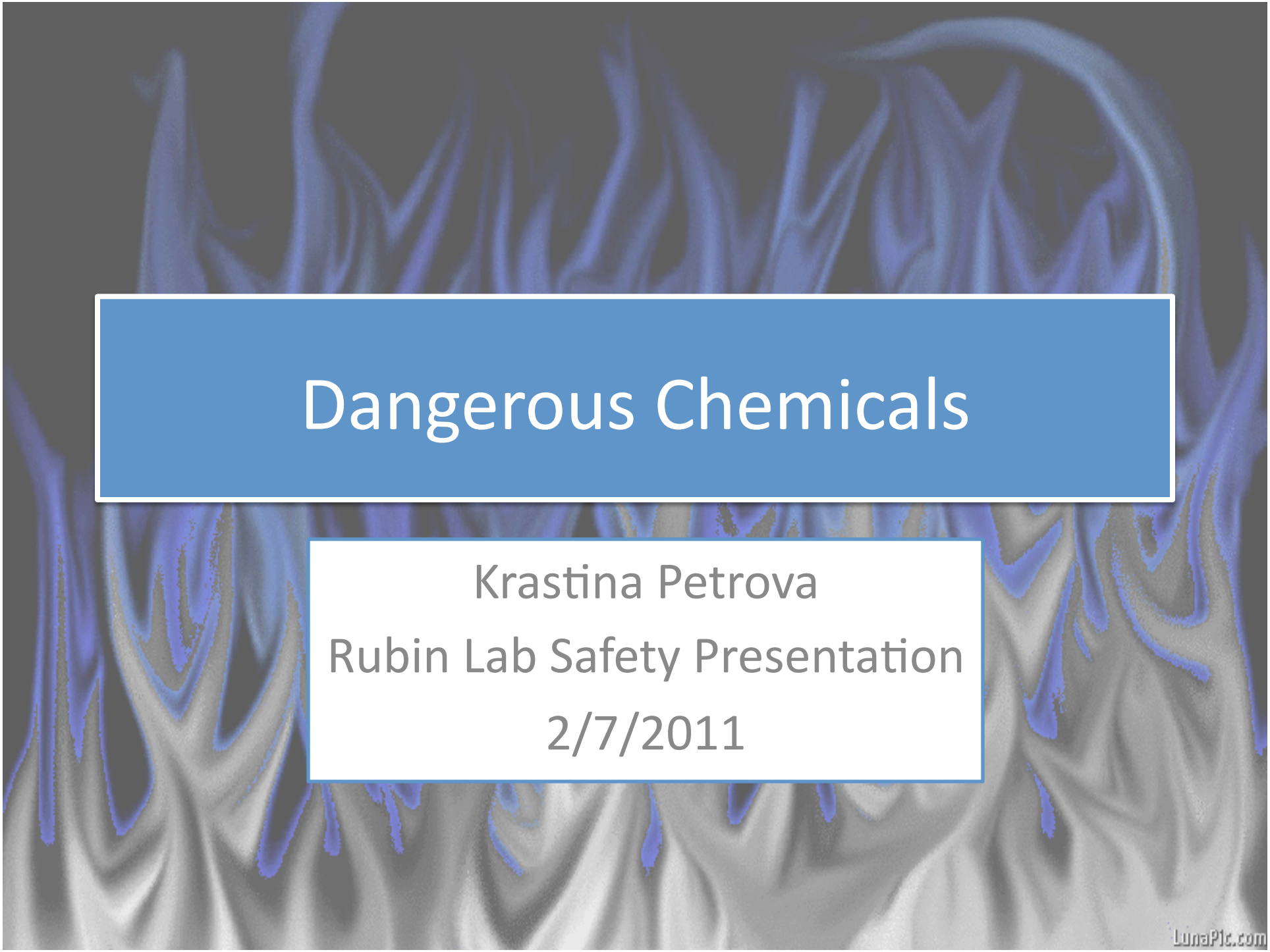

Dangerous Chemicals

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Rubin Lab Safety Presentation

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Some classes of Dangerous Chemicals

Pyrophorics

Acute toxins

Corrosives

Explosives

Carcinogens

Pyrophorics

a substance that will ignite spontaneously in air or upon exposure to water or water vapor

Organolithiums: *t*-BuLi, *n*-BuLi, MeLi
Organozincs: Et_2Zn
Organomagnesiums: EtMgBr
Organoaluminums: Me_3Al

Metal powders: Zn, Al, Mg, Ti, Ni, Pd
Alkali metals: K, Na
Metal hydrides: $LiAlH_4$

Non-metal alkyls: BR_3, PR_3, AsR_3

Often used in conjunction with flammables!

Working Safely with Pyrophorics

1.) Don't work alone!
- notify others, remind them of safety procedures
- beware of the location of the class D fire extinguisher

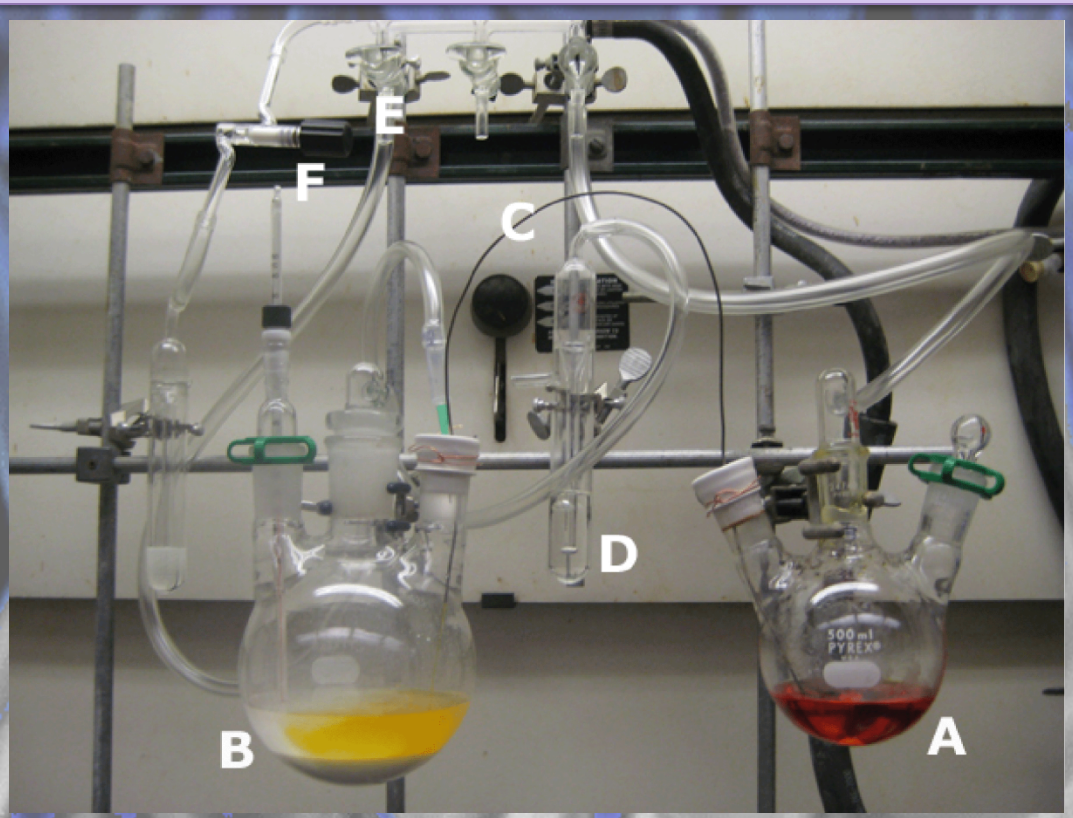
2.) Wear the right protection
- nitrile gloves or (nitrile + neoprene) gloves
- goggles or face shield
- buttoned-up fire-resistant lab coat

3.) Check the state of the reagent and your work space
- corroded septum?
- excess flammable material or clutter in hood?

4.) Use the proper technique
- syringe or cannula?

Syringe and Cannulation Techniques

Watch UCLA pyrophoric safety video:
http://www.youtube.com/watch?v=RaMXwNBAbxc



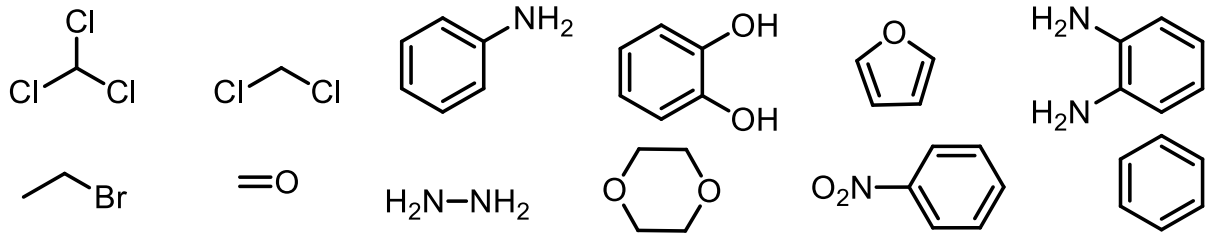
Carcinogens

1.) Label known carcinogens as such.

2.) Store in carcinogen cabinet or in secondary containment.

3.) Change gloves after using carcinogens.

Some common carcinogens:



Explosives: Azides

What NOT to do with NaN_3:

- use with chlorinated solvents (di- and tri- azidomethanes)
- mix with CS2, bromine, Bronsted acids, or heavy metals.

In general, "safe" azides conform to the formula:

(#O + #C)/(#N) > or = 3

What to avoid with organic azides:

- concentrating to dryness
- putting under vacuum
- ground-glass joints
- mechanical shock
- distillation
- exposure to light and silica

What to definitely do:

- put in separate waste container
- avoid mixing with acid

Peroxides and peroxide formers

What to avoid :

- metals
- heat, friction, shock
- vacuum

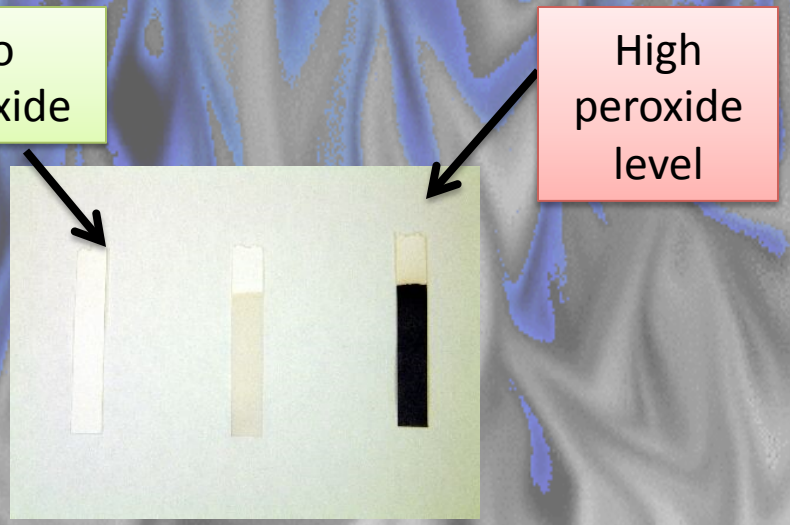
How to hydrolize:

- Use 80 parts water, 20 parts NaOH, and small amount of surfactant
- Slowly pour peroxide in solution with stirring (use ~10X more alkaline solution)

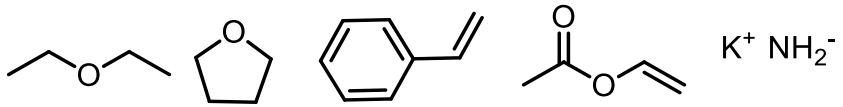
How to test for peroxides:

Use starch-iodide paper.

- immerse in solution for 1 sec
- breathe on strip for 30 sec



Common peroxide formers:



Corrosives: Aqua Regia and Piranha

AVOID CONTACT WITH ORGANIC SOLVENTS

Aqua regia:

- 1:3 nitric to hydrochloric acid
- use proper ventilation!

$HNO_3 + 3\ HCl \rightarrow NOCl + Cl_2 + 2\ H_2O$

- don‘t use is closed containers
- dilute with water slowly and neutralize

Piranha:

- 1:3 30% hydrogen peroxide to sulfuric acid
- mix slowly!
- dilute with water and neutralize

Try other cleaning methods first.

Other Common Dangerous Chemicals

Reproductive toxins

- carbon disulfide
- toluene
- pyridine

- HF

Acute toxins

- diazomethane
- sodium azide
- OsO_4
- organomercury
- organotin