



DEPARTMENT OF
ENVIRONMENTAL SAFETY,
SUSTAINABILITY & RISK

Safety Refresher for Chunsheng Wang Lab

Jessica Snyder

Laboratory & Chemical Safety Specialist

True or False?

- My laboratory is a perfectly safe place.
- I know all the hazards of everything I work with.
- I know the hazards of everything other people work with around me.
- I know who to talk to if I have a safety concern.
- I am expected to talk to others about safety concerns.
- I am responsible for safety.



Why is this important?

- Your laboratory is a high hazard work area
 - Highly reactive chemicals
 - Compressed gases (flammable, oxidizers, and inert)
 - Electrical equipment
- Safe science is good science!
 - Your health and safety are most important
 - What can harm you can harm your research
 - Injuries cost you time to heal
 - Accidents destroy experiments, equipment, and supplies
 - Accidents injure your reputation, the lab's reputation, and UMD's reputation.



What are *your* responsibilities for conducting safe research?

- Practice good laboratory safety
- Understand hazards associated with your research
- Understand how to respond to incidents
- Ensure laboratory waste is managed properly
- Keep your areas clean and organized





DEPARTMENT OF
ENVIRONMENTAL SAFETY,
SUSTAINABILITY & RISK

Chemical Hygiene

Recognizing chemical hazards

- Chemical Labels
- Safety Data Sheets
- Reference materials
 - *Prudent Practices in the Laboratory*
 - PubChem (CDC, online)
 - Cameo Chemicals (online)
- Dr. Wang
- Senior Lab Members
- Standard Operating Procedures
- Internet search



SDS: Section 10

Section 10 **Stability and Reactivity** contains:

- Incompatible materials
- Decomposition products
- Other hazardous conditions and reactions.

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide

10.6 Hazardous decomposition products

Other decomposition products - no data available
In the event of fire: see section 5

This is Section 10 from the SDS for concentrated hydrochloric acid from Sigma-Aldrich.



GHS Hazard Symbols

Hazard symbols or pictograms convey information about the health, physical and environmental hazards associated with the chemical. There are nine pictograms.



Acute Toxicity (Severe)



Acute Toxicity (Harmful)
Dermal Sensitizer,
Narcotic Effects,
Respiratory Tract Irritant



Carcinogen
Respiratory Sensitizer
Reproductive Toxicity
Target Organ Toxicity
Mutagenicity
Aspiration Toxicity



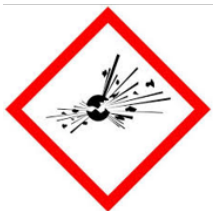
Corrosive
Severe Skin Burns and
Eye Damage,
Serious Eye Damage



Flammables,
Self-Reactives,
Pyrophorics,
Self-Heating,
Emits Flammable Gas,
Organic Peroxides



Gases Under Pressure



Explosives,
Self-Reactives,
Organic Peroxides



Oxidizers



Aquatic Toxicity



GHS Label

Hazard Statements

Hazard Symbols (Pictograms)

PHARMCO-AAPER
A PHARMACEUTICAL COMPANY

METHANOL

Reagent ACS/USP/NF Grade
Assay by GC, min..99.9%

CATALOG NUMBER: 339000ACS PACKAGING SIZE: 1 Pint
LOT NO: XXXXXXXXXXXXXXXX
BATCH NO: XXXXXXXX CAS No: Methyl Alcohol: 67-56-1

DANGER! Highly flammable liquid and vapor. Toxic if swallowed or in contact with skin. Toxic if inhaled. Causes damage to organs.

Specific measures (see first aid measures on this label). Specific treatment (see supplemental first aid instructions on this label). IF EXPOSED: Call a POISON CENTER or doctor/physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water. IF SWALLOWED: Immediately call a POISON CENTER or a doctor/physician. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Avoid contact during pregnancy/while nursing. Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Do not eat, drink, or smoke when using this product. Ground/bond container and receiving equipment. Keep away from heat, sparks, open flames, and hot surfaces. No smoking. Keep container tightly closed. Take precautionary measures against static discharge. Use explosion-proof electrical, ventilating, and lighting equipment. Use only non-sparking tools. Use only outdoors or in a well-ventilated area. Wash hands thoroughly after handling. Wear protective gloves and eye and face protection.

Store in a well-ventilated place. Keep cool. Store locked up.
Dispose of contents and container to an approved waste disposal plant.

ANTIDOTE:
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Induce vomiting by giving one teaspoon of Syrup of ipecac.

Not to be considered a medical device. Not intended for use as a Disinfectant as defined by the EPA

Intentionally Left Blank

Product filtered prior to filling.
Manufactured by: PHARMCO-AAPER
58 Vale Road, Brookfield, CT 068047
TEL: 1.800.243.5360
Particles inherent to the packaging may be present.
Methanol-ACS-USP-Etc-1 pint- 06/02/2014 CJA

Signal Word

Precautionary Statements



GHS Safety Data Sheets

Safety data sheets (SDS) communicate the hazards associated with the product and provide guidelines for safe handling and storage.

Each SDS has 16 sections. We will be looking at 4 of these sections in detail:

- Section 2: Hazards Identification
- Section 3: Composition/Information on Ingredients
- Section 8: Exposure Controls/Personal Protection
- Section 10: Stability and Reactivity



SDS: Section 2

Section 2: Hazards Identification contains

- GHS health hazard classifications
- Hazard statements
- Precautionary statements
- Pictograms

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidizing liquids (Category 3), H272
Skin corrosion (Category 1), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H272
H314
H318

Precautionary statement(s)

P210
P220
P221
P264
P280

P301 + P330 + P331
P303 + P361 + P353

May intensify fire; oxidizer.
Causes severe skin burns and eye damage.
Causes serious eye damage.

Keep away from heat.
Keep/Store away from clothing/ combustible materials.
Take any precaution to avoid mixing with combustibles.
Wash skin thoroughly after handling.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Aldrich - 433233

Section 2 from the SDS for concentrated nitric acid (Sigma-Aldrich).



DEPARTMENT OF
ENVIRONMENTAL SAFETY,
SUSTAINABILITY & RISK

Chemical Storage

- Chemicals should be stored according to hazard class
 - Not Alphabetically
 - Some chemicals have multiple hazards (e.g., glacial acetic acid)
- All chemicals should have compatible secondary containment
- Properly label all chemicals
 - Including samples
- Must have appropriate storage location
 - Special Cabinet (e.g., flammable liquids storage cabinet)
 - Not in fume hood
 - Not under sink

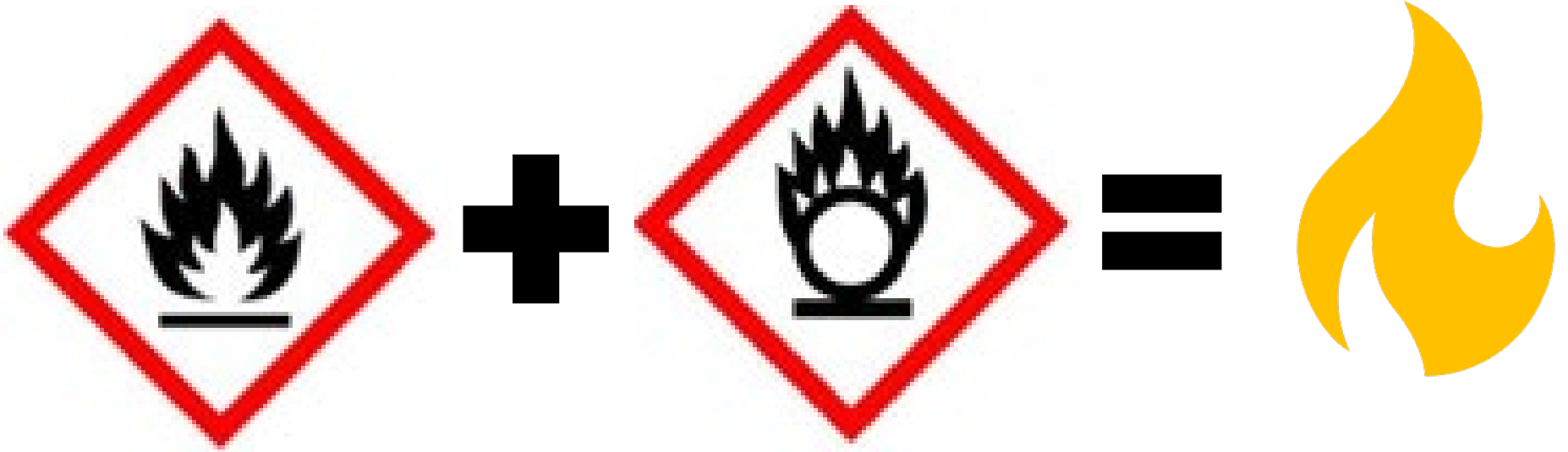


Chemical Storage: Hazards

- Physical Hazards come first
 - Oxidizer
 - Flammable
 - Corrosive
 - Water or air reactive
 - Explosive
 - Reactivity
- Incompatible classes must be kept separate
 - Most common improper storage: oxidizers and flammables together
- Use location or secondary containment to keep incompatible chemicals separated



Incompatible!



Chemical Storage: Hazards

- Health hazards come second
 - Toxic
 - Harmful
 - Sensitizer
 - Corrosive
 - Separate toxic chemicals from reactive and corrosive chemicals
- Do not store above eye level



Chemical Storage: Hazards

- Special storage needs:
 - Flammables:
 - Flammable cabinets or Flammable-rated refrigerators/freezers
 - Away from heat sources and spark hazards
 - Away from oxidizers
 - Corrosives:
 - In labeled corrosive cabinets
 - Separated from incompatible corrosives
 - Acid/base
 - Oxidizers





DEPARTMENT OF
ENVIRONMENTAL
SAFETY

Managing Waste

Managing Waste: Why?

- Waste management is mandated by:
 - Federal laws (EPA)
 - Maryland laws (MDE: stricter than EPA)
 - Prince George's county
 - Washington Suburban Sanitary Commissions
- Waste mismanagement has repercussions!
 - Accidental reactions and exposures
 - Fines from regulatory agencies
 - Lab shutdowns



Storage of Chemical Waste

- Waste containers
 - Must be compatible with chemical
 - Must be in secondary containers (bins)
- Segregate waste
 - By hazard
 - From incompatible materials
- Must be labeled fully in English on green tag



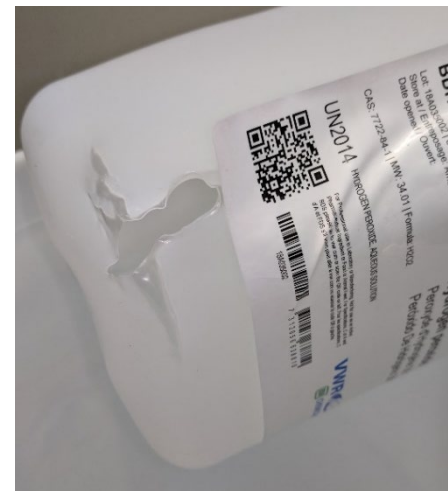
Above: properly segregated, contained waste.

Left: A waste bottle melted and sprayed waste when incompatible waste were combined.



Waste Handling

- NEVER mix unknown or incompatible waste
 - If you are not sure, do not mix it
- Waste must be closed at all times unless:
 - It is reacting or off-gassing
 - New waste is being added
- If waste is reacting or generating gas:
 - Keep it open in a secondary container until fully reacted
 - Keep in a fume hood (or glove box) toward the back
 - Place labels and signs indicating what it is, and hazards involved:
 - Caution! Reacting waste: do not close cap or move from hood. Toxic gas!



Above: A waste bottle melted and sprayed waste when incompatible waste were combined.

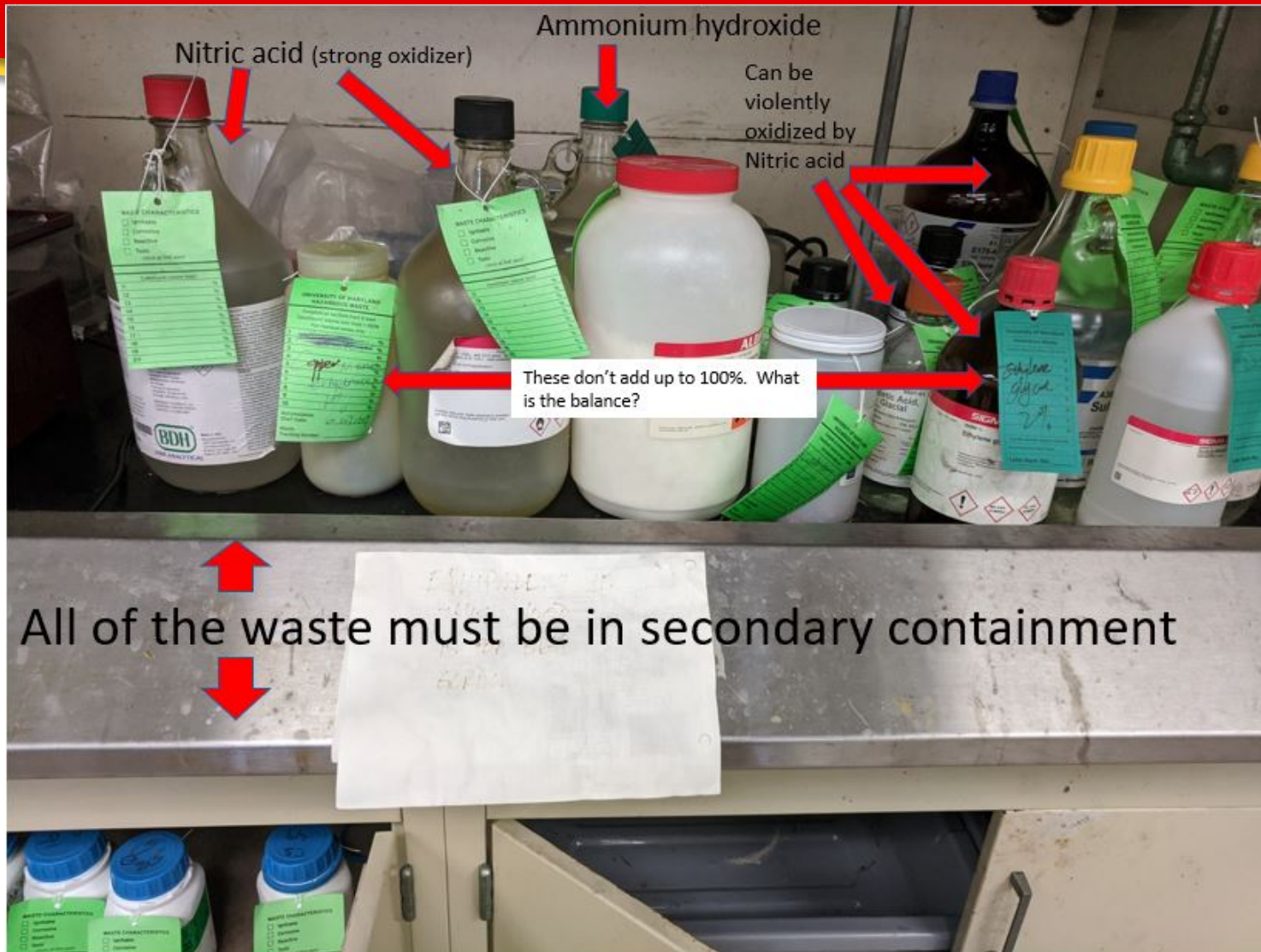


Managing Waste: Your laboratory



DEPARTMENT OF
**ENVIRONMENTAL
SAFETY**

Managing Waste: Your laboratory



Laboratory Safety Contacts

Lab Safety Group: labsafety@umd.edu

Miriam Sharp, Lab Safety Manager

msharp@umd.edu (301) 405-2070

Jonathan Robertson, Senior Industrial Hygienist

(hazardous exposures, chemical & general lab safety)

jrober14@umd.edu (301) 405-8755

Jessica Snyder, Industrial Hygienist

(chemical & general lab safety)

jasndyer@umd.edu (301) 405-3219

Dmitry Akmal, Research Safety Specialist

(electrical and engineering, general lab safety questions)

dakmal@umd.edu (310) 405-6087

Hazardous waste questions? Emergency Spills?

Environmental Affairs: (waste and spills) envaffairs@umd.edu



DEPARTMENT OF
ENVIRONMENTAL SAFETY,
SUSTAINABILITY & RISK