



Facility manager:

Suzy Vitale: 202 478 8918

Secondary Contacts:

Emma Bullock: 202 478 8986

Emergency Information:

Suzy Vitale: 925 451 6098 (cell)

Emma Bullock: 202 361 5649 (cell)

Gary Bors: 202-510-8577

All other emergencies: 911

Purpose:

The focused ion beam (FIB) uses a Xenon plasma ion beam for nano-to-microscale material removal, manipulation, and sample preparation for other characterization techniques such as transmission electron microscopy (TEM) or electron microprobe analysis (EMPA).

All laboratories and facilities on the Broad Branch Rd. campus are controlled areas. Specific training must be completed and documented before working in this laboratory / facility.

Laboratory-specific information:

- Chemicals:
 - A wash bottle of **ethyl alcohol (ethanol)** is kept on the sample preparation workbench. Ethyl alcohol (ethanol) is used for cleaning. Ethyl alcohol (ethanol) is flammable and is hazardous to your health. You must wear gloves when using ethyl alcohol. An MSDS for ethyl alcohol may be found at <http://www.sciencelab.com/msds.php?msdsId=9923955>.
 - A small bottle (30g) of **silver paint** is kept on the sample preparation workbench. Silver paint is used for mounting samples and for providing electrical conductivity to insulating samples. Silver paint is flammable and is hazardous to your health if it should come in contact with your skin. You must wear gloves when applying silver paint to your sample. An MSDS for silver paint may be found at https://www.tedpella.com/SDS_html/16062_16062-15_sds.pdf.
 - A small bottle of **acetone** is stored in the cabinet next to the sample preparation workbench. Acetone is used to extend the life of silver paint in the bottle when it begins to dry out. It also thins silver paint for custom applications. Acetone is flammable and hazardous to your health if it should come in contact with your skin. You must wear gloves when using acetone. An MSDS for acetone may be found at https://www.tedpella.com/SDS_html/16023_sds.pdf.
 - A small container of **Epo-Tek** (30g) is stored in the cabinet next to the sample preparation workbench. Epo-Tek is a conductive adhesive that is used for mounting samples. Epo-Tek is hazardous to your health if it should come in contact with your skin. You must wear gloves when working with Epo-Tek. An MSDS for Epo-Tek may be found at https://www.tedpella.com/SDS_html/16016_Parts_A_B_sds.pdf.
 - **All of the above listed chemicals are extremely hazardous to your health if they should be ingested. No food or beverages are allowed in the FIB lab.**
- Radiation: Upon striking the surface of target materials, an electron beam excites electrons of target atoms and when these electrons de-excite, characteristic X-rays are generated and detected. Users are shielded from the X-rays by the electron microscope housing, which reduces user radiation exposure potential to near background levels. Radiation exposure measurements of SEM's manufactured since the 1970s have shown that they are well



designed, safety interlocked and shielded, and the data assure the radiation safety of individuals near the instruments. If the shielding is removed or damaged the instrument would no longer have vacuum integrity and the electron beam could not be turned on. No personal radiation dosimeter is necessary for FIB use.

- High Voltage: Although the instruments are operated at high voltages (1 to 30 keV), the cabling is well insulated and the instrument well-grounded and protected. There are no unusual electrical hazards. However, as with any piece of electronics, care need to be taken to not trip over electrical cables or spill liquids into the electronics. Beverages may not be brought into the laboratory. Chilled water lines are connected to the high vacuum pump and high voltage electronics of the instrument. Were they to rupture, they could cause danger of major instrument shorting and possible fire. If any signs of major water rupture, shorting or fire are observed during operation of these instruments, the user should immediately contact the facility manager and building maintenance personnel.
- No one, unless specifically authorized to do so by the facility manager or electronics engineer, is to go behind the FIB or touch any of its electronics or vacuum systems.
- Gas Cylinders: Cylinders of nitrogen gas are contained in the laboratories in A-G22B. These are non-flammable and non-toxic. However, the tanks are under high pressure and can explode if subject to severe shock. The tanks and their regulators normally need no adjustment and should not be handled or moved by anyone except the facility manager or another person trained in the safe handling of gas cylinders. The tanks are attached to mountings on the walls by means of straps, to remove the risk of them tipping over.
- Sharps: Scalpels and razor blades are stored in the sample preparation area of A-G22B to aid in cutting and mounting samples for analysis. Care should be taken when handling sharp cutting implements to avoid injury. A sharps disposal container is located within the sample preparation area of A-G22B.
- After Hours Restrictions: Only users fully checked-out on the instrumentation and its safe operation, and appropriately authorized by the facility manager, may operate the FIB after hours or at weekends.
- Training: Individuals may only be trained in the use of the FIB by the facilities manager.
- Fire extinguisher: A fire extinguisher is located just inside the entrance to the FIB lab.

Laboratory User

I agree that I have thoroughly read and understood this laboratory safety document. I have access to this safety information at all times when I am working. I have been trained to be able to identify the hazards to which I may be exposed and to follow the work practices and procedures discussed in this document. I certify that I will conduct my research work safely and that I will be responsible for following stated safety policies.

User Name (Print)

User Signature

Date

Principal Investigator

I certify that the information presented in this safety document is accurate and complete. I agree to comply with all safety procedures and to fully train and supervise all researchers under my direction.

PI Signature

Date