CENTER FOR MATERIALS SCIENCE & ENGINEERING
at MIT

X-RAY DIFFRACTION SHARED EXPERIMENTAL FACILITY

RULES AND REGULATIONS

for working in the
CMSE X-Ray Diffraction
Shared Experimental Facility

http://prism.mit.edu/xray

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IN THE EVENT OF AN EMERGENCY OR SUSPECTED ACCIDENTAL EXPOSURE TO X-RAYS FROM EQUIPMENT IN THIS LABORATORY, DO THE FOLLOWING IMMEDIATELY:

NOTIFY THE SUPERVISOR OF THIS LABORATORY:

SCOTT SPEAKMAN
AT x3-6887
OFFICE: 13-4009A

BETWEEN 8AM AND 5PM:
CALL THE RADIATION PROTECTION OFFICE AT
x3-2180
x3-2360
ASK TO SPEAK TO A STAFF MEMBER

EVENINGS WEEKENDS, AND HOLIDAYS:

CALL THE CAMPUS POLICE AT
x100

THEY WILL NOTIFY THE RADIATION PROTECTION OFFICE
AND PROVIDE ASSISTANCE.

YOU MAY NOT WORK ALONE IN THIS LABORATORY.
AFTER 5PM, WEEKENDS, AND HOLIDAYS, YOU MUST HAVE ANOTHER PERSON PRESENT.

The X-Ray Diffraction facility has many users. In order for all users and the costly equipment to coexist peaceably, certain rules must be imposed. Some are imposed to ensure your safety, some to maintain the equipment in good working order, and others to facilitate civility and good will among the users.

In order to work in the X-Ray SEF, you must read and sign these rules, indicating that you agree abide by them. Failure to follow these rules may result in revocation of your access to the XRD SEF.

Remember, you are not just responsible for your own safety; you are also responsible for the safety of those around you.

RULES AND REGULATIONS in the X-RAY SEF

1. Always follow all laboratory safety and chemical hygiene rules, including lab specific rules, official MIT rules, OSHA regulations, and 'best practices'.

2. Never defeat or bypass any safety interlock on the X-ray diffractometers. Violation of this rule will result in loss of access to the X-Ray SEF and possibly other corrective measures.

3. Always follow the procedures outlined in the official SOPs (available online or in the red binders).

4. It is your responsibility to check the operating conditions of the X-ray generator and diffractometer before you start work.
- Read all signs posted on the instruments, as they may include instructions and/or notices about changes in the instrument.
- Make sure that all X-ray shielding is in place.
    - Never remove any X-ray shielding, except as instructed by the SOP.
- Check that the X-ray safety shutter is closed.
    - Never open the enclosure door when you know or suspect that the shutter may be open.
- Survey inside the enclosure with the Gieger counter.
    - Readings inside the enclosure must be less then 0.05 mR/hr.
    - If readings exceed 0.05 mR/hr, shut the enclosure door, turn off the generator, and immediately notify Scott Speakman.

5. If you discover that the instrument is not working properly:
- Report the problem to Scott Speakman in person, via voice mail (x3-6887), or via e-mail (speakman@mit.edu)
- Post a sign on the instrument so that other users are aware that there is a problem.
- Do not attempt to repair the instrument yourself.
- Never remove, handle, or change the X-ray source (sealed tube or rotating anode).
- Never tamper with or handle the X-ray safety shutter.
- Never remove radiation shielding unless instructed to do so by the official SOP.
- Be aware that the X-ray tube tower contains Be windows. Never touch any part of an exposed X-ray tube tower.

- If the instrument is broken by negligence or abuse and the problem is not reported, then it will be assumed that the last person that used the instrument but did not report the problem is responsible and appropriate action will be taken.
- If you break the instrument and report the problem in a timely manner, then there will be no repercussions (either financial or administrative).

6. If the radiation monitor on top of a Rigaku diffractometers sounds the alarm, turn off the generator (even if a run is in progress) and immediately notify Scott.

7. "STOP WORK" ORDERS

If a person witnesses another individual performing actions that may compromise their safety and/or the safety of others, then that person should tell them to "Stop Work". The individual should cease all activity and listen to the concerns expressed. The two should discuss and agree on a safe procedure for the work to continue. If an agreement cannot be reached, then the two must contact the nearest supervisor and discuss the issue with them.

- Any person may issue a "Stop Work" Order to any one else without fear of repercussion.
- If receiving a "Stop Work" Order, you must immediately cease all work and listen, with respect and due attention, to the concerns of the person issuing the order.
- Work may not continue until the concerns of the "Stop Work" Order have been resolved- i.e. do not just return after the person issuing the "Stop Work" Order has left and resumen the work then.
- The "nearest supervisor" may be the lab supervisor (Scott Speakman), the building safety coordinator (Ed Kruzel), an EHS representative or CMSE adminstrator.

8. If working after hours, you must ensure that there is at least one other person in the lab with you. Institute policy states that no one is permitted to work alone in any lab.

- During normal work hours this is not usually a problem; you may assume that the regular flow of traffic means that there are enough people around for your safety.
- After hours (between 5 pm to 9 am, during holidays and weekends) the entrance to this facility is closed and locked for security reasons. You must arrange for someone to be around to assure your safety.
- After hours, do not give entry into the lab to anyone other than your safety partner. Remember, the door-entry card-reader tracks who enters the lab; you can be held responsible for damages caused by people that you let into the lab.

9. No food or beverages are permitted in the laboratory.

10. The X-ray lab is not equipped for safe chemical processing. No chemical work beyond loading the sample holder should be done in the X-ray lab.

11. Preparation of samples should be done in your own laboratory when possible. If it is necessary that samples be prepared in the XRD Lab, then:

- EPA regulations require us to identify all hazardous materials generated as waste.
- Do not use the sink or wastebaskets to dispose of your samples.
- Save paper towels, Kimwipes, and Q-tips contaminated by your samples in a bag and take them with you when you leave. Dispose of them properly in your lab.

- Take all of your samples with you when you leave. Any sample left in the lab will be disposed of and the sample holder confiscated.

12. You should spend as little time in the X-ray lab as possible.
- Do not loiter in the X-ray lab while your data are being collected.
- Analyze your data using the computers in room 13-4041, not the computers in the X-ray lab.
- However, you must return to the X-ray lab as soon as your measurement is complete in order to turn the instrument off and to retrieve your sample.

13. If you spill your sample in the diffractometer and cannot clean it up (for example, any spill inside the radiation protective shielding in the Rigaku), report the spill to Scott. Specify what material you spilled and any safety precautions necessary when cleaning it up. If you do not report the spill, and it can be determined that the material is yours, you will be charged for the time it takes to clean up the spill (minimum 0.5 hours).

14. The equipment in this facility may be used only by those persons that have been given instruction and authorization by Scott Speakman.
- You may not teach anyone how to operate the equipment in this facility. Each individual must take the formal training offered by Scott Speakman.

15. You are solely responsible for the preservation and security of data collected in the X-ray lab. We do not guarantee that your data will be backed up and safe from deletion, nor do we guarantee that others cannot access and copy your data.

16. You must record your instrument use time in the electronic log book. Failure to do so will be reported to the CMSE administration who may pursue corrective action.

17. You may reserve instrument time using the Faces system at faces.ccrc.uga.edu
- Log into the CMSE_XRAY group using your personal username and password.
- You may reserved instrument time 7 days in advance (14 days in advance on the Bruker D8 with GADDS).
- You may reserve 2 sessions per day and up to 6 sessions in a week period.
    - A session may be up to 2hrs long on the Rigaku RU300 and 3hrs long on other instruments during prime time (9 am to 5 pm).
    - A session may be up to 16hrs long during off-peak hours.
    - If you need a large block of time, you may reserve 2 consecutive sessions.
- Failure to show up for reserved instrument time will be reported to the CMSE administration, who may pursue corrective action.
- If you want to cancel a reservation, you must do so 12 hours before the start of your time slot in order to avoid a penalty.
- If a person is 15 minutes late for their reserved time slot, they forfeit that entire reservation.

18. Updates to the official Rules and Regulations will be posted in the red binders labeled “XRD Lab Manual”. You are expected to comply with the rules as posted in this binder.

Name:_____
Please print

MIT ID #:_____

Email:_____

I have received a copy of the Rules and Regulations for using the
X-Ray Diffraction Shared Experimental Facility (Revised 11 March 2009).
They have been explained to me, I understand them and agree to abide by them.

Signature:_____ Date:_____

I have completed the General Chemical Hygiene course (Req. #100W) and passed the online chemical hygiene and safety quiz.

Signature:_____ Date:_____

I have completed the X-Ray Safety: Analytical/Industrial (Req. #361c) offered by the Radiation Protection Office of EHS.

Signature:_____ Date:_____