

Fourier Transform Infrared Spectroscopy (FTIR)

Standard Operating Procedure

Lab: ESB 168

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Section 1: Overview

Type of SOP: Process Hazardous Material Hazardous Class of Materials Equipment

Synopsis:

This SOP describes the procedure for safe use of FTIR equipment and warns against any potential danger associated with the way the machine operates.

Section 2: Risk Assessment Summary (Hazards and control measures)

Materials:

Material (name, CAS #, other ID)	Hazards
Liquid Nitrogen	Tissue freezing and severe cryogenic burns of skin Tissue freezing and severe cryogenic burns of eyes

Relevant References for Material Hazards:

<http://www.nwmissouri.edu/naturalsciences/sds/n/Nitrogen%20liquid.pdf>

Equipment Hazards:

N/A

Hazardous Conditions:

Exposure to liquid nitrogen either to skin or eyes

Technique Hazards:

Pouring liquid nitrogen into the IR detector: Spilled liquid nitrogen can be hazardous to skin or eyes.

DO NOT stare into the optics compartment or play around with the beam path as it may cause permanent damage to your eyes.

Personal Protective Equipment

Safety eyewear
Nitrile gloves

Engineering Controls

N/A

Section 3: Procedures

- 1) All the users have to be trained by one of the superusers before using the equipment. Do not use the equipment if you are not trained.
- 2) Decide which light source (W nIR source or Globar mIR source), beam splitter, detector and microscope lens to use. Make sure there is no solvent bottles or liquid around the equipment since calcium fluoride lens is sensitive to humidity.
- 3) Cool down the IR detector on microscope with liquid nitrogen if collecting data in IR regime. Be safe while getting liquid nitrogen and pouring into the hole (using a funnel) and make sure you wear safety glasses and gloves. Wait around 15 minutes for complete cooldown.
- 4) Open the OPUS software. There should be a green dot at the right bottom of the software. If it is red, that indicates an error. Please let the superusers know and do not proceed. Choose which detector to use. Choose Measure → Advanced measurement → Basic tab to load the correct .xpm file. Switch to check signal tab to see the interferogram. Measurements would only be done if signal counts is >100. Adjust the knife-edge apertures on the microscope and the Aperture settings in the Optic tab to adjust the signal counts. Press save peak position before taking reference measurements.

- 5) Depending on reflection or transmission measurement, make sure correct buttons are active on the microscope. Switch to the desired objective lens. Use an appropriate reference and adjust the focus by adjusting the z position of the lens while in ocular viewing mode. Go back to measurement mode by pressing the waveform button on the microscope. Select the aperture from the microscope.
- 6) Run a background scan from the software by pressing “Background Single Channel” when the reference is on the stage. Afterwards, place your sample, adjust the focus and take the measurement by pressing “Sample Single Channel”.

Section 4: Waste Disposal/Cleanup

The samples and glass slides should be disposed off in your own labs as per the DRS requirements. DO NOT leave any samples, tweezers or your personal reference mirrors anywhere near the equipment.

Section 5: Emergency Response

Skin contact: Remove any clothing that may restrict circulation to frozen area. Do not rub frozen parts as tissue damage may result. As soon as practical, place the affected area in a warm water bath which has a temperature not exceeding 105 °F.

Eye contact: In case of splash contamination, immediately flush eyes with water for at least 15 minutes.

Section 6: Additional Information

Advice:

Get rid of the excess liquid nitrogen to avoid any spills and potential contact.

Checklist:

- Read (Material) Safety Data Sheets.
- Decide whether liquid nitrogen is needed for the experiment

