
Health, Inventory, and Safety Concerns in our Research Group

“All substances are poisons; there is none which is not a poison. The right dose differentiates a poison from a remedy.”

Paracelsus

- Disclaimer
- Health
 - Manganism
- Inventory
 - Use
 - Arrangement
 - Maintaining
- Safety
 - Hazardous waste
 - Gloves
 - MSDS
 - Radiation training
 - Inspections
 - Instrument contacts

NOTICE:

- ***This presentation is not meant to be complete and will not include all hazards present in our lab.***
- ***You know your research best and the implicit and explicit hazards involved. Everybody is responsible for a safe working environment.***
- ***If proper safety precautions are followed then your risk in our labs will be minimized.***

Manganese Sources

- Rock-ubiquitous
- Manufacturing
- Drinking water - 0.004 ppm (EPA)
- Air – 0.02ug/m³ (EPA)
- Soil – 40-900 ppm (EPA)
- Food – 1-5mg/day
- Absorption thru skin – trace
- Ingestion – 3-5% absorbed
- Inhalation – <2 ug/day *ambient*
 - Insoluble-trace
 - Soluble->50% directly to bloodstream
- MMT (Methylcyclopentadienyl Manganese Tricarbonyl)
 - Antiknock gas additive
 - Used in Canada since 1977
 - Increased the airborne Mn conc.

Manganese and Biology

- High concentration in nuts, grains, and teas
- Essential nutrient in cellular metabolism
 - Can regulate
 - Adult male intake ~2.5 ug/day (NAIM) *sug*
 - Adult female intake ~1.8 ug/day (NAIM) *sug*
 - Absorbs in small intestine-like Fe
- Normal blood levels <10 ug/l
- Homogeneous distribution in body
 - Largest in mitochondria
 - Acute poisoning liver and kidney accumulate first
- Know neurotoxin

Manganese Hazardous Levels

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- **NAIM**
 - Total: 11 mg/day
- **OSHA**
 - Air-15 min ceiling: 5 mg/m³
- **NIOSH**
 - Air-PEL: 1 mg/m³
- **EPA**
 - Air RfC: 0.00005 mg/m³
 - Ingestion: 0.14 mg/kg/day
 - Drinking water: 0.05 mg/kg/day

RfC (inhalation reference concentration):
An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure of a chemical to the human population through inhalation (including sensitive subpopulations), that is likely to be without risk of deleterious noncancer effects during a lifetime.

PEL (permissible exposure limit) a time-weighted average; the concentration of a substance to which most workers can be exposed without adverse effect averaged over a normal 8-h workday or a 40-h workweek

Manganese Exposure

- Acute
 - Little
- Chronic
 - CNS damage
 - Muscle damage
 - Visual reaction time
 - Coordination
 - Nerve tissue damage
 - Psychological disorders
 - Manganism

Inventory



What is a Chemical?

- This is a compound that has been ordered from a company.
- Stored on appropriate shelves in lab according to the inventory.

What is a Sample?

- This is a material that has been synthesized in our group.
- Stored in personal area ACCORDING to REACTIVITY.
- All old samples to shelves across from XRD

Chemicals-Overview

- Look for chemical on inventory
- Order (If not in inventory)
- Write down where chemical goes in inventory
- Pickup at main stockroom & tell them the room where the chemical will be stored
- Initial and date
- Put on proper shelf
- No chemicals in drawers (samples-Yes)
 - Exception: highly specialized. Should be minimal <5
- Not in use - Return to shelf
- Empty-remove from inventory
 - Take empty container to stockroom
 - Remove barcode and give to stockroom
 - Write bar code number down and give to stockroom

Finding Dept Chemicals

- Individuals may now access the database from any computer in the building as long as a valid user name and password are provided. The website is
 - chemdata.chem.uconn.edu/vimweb
- contact Charlene Fuller to set up user names and passwords.
- I have access if you need it.

Finding Group Chemicals

- Use Dept Inventory finder
 - Most up-to-date
- Check inventory index
 - General categories
- Check lab diagrams
 - Specific locations
- Check printed inventory
 - Updated once a year (May)

Lab Inventory Index

Lab Inventory Index

Inorganics	
Acetates	306A
Acids Inorganic	313
Acids metal	306B
Aluminate solid	313
Ammonium	313
M-ates W, etc...	306B
Bases	313
Boiling chips	311
Borates	306B
Bromine Solid	306B
Buffers	306B
Carbonates	313
Chromates	311
Electrolytic solution	306B
Glass Wool	311
Halides	306A
Hydroxide	313
Indicators	306B
Iodine Solid	306B
K-Halides, OAc SO _x	306A

Organics	
Acid Nitric	315
Acids and Large -OH bottles	306A
Acids Organic Liquid	313
Alcohols <2.5 L	311-Yellow Organic Cabinet
Alkanes <1 L	311-Yellow Organic Cabinet
Alkanes <2.5 L	311-Yellow Organic Cabinet
Alkenes <1 L	311-Yellow Organic Cabinet
Amides, Amines, Imines	306A
Amonium Nitrate	311
Anilines	318
Aza & Azo	311-Yellow Organic Cabinet
Benzenes	313
Formates	317
Formide	318
Hydrocarbon >2 L bottles	306A
Hydrocarbon Halogenated	318
Large EtOH container	311
Nitrile Aceto	318
-ones and ethers	306A
Propoxides	311

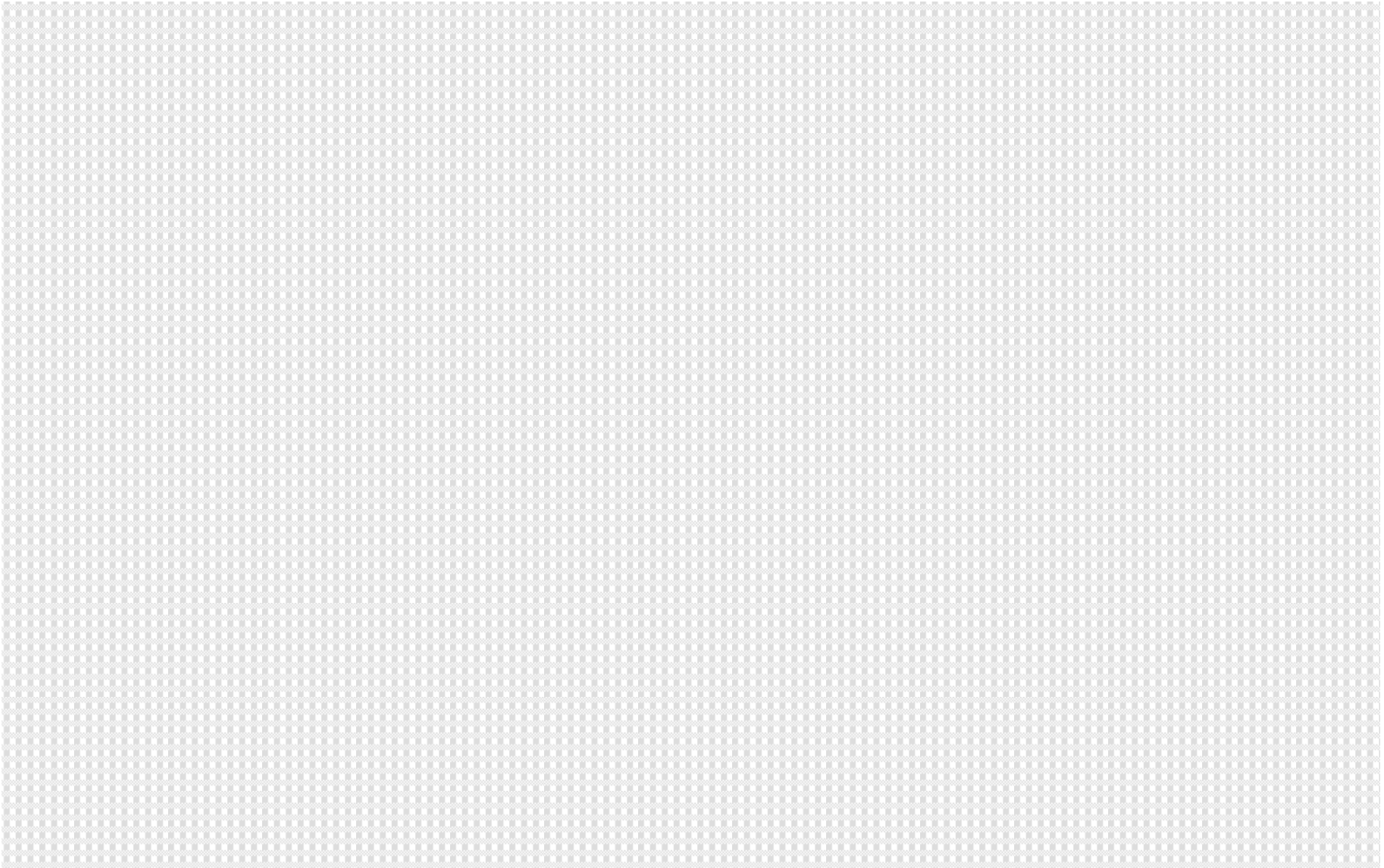
How to Order Chemicals

- Fill out order form
- E-mail form to Dr. Suib for approval
- Determine room where chemical will be stored
- Pickup at main stockroom & tell them the room where the chemical will be stored
- Initial and date
- Put on designated shelf

Instructions for maintaining chemical Inventory. ¹⁶

- All chemicals are to be received by the Main Stockroom and will be inventoried upon arrival
- All empty chemical containers must be removed from the inventory
 - The empty container can be returned to the Main Stockroom
 - The Chemical ID Tag from the empty container can be removed and returned
 - The Serial Number from the Chemical ID Tag from the empty container can be written on a sheet of paper and given to the stockroom
- Inventories exist for all labs in this building however there may be discrepancies as far as the database is concerned.
 - Charlene W. Fuller
 - Tel (860) 486-4655
 - FAX (860) 486-2981
 - charlene.fuller@uconn.edu
- While working fix problems

Safety



Inventory Reduction Suggestions¹⁸

- Check inventory for chemical
- Check main stockroom for chemical
 - inventory
 - archive
- Order the minimum quantities needed
- Keep track of expiration dates
- Share “stock material”
- RETURN TO SHELF IMMEDIATELY AFTER USE
- Remove hazardous waste AT LEAST every 6 months
- Promptly dispose of unwanted materials by submitting a Hazardous Chemical Waste Pickup Form.

What is Hazardous Waste?

- Environmental Protection Agency (EPA) considers the following to be characteristics of hazardous waste:
- Ignitability
 - flash point less than 60°C
 - It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard
- Corrosivity
 - aqueous solution pH < 2, or >12.5
 - A liquid that corrodes steel (SAE 1020) at a rate greater than 6.35 mm/year at 55°C
- Reactivity
 - normally unstable and readily undergoes violent change without detonating
 - reacts violently with water
 - forms potentially explosive mixtures with water
 - with water, generates toxic, gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment
 - capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement
 - readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure
- Toxicity-Leaching
 - Toxic material that could leach into water supplies
- ****any byproduct you synthesize in lab****

How to Label Hazardous Waste²⁰

- Get a Hazardous Waste Label
 - Do Not Modify this
- Write full IUPAC style
 - No common names, except water
- Estimate percentages
- Unknown waste (from past members only)
 - Write “Unkown” on label

Hazardous Waste Pickup

- www.ehs.uconn.edu/cwc/request.php
- Pickups are Mondays, Wednesdays, and Fridays
- **Contact Name*:**
- **Campus*:**
- **Department:**
- **Building*:**
- **Room Number:**
- **Phone Number*:**
- **Description: Number and size of Containers ready for pickup/ Comments**
- **Replacement Containers:**
- **# of 5-gallon Containers:**
- **# of 55-gallon Containers:**
- **Hazardous Waste Stickers**
- **Hazardous Waste Tags**

Choosing Gloves

- Consider
 - Splash Test
 - Immersion Test
 - Breakthrough times
 - Breakthrough rates
- See sheets by safety board
- http://www.hazmat.msu.edu:591/glove_guide/
- <http://www.ansellpro.com/specware/guide.asp>
- <http://www.mapaglove.com/ChemicalSearch.cfm?id=0%20>

MSDS

- This helps clarify a MSDS
 - <http://www.ilpi.com/msds/ref/demystify.html>
- Where to find:
 - <http://www.ehs.ohio-state.edu/index.asp?PAGE=ehs.msds>
 - <http://hazard.com/msds/>
 - <http://www.chemexper.com/>
 - Also has basic properties and spectra
 - <http://msds.ehs.cornell.edu/msdssrch.asp>
 - <http://www.msds.com/>
 - <http://www.setonresourcecenter.com/MSDSs/comply1.htm>
 - <http://ull.chemistry.uakron.edu/erd/>

Just for fun:

- *Fake MSDS*
 - <http://www.ilpi.com/fun/msds/index.html>

Radiation Training

- Details change
- Training Schedules & Training Registration
- Dawn Kemp
 - dawn.kemp@uconn.edu
 - 486-1105

Inspections

- Inspection Checklist
- Paperwork update (handout)
 - Group contact list
 - Emergency contact for lab
 - Lab personnel
 - Laboratory Safety Information Card

Santa Clara County Inspections Violations

<u>Violation Category</u>	<u>Totals</u>	<u>Percentage</u>
Hazardous Waste	557	34.97%
Separation/Contamination/Monitoring	463	28.67%
Inventory, HMBP/HMMP	233	14.68%
Recordkeeping and Labeling	146	9.07%
Fire	137	8.63%
Training, Emergency Response, Unauthorized	56	3.53%
Other Violations	9	0.44%
TOTALS	1601	100%

Environmental Health and Safety²⁷

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- Laboratory Safety: Stefan Wawzyniecki
 - stefan.w@uconn.edu
 - 486-1110
- Other EH&S Sites:
 - <http://198.170.117.5/weblinks.htm#rieh>

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WHERE TO FIND A MSDS

- <http://www.ehs.ohio-state.edu/index.asp?PAGE=ehs.msds>
- <http://hazard.com/msds/>
- <http://www.chemexper.com/>
- <http://msds.ehs.cornell.edu/msdssrch.asp>
- <http://www.msds.com/>
- <http://www.setonresourcecenter.com/MSDSs/comply1.htm>
- <http://ull.chemistry.uakron.edu/erd/>

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