

## Experiment Safety Review Form

### Review Number: PS-ESR-1-146-2012

PRINCIPAL INVESTIGATOR: Vesna Stanic

GROUP: NSLS

EXT: 8401

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LIFE NUMBER: 24703

<b>Project Title:</b> Soft matter and biophysics sample preparation, NSLS beamlines X9 and X6B
<b>Location(s):</b> 0725
<b>Area(s):</b> 0725-FIRST-1-146
<b>Proposed Start Date and Duration:</b> 6/10/2011 - 1 years

**SIGNATURES:**

<b>Principal Investigator:</b> Vesna Stanic	<b>Date:</b> 6/29/2011
<b>Experiment Review Coordinator:</b> Lori Stiegler	<b>Date:</b> 6/29/2011
<b>Reviewer:</b> Christopher Weilandics	<b>Date:</b> 6/22/2011
<b>Reviewer:</b> Frank Zafonte	<b>Date:</b> 6/6/2011
<b>Reviewer:</b> Deborah Bauer	<b>Date:</b> 6/20/2011
<b>Reviewer:</b> Brian Heneveld	<b>Date:</b> 6/3/2011
<b>Approval:</b> Lori Stiegler	<b>Date:</b> 6/29/2011
<b>Review/Approval (ERC) Comments:</b> 06/21/2012 10:07 AM No change in tasks or hazards. Extended for one year. 06/29/2011 2:21 PM	
<b>Walkthrough Signature:</b>	<b>Date:</b>
<b>Expiration Date (max 1 yr.):</b> 6/29/2013	
<b>FUA Change Required?</b> No	
<b>Fire Rescue Run Card Changes Required?</b> No	
<b>Has a NEPA Review been Performed for this Project?</b> No	
<b>Required Approvals (i.e., IACUC, IBC, etc.):</b>	
<b>Project Termination Acceptance Signature:</b>	<b>Date:</b>
<b>Comments:</b>	

**I. Define the Scope of the Work**

## A. Description

Scope: The laboratory is a resource for soft matter scientific staff members Stanic, DiMasi, Pindak, and Yang, their collaborators and group members, and the users of beamlines X9 and X6B. All these users perform wet chemistry experiments which are mutually compatible and may be covered under any of the following procedures. **Safety glasses with side shields are required for entry into lab.**

Preparation of solutions: Aqueous and organic solutions of soluble salts and organic compounds may be prepared by weighing dry materials and mixing. Likely solutions which are not sink disposable are listed in section B. Mass balance, shaker, stir/heat plate, sonicator, and centrifuge may be used. Inert gas bubbling apparatus (carbon dioxide, dry nitrogen from compressed gas cylinder) may be used. NSLS staff or user training required.

Solutions with chloroform or other carcinogens: Users prepare solutions that may contain carcinogens in fume hood only, wearing nitrile gloves and splashproof goggles. Carcinogens must be double contained and cabinet and containers marked "carcinogen". At least one experimenter in the group using these procedures must have hazardous waste training. All experimenters handling chloroform or other carcinogens must have laboratory standard training.

Preparation of soft materials: Solid, glassy, or gel samples are prepared for x-ray experiments for example by spreading onto glass substrates. Heat plates may be used. Sample chambers which control temperature with heat may be used.

Langmuir trough: Requires transport of < 20 mL bottles and/or < 100  $\mu$ L syringes, of solvents including chloroform to the trough apparatus, which may be done outside the fume hood and with ordinary safety glasses and nitrile gloves.

Cleaning apparatus and samples: Acids are used to clean glassware and dissolve mineral deposits. Solvents are used to clean organics from surfaces such as glass, teflon and delrin. Detergents are also available. Hazardous chemicals to be handled in hood as appropriate with appropriate training. Strong acid and solvent use requires fume hood, appropriate gloves, and splashproof goggles. Piranha solution (mixture of sulfuric acid and hydrogen peroxide) may be used to clean samples in the chemical fume hood.

Apparatus assembly: Work conducted on sample chambers and sample prep equipment on the benchtop, including use of hand tools. Use of dedicated electronic control equipment, which must pass NSLS inspection if not UL listed.

### Equipment manuals or procedures that are controlled documents:

N/A

## B. Human Performance Factors

Some equipment is stored on high shelves. Proper use of a step ladder is required.

Occasional use of piranha or corrosive etch solution by visiting users. The work area will be segregated during piranha use to minimize potential for inappropriate mixing (organics) and overpressurization of etch solutions. Piranha etch will be clearly labeled to avoid misidentification.

## C. Waste Minimization/Pollution Prevention

Waste minimization is done by individual oversight, divided into groups covering the main activities of the lab. Vesna Stanic and Elaine DiMasi oversee X6B users and collaborators. Lin Yang oversees X9 users and collaborators. Ron Pindak oversees other NSLS soft matter group members. Vesna Stanic or Elaine DiMasi will have ultimate oversight of satellite area management, storage, and housekeeping.

## D. Materials Used /Waste Generated

Materials Used	Disposal Method	Amount per Use	Amount per Year	Comments
Chloroform	Hazardous	20.00 ml	100.00 ml	
Tissues contaminated with chloroform acids from cleaning	Hazardous	5.00 g	25.00 g	
Inert gas, CO2 or N2	Fugitive	1.00 ft3	10.00 ft3	
Piranha solution, sulfuric acid w/H2O2	Hazardous	100.00 ml	2.00 ltr	
Solvents	Hazardous	0.00	1.00 ltr	
Plant viruses TMV and CPMV	Trash	0.00	1.00 mg	
TMV and CPMV solutions containing MES buffers, salts, and 10% bleach	Sanitary	0.00	300.00 ml	See LEEF attached.
		0.00	0.00	

## II. Identify and Analyze Hazards Associated with the Work

The following hazards were identified:

### Physical Hazards:

- Compressed gases (lecture bottles, cylinders, gas lines) (Area: 0725-FIRST-1-146)
- Flammable liquids (Area: 0725-FIRST-1-146)

### Chemical Hazards:

- Chemicals, Hazardous (General)
- Carcinogens (Area: 0725-FIRST-1-146)
- Reproductive toxins (Area: 0725-FIRST-1-146)
- Corrosives
- Piranha Etch/Corrosive Etching Solutions
- Flammable liquids (Area: 0725-FIRST-1-146)
- Strong oxidizers

### Ionizing and Non-ionizing Radiation Hazards:

- None

### Biological Hazards:

- BSL-1 plant viruses (Other)

### Offsite Work:

- None

### Other Issues (Security, Notifications, Community, etc.):

- None

### Significant Environmental Aspects

- Any amount of hazardous waste generation (Area: 0725-FIRST-1-146)

## III. Develop and Implement Hazard Controls and Assess Risk

### A. Physical Hazards, Tasks and Controls

Hazard, Default Controls, Task Specific Info	Risk Level
<p><b>Hazard:</b> Compressed gases (lecture bottles, cylinders, gas lines)</p> <p><b>Default Controls:</b></p> <ul style="list-style-type: none"> <li>Any systems &gt;15psi must be SME Approved</li> <li>Transport cylinders using a cylinder cart</li> </ul>	Negligible (0-20)

- Secure cylinders to a fixed object/wall
- Use regulator, hoses, and components compatible with gas
- Use hoses and clamps rated for maximum regulator output or use pressure relief device
- Wear safety glasses with side shields when installing/removing/or adjusting regulator
- Label piping/tubing

**Hazard: Flammable liquids**

Negligible (0-20)

**Default Controls:**

As for chemicals, plus  
Store large quantities in Flam. cabinets as required

**B. Chemical Hazards, Tasks and Controls**

Hazard, Default Controls, Task Specific Info	Risk Level
<p><b>Hazard: Chemicals, Hazardous (General)</b></p> <p><b>Default Controls:</b></p> <ul style="list-style-type: none"> <li>• All operations with large (&gt;250ml, health hazard 3) quantities of hazardous chemicals (pouring, mixing, evaporation, etc) in hood, or use snorkel when hood is impractical</li> <li>• Register Commercial Chemicals in CMS</li> <li>• Work alone after hours only if permitted by supervisor or ESR</li> <li>• Identify containers so contents are identifiable unless being actively used (ex. 1 shift)</li> <li>• Food, beverage, smoking, and cosmetics are prohibited</li> <li>• Handle glassware properly: no mouth suction, no drinking from labware.</li> </ul> <p><b>Task Specific Info:</b></p> <p>Put up chain with 'chemicals in use' posting across work area. Lab coats required for entry when chemicals are in use.</p>	Negligible (0-20)
<p><b>Hazard: Carcinogens</b></p> <p><b>Default Controls:</b></p> <p>Use hazardous chemicals controls plus: Establish and post a "designated area" where used Note location on fire run card and hazard info. placard. Exposure monitoring to assure that action levels not exceeded Establish procedures for work area cleanup and decontamination</p>	Negligible (0-20)
<p><b>Hazard: Reproductive toxins</b></p> <p><b>Default Controls:</b></p> <p>Use hazardous chemicals controls plus: Establish and post a "designated area" where used Note location on fire run card and hazard info. placard for storage of solids, greater than 40 pounds; liquids, greater than 5 gallons; gases, greater than 10 pounds Exposure monitoring, determined by SHSD Rep, to assure that action levels not exceeded Prior to decommissioning, establish procedures for sampling and decontamination</p>	Negligible (0-20)
<p><b>Hazard: Corrosives</b></p> <p><b>Default Controls:</b></p> <p>Use hazardous chemicals controls plus: - Unobstructed access to Emergency Eyewash and Shower</p> <p><b>Task Specific Info:</b></p> <p>Keep door open for access to eye wash and shower.</p>	Negligible (0-20)
<p><b>Hazard: Piranha Etch/Corrosive Etching Solutions</b></p>	Negligible (0-20)

<p><b>Default Controls:</b></p> <ul style="list-style-type: none"> <li>• Use smallest amount possible.</li> <li>• Work in hood behind a sash.</li> <li>• This material is very reactive (exothermic).</li> <li>• Avoid organics. It will explode if mixed with organics!</li> <li>• Before wasting the solution you must allow it to Cooldown for 24 hours or longer uncovered in a hood.</li> <li>• When there is no more gas generation, it must be wasted into a clear poly-coated waste bottle equipped with a venting cap. The waste bottle must have the special label indicating Piranha Etch/Corrosive Etchant. (Note: Corrosive etchants containing HF must be stored in plastic bottles</li> <li>• It is recommended to segregate Piranha etch/Corrosive Etchants from other wastes.</li> <li>• Never place Corrosive Etching Solutions in an airtight container—they will over-pressurize and may explode!</li> </ul> <p>PPE: Safety glasses with side shields or goggles Labcoat, closed toed shoes, long pants. Face Shield (or hood sash) when mixing.</p>	
<p><b>Hazard: Flammable liquids</b></p> <hr/> <p><b>Default Controls:</b> Use hazardous chemicals controls. Review large quantity storage with Fire Protection Engineer Note location on fire run card and hazard info. placard for storage of solids, greater than 40 pounds; liquids, greater than 5 gallons; gases, greater than 10 pounds</p>	<p><b>Negligible (0-20)</b></p>
<p><b>Hazard: Strong oxidizers</b></p> <hr/> <p><b>Default Controls:</b> Use hazardous chemicals controls. Review large quantity storage with Fire Protection Engineer</p> <hr/> <p><b>Task Specific Info:</b> See corrosives, piranha solution controls</p>	<p><b>Negligible (0-20)</b></p>

**C. Environmental Hazards, Tasks and Controls (include on/off site transportation and products/services)**

Hazard, Default Controls, Task Specific Info	Risk Level
<p><b>Hazard: Any amount of hazardous waste generation</b></p> <hr/> <p><b>Default Controls:</b> Engineering Controls</p> <ul style="list-style-type: none"> <li>• Waste will be accumulated in chemically compatible containers that appropriately contain/protect the waste.</li> <li>• Waste containers will be closed in a tray (secondary containment) in the Satellite Accumulation Area (SAA).</li> </ul> <p>Administrative Controls</p> <ul style="list-style-type: none"> <li>• All hazardous waste containers will have a (red) "Hazardous Waste Label" that has the generator's name and the chemical contents (trade name/formula not acceptable).</li> <li>• All waste will be accumulated in closed containers and kept in an established and posted SAA until ready for transfer to the 90-Day Haz Waste Area for pick-up by Waste Management.</li> <li>• For pick-up by Waste management, complete the Nonradioactive Haz Waste Control Form and consult the 90-Day Area Manager to gain access/transfer the waste to the 90Day Area.</li> </ul> <p>Training: Hazardous Waste Gen. (HP-RCRIGEN3).</p> <p>PPE: When handling waste materials follow PPE requirements specified for the specific materials.</p>	<p><b>Negligible (0-20)</b></p>

Comply with the SBMS Subject Area: "Hazardous Waste Management".

#### D. Radiation Hazards, Tasks and Controls

None

#### E. Biological Hazards, Tasks and Controls

Hazard, Default Controls, Task Specific Info	Risk Level
<p><b>Hazard:</b> BSL-1 plant viruses (Other)</p> <hr/> <p><b>Default Controls:</b></p> <hr/> <p><b>Task Specific Info:</b></p> <p>Use standard microbiological practices</p>	Negligible (0-20)

#### F. Offsite Work Hazards, Tasks and Controls

None

#### G. Other Issues (Security, Notifications to Other Organizations, Community Involvement, etc.)

None

#### H. Recommended Exposure Monitoring

- None

Description or comments:

#### I. EPHA Determination

Chemical Name	Quantity (lbs, gal)	Location (Bldg/Room#)
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### IV. Perform Work Within Controls

#### A. Recommended Training and Medical Surveillance Summary

- NSLS Env Awareness SAA Managers (LS-ENV-SAA)
- NSLS R2A2 for Lab Steward (LS-R2A2-LAB-STWD)
- Laboratory Standard (HP-IND-220)
- Hazardous Waste Generator (HP-RCRIGEN3)
- Compressed Gas Safety (TQ-COMPGAS1)

#### B. Personnel Training, Qualification, and Authorization List

Employee/Guest Name	Life/Guest#	Dept	Required Training Course(s)	Signed
Elaine DiMasi	21321	PS	Compressed Gas Safety (TQ-COMPGAS1) [ EXPIRES: 8/3/2015 ] Laboratory Standard (HP-IND-220) [ EXPIRES: 12/31/2012 ] Hazardous Waste Generator (HP-RCRIGEN3) [ EXPIRES: 9/26/2012 ]	7/30/2012 4:45:24 PM
Lin Yang	22608	PS	Compressed Gas Safety (TQ-COMPGAS1) [ EXPIRES: 1/13/2013 ] Laboratory Standard (HP-IND-220) [ EXPIRES: 5/16/2013 ] Hazardous Waste Generator (HP-RCRIGEN3) [ EXPIRES: 5/21/2013 ]	7/1/2011 12:07:13 PM

Vesna Stanic	24703	PS	Compressed Gas Safety (TQ-COMPGAS1) [ EXPIRES: 2/13/2013 ] Laboratory Standard (HP-IND-220) [ EXPIRES: 6/6/2014 ] Hazardous Waste Generator (HP-RCRIGEN3) [ EXPIRES: 6/5/2013 ] NSLS Env Awareness SAA Managers (LS-ENV-SAA) [ UNASSIGNED: EXPIRES: 10/26/2012 ] NSLS R2A2 for Lab Steward (LS-R2A2-LAB-STWD) [ UNASSIGNED: EXPIRES: 10/17/2012 ]	6/23/2011 6:14:47 PM
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### C. Emergency Procedures

Follow the NSLS Local Emergency Plan. Call the Control Room for any incidents. Spill control supplies are located in the hallway outside room 1-149.

### D. Transportation

None

### E. Logistical Interactions

None

### F. Termination/Decommissioning

Any chemicals or equipment will be transferred or dispositioned upon transfer of Lab Steward or change in lab function.

### V. Provide Feedback

None

### VI. Attachments

#### Attached Files:

[03-02-10 LEEF LS \(TMV\).pdf](#)