

# Lab Safety Plan for XRD Room (Rm112)

## 1. Basic Information

**1.1 Laboratory Locations Covered by this Plan.** Nanophotonics Center (Engineering & Technology Lab Building) Rm 112 (XRD Room).

### 1.2 Location of (M)SDSs, and any Other Laboratory Documents for this Room

In the Literature Holder mounted on the wall next to the door

## 2. Emergency Assistance Information

### 2.1 Group's Emergency Contact Information

Prof. Jing Li                      806-401-9289

Weiping Zhao                    806-317-5636

### 2.2 Advisors

Prof. Hongxing Jiang    806-834-5739 (Office)

Prof. Jingyu Lin            806-834-5383 (Office)

### 2.3 Secretary

Qing Feng                      806-834-2094 (Office)

### 2.4 TTU Environmental Health and Safety (EH&S)

Daytime Emergencies (M-F, 8:00 am -5:00 pm)      806-742-3876

Non-daytime Emergencies (24 hrs/day, 7 days/week)      806-742-3328

### 2.5 TTU Emergency Maintenance

Any Time                      806-742-3328

### 2.6 TTU Police (UPD)

Emergency 9-911

Non-Emergency 806-742-3931

**3. Required Training for Working in this Room**

3.1 Safety Awareness Training

3.2 Hazard Communication

3.3 Chemical Hygiene Plan Training

3.4 Laboratory Safety

3.5 Radiation Safety

**4. Standard Operating Procedures (Attached)**

**5. Record of Training (in the literature holder mounted on the wall next to the door)**

# XRD Standard Operating Procedures

1. Before handling the XRD machine make sure that you have gone through the XRD manual and have taken note of all important safety precautions. Write down the start time and operating current and voltage on the XRD log book.
2. Before turning on XRD, turn on the water and the chiller.
3. Wait till the chiller reaches the desired set temperature and then power on the XRD by selecting the following. (Rigaku -> Control -> XG operation -> XG control RINT 2100 -> Power ON).
4. Before opening the door to load the sample, make sure that the shutter is closed and no X-rays are being generated.
5. Always press the OPEN DOOR button and wait for the beep sound to die down before opening the door.
6. Load the sample carefully at the desired position and shut the door completely.
7. Now you can turn on the X-ray, open the shutter and set the desired measurement condition in the Standard Measurement window.
8. Set the fixed angle for the rocking curve, the start and stop angles and the scan speed.
9. Once you determine the offset from the rocking curve, use it in the 2 theta scan measurement.
8. Never try to open the door when the measurement is in progress or when the shutter is open. If there is a need to open the door during measurement, break the measurement, close the shutter and then open the door.
9. After the measurement, in order to shut down the XRD machine go to the XG control window RINT2100 and turn the X-ray off and then the Power off.
10. After Xray turned down for more than 15 minutes. Turn off the chiller and make sure you shut down the water valves too.
11. Whenever you are leaving the room just checks if the Xray machine is shut down and the chiller and water is shut down too. Switch off the lights and lock the door when you exit the room.

## X-Ray Turn-On and Basic Warm-Up Procedure

With door closed "C Power On "CCooling Water On- You should have a READY lamp.

Click X-Ray On symbol to turn X-Ray On(Power on at 20kV 2MA).

Increase MA in 2MA steps to 20KV 10MA and leave at this power for a minimum of 15 minutes to allow Tube&Target to slowly warm up.

X-Ray Operational Use Warm Up

Basic X-Ray Turn-On and Warm-Up have already been completed.

- 1 --Increase MA setting to 20MA and click SET button.
- 2 "C Increase KV setting to 30KV and MA setting to 30MA and click SET button.
- 3 ;<sup>a</sup> Increase KV setting to 40KV and MA setting to 40MA and click SET button.
- 4 ;<sup>a</sup> Leave at this power for a minimum of 15 minutes before use so the X-Ray tube target and filament become temperature stable.

Door Opening With X-ray On(Shutter closed)

Note: Check Christmas Tree Lamps to ensure shutter is closed!!!

- 1 "C Push the ;°Door Open;±Yellow Switch. (Lamp will turn on)
- 2 "C WAIT until the lamp starts flashing & safety beeper is beeping.

If Lamp does not start flashing "C Shutter may be open

- 3 "C Open Door firmly( if slowly you can trip microswitch shutting off X-Rays as it senses microswitch opening-closing-opening).

NOTE: Shutter is closed so there is no X-Ray to worry about!

- 4 "C When closing Door after you have the sample mounted/unmounted. Close slowly

But firm holding both doors so they don't bounce.

# Lab safety

Note for lab safety training/talk on Nov.20,  
2011

Environmental Health & Safety website: <http://www.depts.ttu.edu/ehs/Web/>

# Required documents

- SOPs for anything potentially dangerous
  - Including how to change MOCVD bubbler, dump sharp/chemical waste, use fume hood
- **Lab safety plan** – must have, in written form
  - Approved by PI
  - Risk analysis from EHS (optional)
  - eg. annual inspection, training
- MSDS
  - Storage(flammable/reactive)
  - Shipping requirements

# Training

- Location of first-aid, fire extinguishers and spill kits
- Personal Protective Equipments (PPE)
  - Gloves: one time use, take care to dispose in regular trash
  - Body cover: no exposed skin
  - Shoes: full foot coverage, no cloth or absorbent materials
  - Eyewear, respirator/ventilation
- Waste management
  - Waste chemicals: separately stored in labeled containers mark with full name and date.
  - Waste sharp items: special container or sharp edge secured



# Training

- Chemical Hygiene
  - Designated area - fume hood: sash below mark
  - Separate flammable/reactive/waste inside fume hood
  - Glassware: rinse after use, label if left in fume hood
  - Store chemicals accordingly
    - Separate flammable/inflammable, base / acid, HF
    - Specialized cabinet / refrigerator (EHS can provide)
  - Handle spills: call (2-3876) immediately if unsure
    - Use spill kits if comfortable
  - HF: especially dangerous, penetrate gloves in seconds.

## Chemical safety



### Precautions:

- Always wear protective clothing, including a face mask, goggles, rubber gloves, and apron when handling corrosive chemicals.
- Use the chemicals only in the designated area;
- Do not transport chemicals around the room in beakers.
- Never pour chemicals back into the original container.

## Storage waste chemical

Store chemicals in accordance with compatibility. Incompatible chemicals coming into contact can generate extremely violent chemical reaction resulting in catastrophic explosions.

- Store waste chemical near the floor to minimize the danger of falling from shelves.
- Store in areas that are cool, dry, and well-ventilated, and away from sunlight.
- Storage area should not be subject to rapid changes in humidity or temperature.

## Disposal chemical

Appropriate and adequate disposal of waste is critical in preventing unnecessary risk to the environment, as well as lowering the likelihood of unsafe conditions

Hazardous Waste Disposal Pickup Request Form

- Select waste type –chemical/Bio waste
- Fill out the form completely
- Transaction Number will be sent by email after fill out the pick up request form. Label all containers with this transaction number.
- Once the form submitted, the pick-up will be scheduled for **Tuesday** and **Thursday** accordingly