommendations activities as needed.					



Future Projects

Future Projects

- Automated SDS-Based Chemical Risk Assessments

Future Projects

- Automated SDS-Based Chemical Risk Assessments
- Review chemicals stored at ambient temperature

Future Projects

- Automated SDS-Based Chemical Risk Assessments
- Review chemicals stored at ambient temperature
- Continue to Improve Safety Conditions with EH&S and Gelb Lab

Future Projects

- Automated SDS-Based Chemical Risk Assessments
- Review chemicals stored at ambient temperature
- Continue to Improve Safety Conditions with EH&S and Gelb Lab

Thank You!





Next Up:

Kelsey Abrams & Katie Anderson



Burke Museum Health and Safety Practices

Challenges of a New Building on Display

Kelsie Abrams, Fossil Preparation Laboratory Manager

Dr. Katie Anderson, Geology & Paleontology Collections Manager



OPENING OCTOBER 12

BUCKEYE



THE MISSIONS

CELEBRATE THE LIFE OF A BEE

EAST CLASSROOM



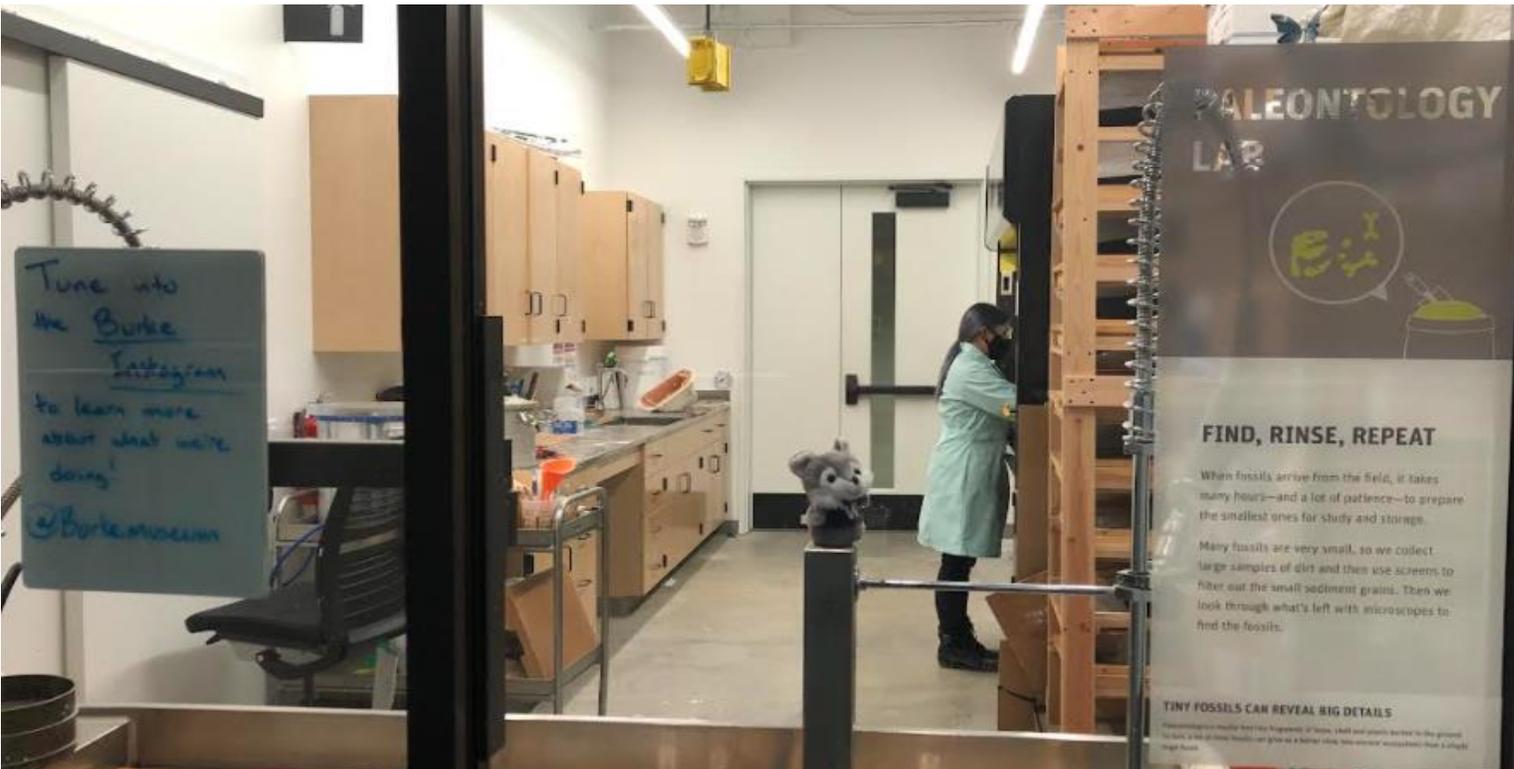
Challenges of a New Building

- Lab spaces visible to the public
- Learning and adapting to new spaces



Visible Labs

- Public sees science in action
- Diverse activities and equipment
- Role models to visitors



Ambassadors of Safety Culture

- Promoting and demonstrating use of safe practices
- Public awareness of PPE and environmental controls



Role Models to Visitors

- Demonstrating that scientists do not follow stereotypes
- Inspiring future generations and increasing awareness



Chambers 1983



Adapting to New Spaces

- Communication and Collaboration
- Intradepartmental Training
- Multiple Response Kits
- Signage/communication



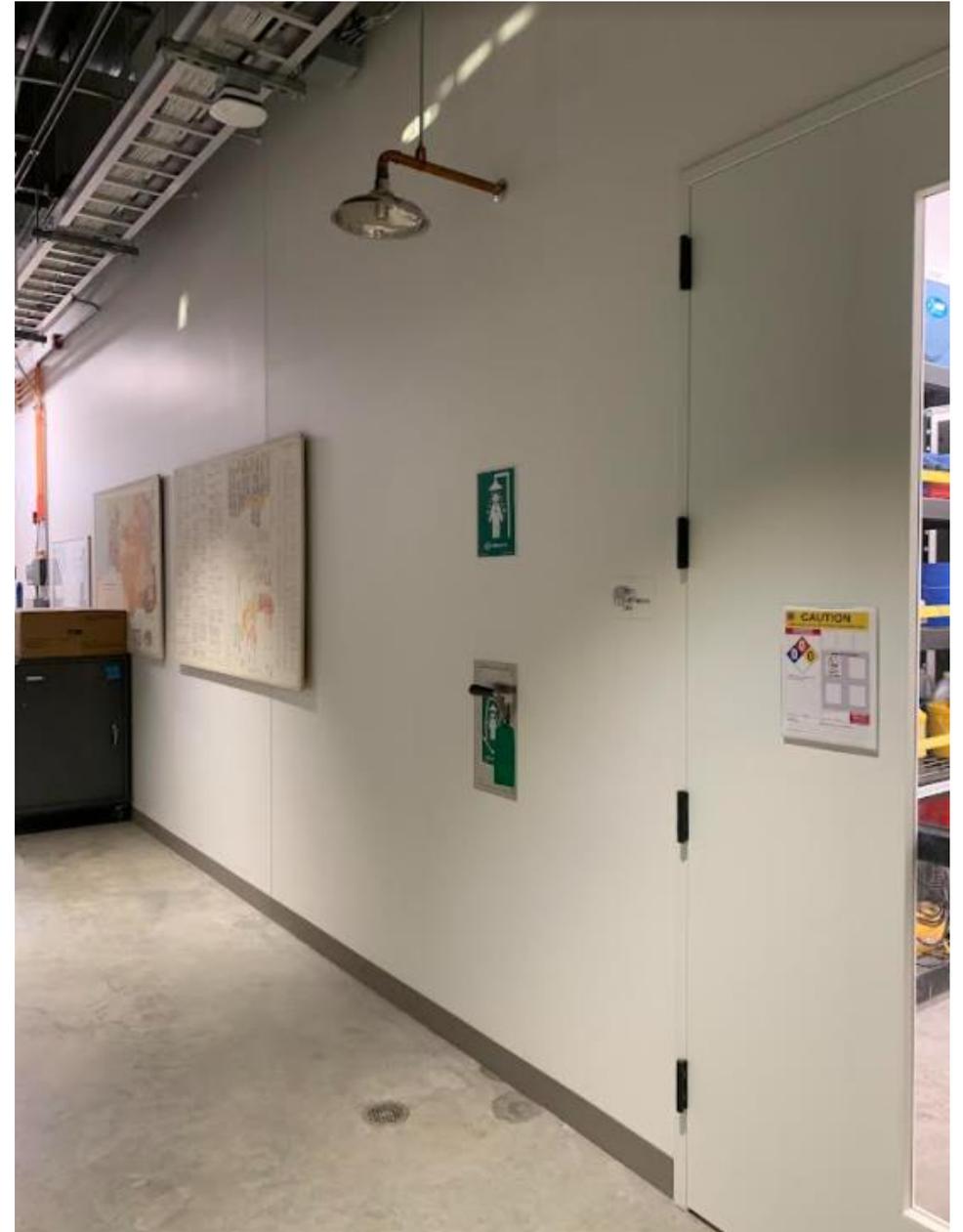
Hydrofluoric Lab

- Paleontology and Geology Department
 - Hydrofluoric Lab
 - Response planning and training



Emergency Shower

- Water Flow
- Emergency Response



Thank You!

- Burke Museum Operations Department
- Dr. Christopher Schiller
- Burke Museum Lab Management Staff (Dr. Sharon Birks!)
- Alex Hagen, UW Environmental Health and Safety



Supporting a Culture of Safety

Stephanie Harrington (she/her)

Associate Dean, Administration, College of the Environment

COLLEGE OF THE ENVIRONMENT

UNIVERSITY *of* WASHINGTON



Nags and Nudges

- Catastrophes
- Calendars
- Cages
- Carrots





