

Name and Code Number: _____
(please print)

**University of Minnesota
Institute of Technology Characterization Facility
Confocal Raman Microscope Laser Safety Review**

Laser Safety

The following information is an application of basic laser safety to the situations encountered in our Confocal Raman Microscope lab. A familiarity with the fundamental laser concepts presented in the University safety training films and the **USA Laser Product Regulation 21 CFR 1040.10** (handout during the training) is presupposed.

Sources of Laser

The Raman microscope is currently connected with a class IIIb Argon laser (Omnichrome, CA) with maximum power less than 500mW (operation power less than 50 mW) and wavelength of 457-529 nm.

General Philosophy of Acceptable Laser Exposure

The Raman microscope uses optical fiber to transmit laser beam from the source to the sample and to the detector. Limited laser exposure between the microscope objective and the sample surface (<0.2 mm) is blocked by applying a laser blocking cover for the whole sampling area reinforced in any operation. Our goal is that one should receive **no exposure** during routine operation of the equipment. Even during alignment procedures exposure is to be avoided.

Principles of Laser Exposure Control

There are three aspects of exposure control important in the lab:

1. Equipment is periodically examined by the staff for any damage of the beam path.
2. Sufficient shielding and laser safety goggles are provided so that no exposure occurs during general usage. Placing any part of the body in the pathway of the laser beam is avoided at all times. A beam stopper sealed inside a laser safety box provides an instant block of the laser at the beginning of the beam path.
3. Alignment of the laser is not accessed by the user. It is routinely performed by the experienced staff.

Laboratory Access

Access to the lab is limited to authorized individuals. Users are required to complete safety training including viewing of the following tape:

“Laser Safety Comes to Light”

Also required is a review of our laboratory’s specific policies as outlined in this document. A record of the training sessions will be kept on file.

Laser operation procedure is included in the basic Raman training. The first time of users operation on the instrument will be assisted by the facility staff. This laser safety review will be signed by users after the first session.

Laser Safety Procedures

Users are required to follow the following laser operating procedures under any circumstances.

1. Before entering the Raman room, check the sign on the door to make sure laser is not in use.
2. Knock the door to warn the operator and enter only after the current operator permits. If you are operating the instrument, show the sign “laser in user” on the door, and make sure there’s no laser exposure when allowing others to enter the room.
3. After turning on the laser, make sure the air cooling system is running. Stop using the laser if the cooling system does not work.
4. The wire for the laser stop control can only be plugged (meaning laser is being directed to the microscope objective) after the sample is mounted and the laser block shield is placed on the sampling area. Unplug the wire to stop the laser when exam/change samples, and allow others to enter the room.

5. The protective housing of the laser head is not intended to be removed by the user. Any maintenance or service which requires access to the inside of the laser head should not be performed by users
6. Never look directly into the laser beam, and always wear laser safety glasses when working around the functioning laser.
7. Never remove the protective cap on the eye piece of the microscope and look into the laser beam. Severe eye damage result.
8. Never remove/change any parts of the instrument that are not included in the instrument training. Do not bend/play with the optical fiber or put anything on the fiber. Damage of the optical fiber may cause laser exposure.

Samples

1. Do as much sample preparation as possible before entering the lab. There is no hood, so use solvents sparingly.
2. Samples may remain in the lab only while you are present. Please take them with you when you leave. Don't throw chemicals in the trash!
3. Clean the sample stage and the sample preparation area before you leave.
4. If you are working with anything particularly hazardous, let the lab manager and others working in the lab know.

Emergency Telephone Numbers

In case of an emergency, the following numbers are provided:

University Environmental Health and Safety Protection: 612-626-6002

After hours: 911

Tell them you are in room 29A, Shepherd Labs, give them a brief description of the incident.

General Laboratory Safety

1. No food or beverages in the facility.
2. The laboratory's Chemical Hygiene Plan is on the web page: <http://www.charfac.umn.edu/>.
3. Gas cylinders must be fastened securely.
4. Eye washes are located in rooms 8 and 22b.
5. Fire extinguishers are located in each room.

Enforcement

The facility director is responsible for enforcing the laboratory safety policy. Safety policy infractions will result in the individual being asked to leave the lab for a period of not less than one day. Grievous negligence could lead to permanent removal from the lab.

Acknowledgment of Understanding

I have reviewed and understand the information in the **Confocal Raman Microscope Laser Safety Review**.

Signature of User Date

Signature of Trainer Date