Expanding FTIR Capabilities at SNOLAB: Building a Chemical and Materials Spectral Database

Utilizing FTIR Spectroscopy for Accurate Material Verification and Contamination Control at SNOLAB

Cameron Van Der Zyl

Analytical Chemistry Program Research Assistant

Why FTIR at SNOLAB?

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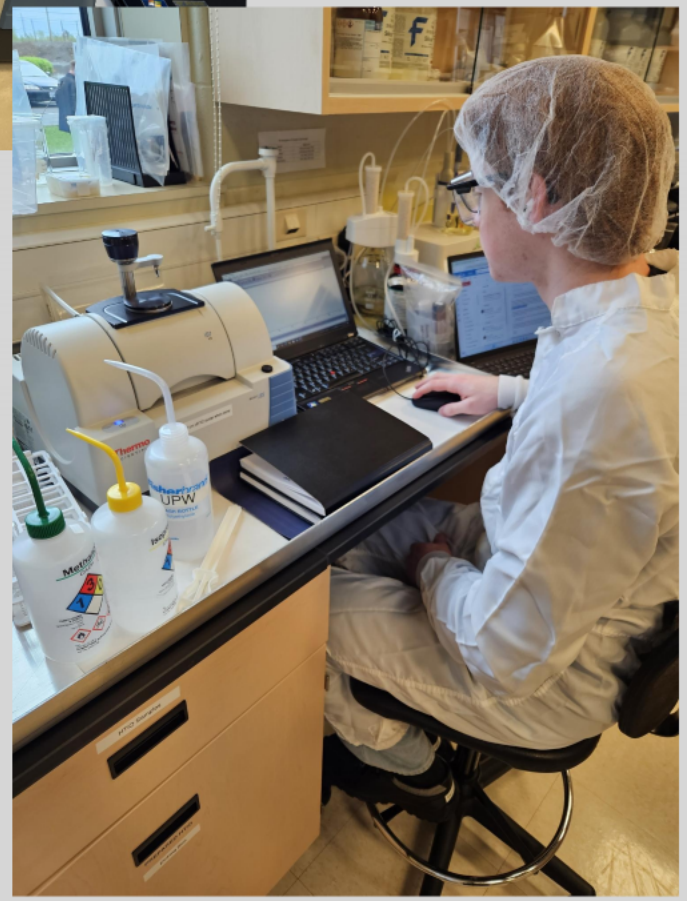


The Environment at SNOLAB

- Ultra-clean, low-background sceince requires strict contamination control

-Need fast, accurate material verification

- FTIR = rapid, non-destructive, versatile

- Previously underused at SNOLAB

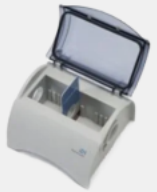
- My project: Unlock full potential + building spectral library

A Quick Primer on FTIR

FTIR Basics

What it does:

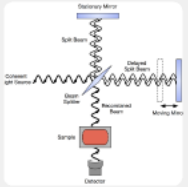
- Identifies chemical bonds via IR absorption
- Each substance has a unique spectrum ("finger print")

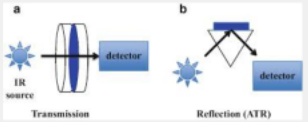


How it works:

-ATR: IR reflects through crystal, measures surface layers

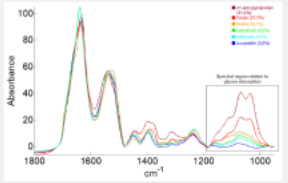
-Transmission: IR passes through thin sample (less common at SNOLAB)





What Spectra Show

- X - axis = wavenumber (1/cm)
- Y - axis = Absorbance/Transmittance (But not limited)
- Peaks = Specific molecular vibrations (Functional Groups)
- Match to reference to ID materials/contaminants



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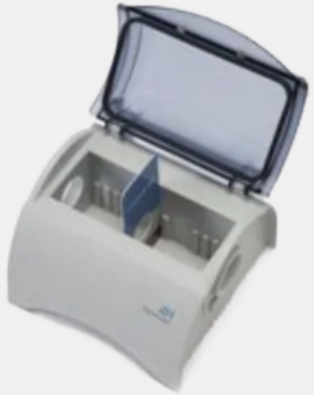

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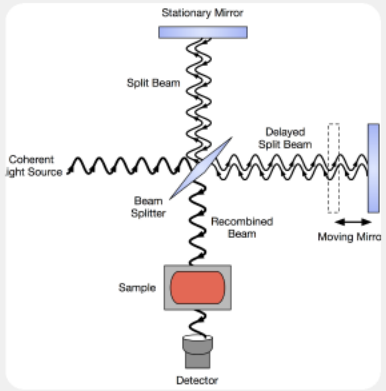

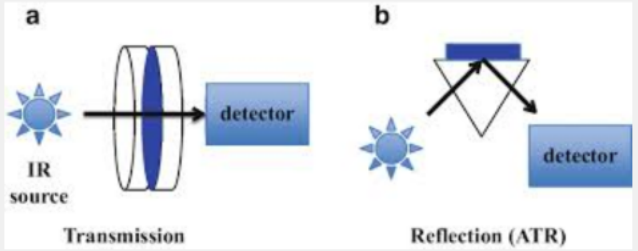

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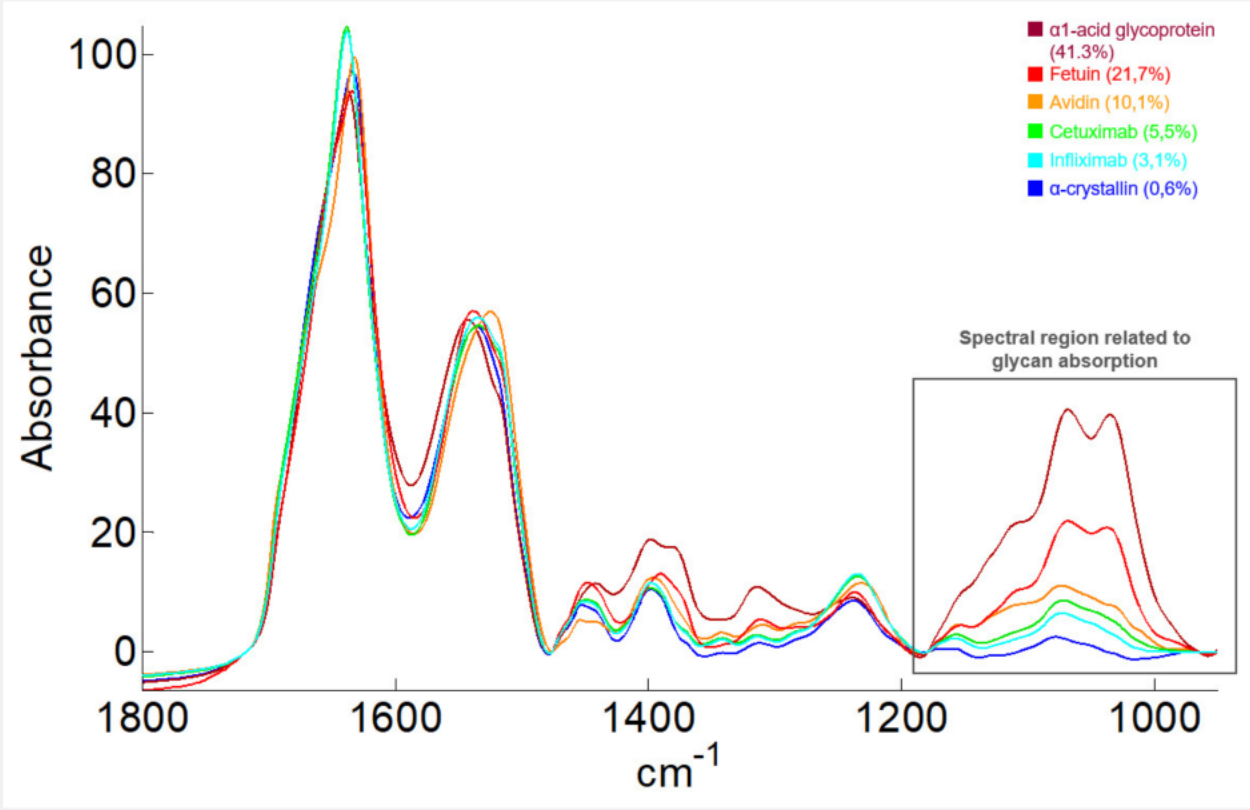


Project Overview: Building a Spectral Reference Library

Creating a comprehensive spectral reference library is crucial for effective material verification at SNOLAB.

Learning Phase

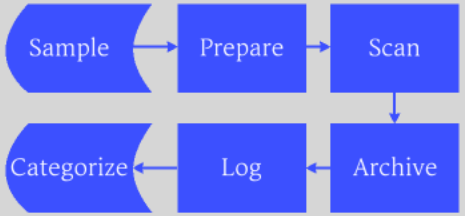
- Mastered FTIR and OMNIC software
- Developed consistent scan parameters & cleaning SOP

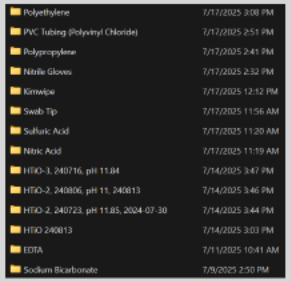
What I needed to learn

- Instrument capabilities
- OMNIC tools
- Background scanning
- Scan setting
- Sample contact/ATR cleaning

Library Build

- Scanned high-priority chemicals, materials, common contaminants
- Created structured folders + metadata system





Automation

- Python tool for functional group recognition

```
import numpy as np

def assign_functional_groups(wavenumber, shape, absorbance):
    matches = []
    partial_matches = []
    shape = shape.lower()
    for fg, wn_min, wn_max, shapes, min_abs, max_abs in FUNCTIONAL_GROUPS:
        # Properly handle None for wn_min/wn_max
        if wn_min is not None and wn_max is not None:
            wn_match = wn_min <= wavenumber <= wn_max
        else:
            wn_match = False
        shape_match = shape in shapes or 'variable' in shapes
        absorbance_match = min_abs <= absorbance <= max_abs
        if wn_match and shape_match and absorbance_match:
            matches.append(fg)
        elif wn_match and shape_match:
            partial_matches.append(fg)
    return matches, partial_matches

#Strong absorbance is > 0.55
#Medium absorbance is > 0.15 but < 0.54
#Weak absorbance is > 0.00 but < 0.14

def main():
    try:
        n = int(input("How many peaks are being a
    except ValueError:
```

```
How many peaks are being analyzed? 3
Please enter the wavenumber (cm^-1), shape (sharp/broad), and absorbance (numeric) for each peak.

Peak 1:
  Wavenumber (cm^-1): 1690
  Shape (sharp, broad, etc): sharp
  Absorbance (numeric): 0.5

Peak 2:
  Wavenumber (cm^-1): 3650
  Shape (sharp, broad, etc): broad
  Absorbance (numeric): 0.3

Peak 3:
  Wavenumber (cm^-1): 2555
  Shape (sharp, broad, etc): sharp
  Absorbance (numeric): 0.7

Peak Assignments with Shape/Absorbance Narrowing:

Peak at 1690.0 cm^-1 (sharp, absorbance=0.5):
  Most likely functional groups:
    - Alkenes | Trisubstituted
    - Alkenes | Conjugated
    - Mononuclear Aromatics | C=C Ring Stretch
    - Ketones | Enol of 1,3-Diketone
    - Ketones | α - Hydroxy Aryl Ketone
    - Carboxylic Acids | Carboxylate Ion

Peak at 3650.0 cm^-1 (broad, absorbance=0.3):
  No matching functional group found.

Peak at 2555.0 cm^-1 (sharp, absorbance=0.7):
  Most likely functional groups:
    - Carboxylic Acids | Dimer
    - Amines | Ammonium Ion
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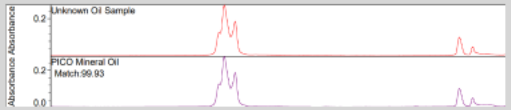
Impact Assessment

- Faster, more consistent material verification with more accurance and consistency



	Index	Match	Compound Name
1	71	99.93	PICO Mineral Oil
2	32	92.36	POLY(ETHYLENE:PROPYLENE:DIENE)
3	637	91.93	Poly(ethylene:propylene:ethylidenenorbornene)
4	629	91.30	Poly(ethylene:propylene:ethylidenenorbornene)
5	252	88.72	Ethylene/propylene/diene terpolymer
6	107	87.43	Mineral oil
7	628	87.28	Poly(ethylene:propylene:diene)
8	758	87.26	Thermoplastic elastomer
9	1	87.11	TRIACONTANE, 99%
10	39	86.98	POLY(ETHYLENE:PROPYLENE)

CONCLUSION

Based on FTIR-ATR analysis, the unknown liquid sample from the PICO detector is conclusively identified as PICO's standard Mineral Oil, with a spectral similarity of 99.93%. There is no evidence of chemical deviation or contamination. The leak likely originated from the existing oil system used in the detector.

Note** a similarity of 100% is generally not attainable as factors as minimal as CO2 and H2O content in the air can cause deviations in spectral readings

Learning Phase

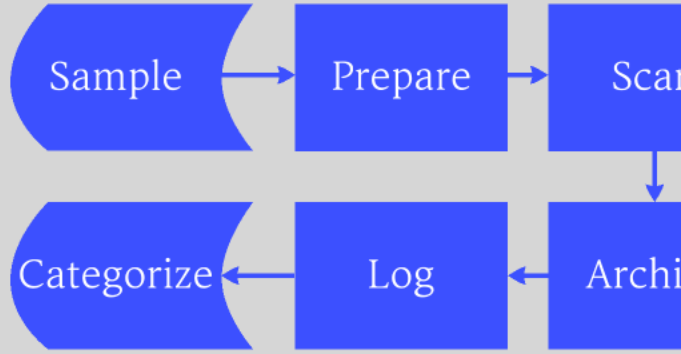
- Mastered FTIR and OMNIC software
- Developed consistent scan parameters & cleaning SOP

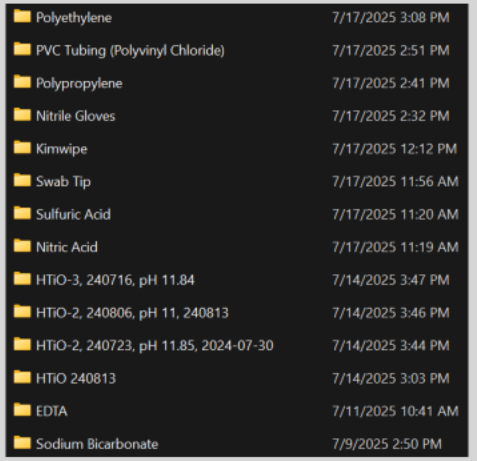
What I needed to learn

- ★Instrument capabilities
- ★OMNIC tools
- ★Background scanning
- ★Scan setting
- ★Sample contact/ATR cleaning

Library Build

- Scanned high-priority chemica materials, common contaminant
- Created structured folders + metadata system





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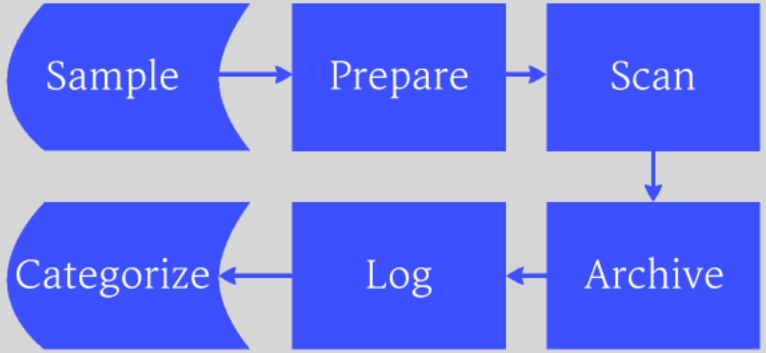

Polyethylene	7/17/2025 3:08 PM
PVC Tubing (Polyvinyl Chloride)	7/17/2025 2:51 PM
Polypropylene	7/17/2025 2:41 PM
Nitrile Gloves	7/17/2025 2:32 PM
Kimwipe	7/17/2025 12:12 PM
Swab Tip	7/17/2025 11:56 AM
Sulfuric Acid	7/17/2025 11:20 AM
Nitric Acid	7/17/2025 11:19 AM
HTiO-3, 240716, pH 11.84	7/14/2025 3:47 PM
HTiO-2, 240806, pH 11, 240813	7/14/2025 3:46 PM
HTiO-2, 240723, pH 11.85, 2024-07-30	7/14/2025 3:44 PM
HTiO 240813	7/14/2025 3:03 PM
EDTA	7/11/2025 10:41 AM
Sodium Bicarbonate	7/9/2025 2:50 PM

Automation

- Python tool for functional group reco

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import numpy as np

def assign_functional_groups(wavenumber, shape, absorbance):
    matches = []
    partial_matches = []
    shape = shape.lower()
    for fg, wn_min, wn_max, shapes, min_abs, max_abs in FUNCTIONAL_GROUPS:
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        shape_match = shape in shapes or 'variable' in shapes
        absorbance_match = min_abs <= absorbance <= max_abs
        if wn_match and shape_match and absorbance_match:
            matches.append(fg)
        elif wn_match and shape_match:
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#Strong absorbance is > 0.55
#Medium absorbance is > 0.15 but < 0.54
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    try:
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```

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# MONONUCLEAR AROMATICS $
('Mononuclear Aromatics | C-H Stretch', 3000, 3100, [
('Mononuclear Aromatics | C=C Ring Stretch', 1450, 16
('Mononuclear Aromatics | Benzene Ring Breath', 675,
('Mononuclear Aromatics | 1,2-Disubstituted', 735, 77
('Mononuclear Aromatics | 1,3-Disubstituted', 800, 86
('Mononuclear Aromatics | 1,4-Disubstituted', 830, 86
('Mononuclear Aromatics | 1,2,4-Trisubstituted', 750,
('Mononuclear Aromatics | 1,2,3-Trisubstituted', 730,
('Mononuclear Aromatics | 1,3,5-Trisubstituted', 820,

# ALCOHOLS AND PHENOLS $
('Alcohols and Phenols | Free OH', 3450, 3700, ['shar
('Alcohols and Phenols | Intramolecular Bonded (weak)
('Alcohols and Phenols | Intramolecular Bonded (stron
('Alcohols and Phenols | Intermolecular Bonded', 3100
('Alcohols and Phenols | Saturated Tert.', 1075, 1250

# ACETALS $
('Acetals | Ketals', 1020, 1180, ['sharp'], 0.55, 14.

# ETHERS $
```

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Please enter the wavenumber (cm^-1), shape (sharp/broad), and absorbance (numeric) for each peak.

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  Absorbance (numeric):  0.5

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Peak Assignments with Shape/Absorbance Narrowing:
```

```
Peak Assignments with Sha

Peak at 1600.0 cm^-1 (sha
  Most likely functional
    - Alkenes | Trisubstit
    - Alkenes | Conjugate
    - Mononuclear Aromatic
    - Ketones | Enol of 1,
    - Ketones | α - Hydrox
    - Carboxylic Acids |

Peak at 3650.0 cm^-1 (bro
  No matching functional

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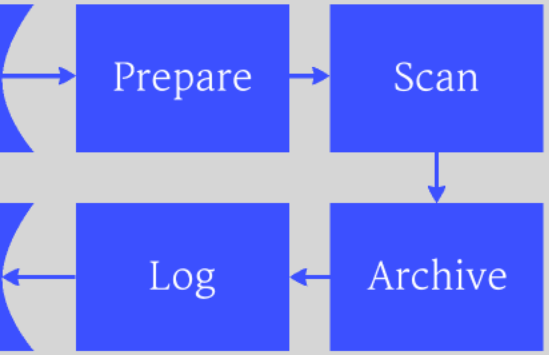

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('Mononuclear Aromatics | Benzene Ring Breath', 675, 900, ['sharp'], 0.1, 0.6),
('Mononuclear Aromatics | 1,2-Disubstituted', 735, 770, ['sharp'], 0.1, 0.5),
('Mononuclear Aromatics | 1,3-Disubstituted', 800, 860, ['sharp'], 0.1, 0.5),
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('Mononuclear Aromatics | 1,2,3-Trisubstituted', 730, 800, ['sharp'], 0.1, 0.6),
('Mononuclear Aromatics | 1,3,5-Trisubstituted', 820, 860, ['sharp'], 0.1, 0.6),

# ALCOHOLS AND PHENOLS $
('Alcohols and Phenols | Free OH', 3450, 3700, ['sharp'], 0.15, 0.54),
('Alcohols and Phenols | Intramolecular Bonded (weak)', 3509, 3704, ['sharp'], 0.15, 0.54),
('Alcohols and Phenols | Intramolecular Bonded (strong)', 2700, 3200, ['broad'], 0.55, 14.0),
('Alcohols and Phenols | Intermolecular Bonded', 3100, 3500, ['broad'], 0.54, 14.0),
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Peak Assignments with Shape/Absorbance Narrowing:
```

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Peak Assignments with Shape/Absorbance Narrowing:

Peak at 1600.0 cm^-1 (sharp, absorbance=0.5):
  Most likely functional groups:
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    - Alkenes | Conjugated
    - Mononuclear Aromatics | C=C Ring Stretch
    - Ketones | Enol of 1,3-Diketone
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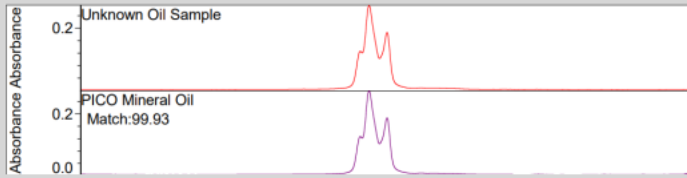

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Peak Assignments with Shape/Absorbance Narrowing:

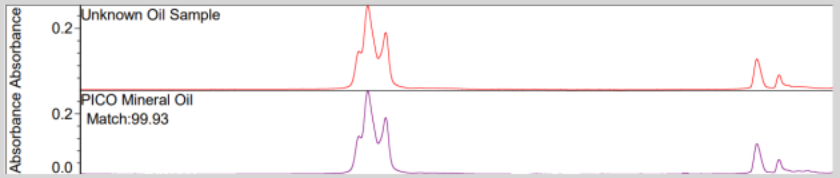
Peak at 1600.0 cm^-1 (sharp, absorbance=0.5):
  Most likely functional groups:
   - Alkenes | Trisubstituted
   - Alkenes | Conjugated
   - Mononuclear Aromatics | C=C Ring Stretch
   - Ketones | Enol of 1,3-Diketone
   - Ketones | α - Hydroxy Aryl Ketone
   - Carboxylic Acids | Carboxylate Ion

Peak at 3650.0 cm^-1 (broad, absorbance=0.3):
  No matching functional group found.

Peak at 2555.0 cm^-1 (sharp, absorbance=0.7):
  Most likely functional groups:
   - Carboxylic Acids | Dimer
   - Amines | Ammonium Ion
```

Impact Assessment

- Faster, more consistent material verification with more accurance and consistency



	Index	Match	Compound Name
1	71	99.93	PICO Mineral Oil
2	32	92.36	POLY(ETHYLENE:PROPYLENE:DIENE)
3	637	91.93	Poly(ethylene:propylene:ethylidenenorbornene)
4	629	91.30	Poly(ethylene:propylene:ethylidenenorbornene)
5	252	88.72	Ethylene/propylene/diene terpolymer
6	107	87.43	Mineral oil
7	628	87.28	Poly(ethylene:propylene:diene)
8	758	87.26	Thermoplastic elastomer
9	1	87.11	TRIACONTANE, 99%
10	39	86.98	POLY(ETHYLENE:PROPYLENE)

CONCLUSION

Based on FTIR-ATR analysis, the unknown liquid sample from the PICO detector is conclusively identified as PICO's standard Mineral Oil, with a spectral similarity of 99.93%. There is no evidence of chemical deviation or contamination. The leak likely originated from the existing oil system used in the detector.

Note** a similarity of 100% is generally not attainable as factors as minimal as CO2 and H2O content in the air can cause deviations in spectral readings

Project Overview: Building a Spectral Reference Library

Creating a comprehensive spectral reference library is crucial for effective material verification at SNOLAB.

Learning Phase

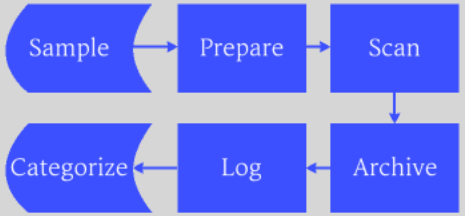
- Mastered FTIR and OMNIC software
- Developed consistent scan parameters & cleaning SOP

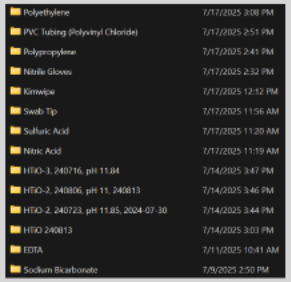
What I needed to learn

- Instrument capabilities
- OMNIC tools
- Background scanning
- Scan setting
- Sample contact/ATR cleaning

Library Build

- Scanned high-priority chemicals, materials, common contaminants
- Created structured folders + metadata system





Automation

- Python tool for functional group recognition

```
import numpy as np

def assign_functional_groups(wavenumber, shape, absorbance):
    matches = []
    partial_matches = []
    shape = shape.lower()
    for fg, wn_min, wn_max, shapes, min_abs, max_abs in FUNCTIONAL_GROUPS:
        # Properly handle None for wn_min/wn_max
        if wn_min is not None and wn_max is not None:
            wn_match = wn_min <= wavenumber <= wn_max
        else:
            wn_match = False
        shape_match = shape in shapes or 'variable' in shapes
        absorbance_match = min_abs <= absorbance <= max_abs
        if wn_match and shape_match and absorbance_match:
            matches.append(fg)
        elif wn_match and shape_match:
            partial_matches.append(fg)
    return matches, partial_matches

#Strong absorbance is > 0.55
#Medium absorbance is > 0.15 but < 0.54
#Weak absorbance is > 0.00 but < 0.14

def main():
    try:
        n = int(input("How many peaks are being a
    except ValueError:
```

```
How many peaks are being analyzed? 3
Please enter the wavenumber (cm^-1), shape (sharp/broad), and absorbance (numeric) for each peak.

Peak 1:
  Wavenumber (cm^-1): 1690
  Shape (sharp, broad, etc): sharp
  Absorbance (numeric): 0.5

Peak 2:
  Wavenumber (cm^-1): 3650
  Shape (sharp, broad, etc): broad
  Absorbance (numeric): 0.3

Peak 3:
  Wavenumber (cm^-1): 2555
  Shape (sharp, broad, etc): sharp
  Absorbance (numeric): 0.7

Peak Assignments with Shape/Absorbance Narrowing:

Peak at 1690.0 cm^-1 (sharp, absorbance=0.5):
  Most likely functional groups:
    - Alkenes | Trisubstituted
    - Alkenes | Conjugated
    - Mononuclear Aromatics | C=C Ring Stretch
    - Ketones | Enol of 1,3-Diketone
    - Ketones | α - Hydroxy Aryl Ketone
    - Carboxylic Acids | Carboxylate Ion

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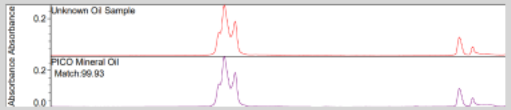

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Future of the SNO-Library(ies)

Library Access

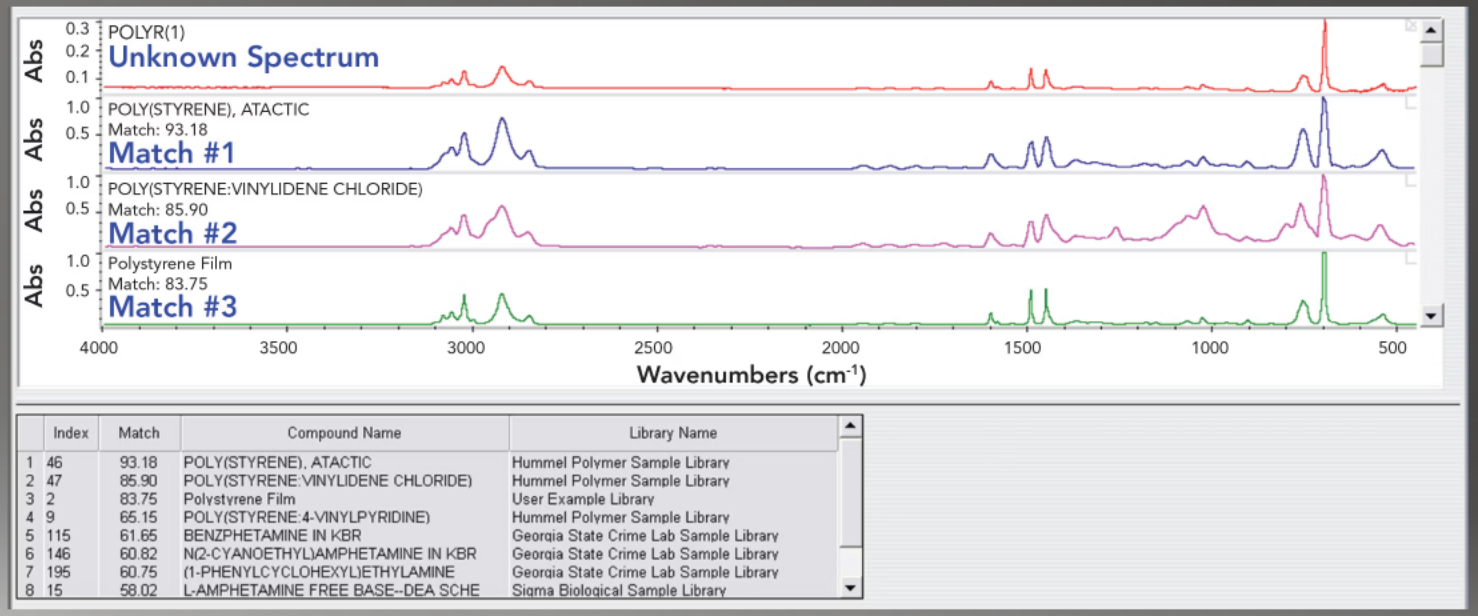
- Access to ~10 libraries
- Made in-lab + externally

Spectra Access

- 100+ spectra scanned in-lab + added to library
-1000+ overall spectra

Future?

- Ability to create new libraries
- Ability to add to current libraries
- International collaboration opportunity???



	Index	Match	Compound Name	Library Name
1	46	93.18	POLY(STYRENE), ATACTIC	Hummel Polymer Sample Library
2	47	85.90	POLY(STYRENE:VINYLIDENE CHLORIDE)	Hummel Polymer Sample Library
3	2	83.75	Polystyrene Film	User Example Library
4	9	65.15	POLY(STYRENE:4-VINYLPYRIDINE)	Hummel Polymer Sample Library
5	115	61.65	BENZPHETAMINE IN KBR	Georgia State Crime Lab Sample Library
6	146	60.82	N(2-CYANOETHYL)AMPHETAMINE IN KBR	Georgia State Crime Lab Sample Library
7	195	60.75	(1-PHENYLCYCLOHEXYL)ETHYLAMINE	Georgia State Crime Lab Sample Library
8	15	58.02	L-AMPHETAMINE FREE BASE--DEA SCHE	Sigma Biological Sample Library

- Thermo Nicolet high quality commercial collections of FT-IR and Raman Spectral Libraries encompassing some 258,000 compounds are available

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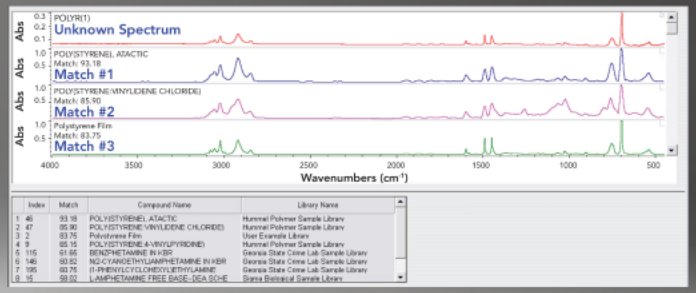
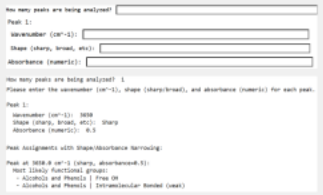


- Thermo Nicolet high quality commercial collections of FT-IR and Raman Spectral Libraries encompassing some 258,000 compounds are available

Automating Functional Group Recognition with Python

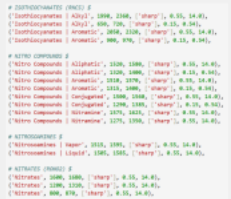
Streamlined Data Analysis

- Input peak wavenumber, shape, absorbance
- Script matches to functional groups
- Flags full and partial matches



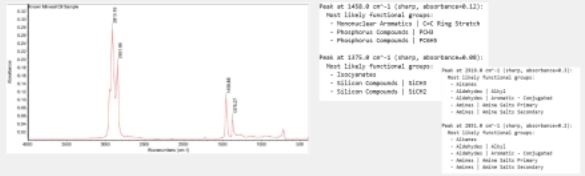
Increased Accessibility

- Simple prompts, no programming skills needed
- Reduces learning curve for FTIR users
- Clear, readable results



Enhanced Efficiency in Research

- Faster unknown identification
- Consistent, reproducible analysis



```python
import numpy as np

def assign_functional_groups(wavenumber, shape, absorbance):
    matches = []
    partial_matches = []
    shape = shape.lower()
    for fg, wn_min, wn_max, shapes, min_abs, max_abs in FUNCTIONAL_GRO
        # Properly handle None for wn_min/wn_max
        if wn_min is not None and wn_max is not None:
            wn_match = wn_min <= wavenumber <= wn_max
        else:
            wn_match = False
        shape_match = shape in shapes or 'variable' in shapes
        absorbance_match = min_abs <= absorbance <= max_abs
        if wn_match and shape_match and absorbance_match:
            matches.append(fg)
        elif wn_match and shape_match:
            partial_matches.append(fg)
    return matches, partial_matches

#Strong absorbance is > 0.55
#Medium absorbance is > 0.15 but < 0.54
#Weak absorbance is > 0.00 but < 0.14

def main():
    try:
        n = int(input("How many peaks are being analyzed? "))
    except ValueError:
        print("Invalid number. Exiting.")
        return

    peaks = []
    print("Please enter the wavenumber (cm^-1), shape (sharp/broad), and
    for i in range(n):
        print(f"\nPeak {i+1}:")
        while True:
            try:
                wn = float(input("  Wavenumber (cm^-1): "))
                break
            except ValueError:
                print("    Please enter a valid number for wavenumber.")
        shape = input("  Shape (sharp, broad, etc): ").strip().lower()
        while True:
            try:
                absorbance = float(input("  Absorbance (numeric): "))
                break
```

Streamlined Data Analysis

- Input peak wavenumber, shape, absorbance
- Flags full and partial matches
- Script matches to functional groups

```
How many peaks are being analyzed?
Peak 1:
  Wavenumber (cm^-1):
  Shape (sharp, broad, etc):
  Absorbance (numeric):
```

```
How many peaks are being analyzed?  1
Please enter the wavenumber (cm^-1), shape (sharp/broad), and absorbance (numeric) for each peak.

Peak 1:
  Wavenumber (cm^-1):  3650
  Shape (sharp, broad, etc):  Sharp
  Absorbance (numeric):  0.5

Peak Assignments with Shape/Absorbance Narrowing:

Peak at 3650.0 cm^-1 (sharp, absorbance=0.5):
  Most likely functional groups:
    - Alcohols and Phenols | Free OH
    - Alcohols and Phenols | Intramolecular Bonded (weak)
```

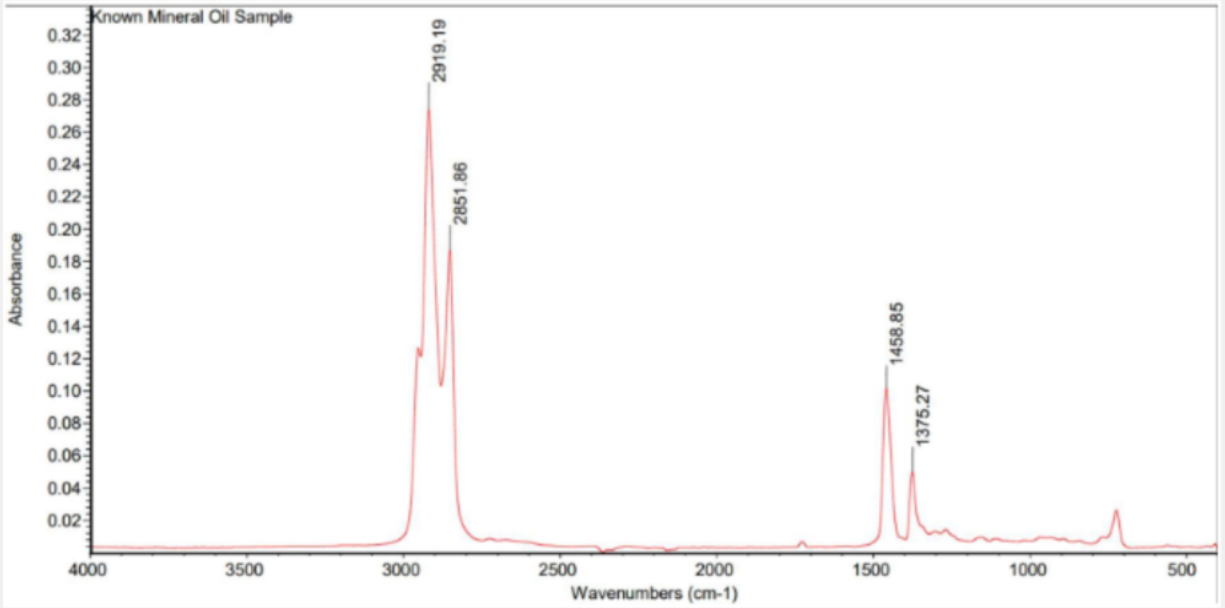
Increased Accessibility

- Simple prompts, no programming skills needed
- Reduces learning curve for FTIR users
- Clear, readable results

```
# ISOTHIOCYANATES (RNCS) $
('Isothiocyanates | Alkyl', 1990, 2360, ['sharp'], 0.55, 14.0),
('Isothiocyanates | Alkyl', 650, 720, ['sharp'], 0.15, 0.54),
('Isothiocyanates | Aromatic', 2050, 2320, ['sharp'], 0.55, 14.0),
('Isothiocyanates | Aromatic', 900, 970, ['sharp'], 0.15, 0.54),

# NITRO COMPOUNDS $
('Nitro Compounds | Aliphatic', 1520, 1580, ['sharp'], 0.55, 14.0),
('Nitro Compounds | Aliphatic', 1320, 1400, ['sharp'], 0.15, 0.54),
('Nitro Compounds | Aromatic', 1510, 1570, ['sharp'], 0.55, 14.0),
('Nitro Compounds | Aromatic', 1315, 1400, ['sharp'], 0.15, 0.54),
('Nitro Compounds | Conjugated', 1500, 1560, ['sharp'], 0.55, 14.0),
('Nitro Compounds | Conjugated', 1290, 1385, ['sharp'], 0.15, 0.54),
('Nitro Compounds | Nitramine', 1575, 1625, ['sharp'], 0.55, 14.0),
('Nitro Compounds | Nitramine', 1275, 1350, ['sharp'], 0.55, 14.0),

# NITROSOAMINES $
('Nitrosoamines | Vapor', 1515, 1595, ['sharp'], 0.55, 14.0),
('Nitrosoamines | Liquid', 1505, 1585, ['sharp'], 0.55, 14.0),

# NITRATES (RONO2) $
('Nitrates', 1600, 1680, ['sharp'], 0.55, 14.0),
('Nitrates', 1200, 1310, ['sharp'], 0.55, 14.0),
('Nitrates', 800, 870, ['sharp'], 0.55, 14.0),
```

Enhanced Efficiency in Research

- Faster unknown identification



- Consistent, reproducible analysis

```
Peak at 1458.0 cm^-1 (sharp, absorbance=0.12):
  Most likely functional groups:
   - Mononuclear Aromatics | C=C Ring Stretch
   - Phosphorus Compounds | PCH3
   - Phosphorus Compounds | PC6H5

Peak at 1375.0 cm^-1 (sharp, absorbance=0.08):
  Most likely functional groups:
   - Isocyanates
   - Silicon Compounds | SiCH3
   - Silicon Compounds | SiCH2
```

```
Peak at 2919.0 cm^-1 (sharp, absorbance=0.3):
  Most likely functional groups:
   - Alkanes
   - Aldehydes | Alkyl
   - Aldehydes | Aromatic - Conjugated
   - Amines | Amine Salts Primary
   - Amines | Amine Salts Secondary

Peak at 2851.0 cm^-1 (sharp, absorbance=0.2):
  Most likely functional groups:
   - Alkanes
   - Aldehydes | Alkyl
   - Aldehydes | Aromatic - Conjugated
   - Amines | Amine Salts Primary
   - Amines | Amine Salts Secondary
```

FTIR's Growing Significance in SNOLAB's Workflows

FTIR's capabilities are now fully realized at SNOLAB, enabling rapid chemical identification, QA/QC assurance, and unknown material analysis with minimal sample prep.
With a growing spectral library and functional group automation, FTIR is becoming a foundational tool across research, operations, and contamination control.

SNOLAB

Sample Date: July 17th 2025
Date of Analysis: July 22nd 2025

Data For: Shane Meister
Email: shane.meister@snolab.ca
Project: PICO
Analyst: Cameron Van Der Zyl

Unknown PICO leak Sample (OSA#2111)

SNOLAB

Sample Date: May 29th 2025
Date of Analysis: May 29th 2025

Data For: Angela Hesketh | Olivia Conrad
Email: ahesketh@snolab.ca | oconrad@snolab.ca
Project: SNOLAB
Analyst: Cameron Van Der Zyl

Particle Counter – Lab A Surface Facility Sampl

SNOLAB

Sample Date: Late May | To surface June 6th 2025
Date of Analysis: June 9th 2025

Data For: Regan Picotte
Email: rpicotte@snolab.ca
Project: CUTE
Analyst: Cameron Van Der Zyl

CUTE Unknown Waste Sample (OSA#2094)

SNOLAB

Sample Date: May 20th 2025
Date of Analysis: May 26th 2025

Data For: Ashley Mathewson
Email: ashley.mathewson@snolab.ca
Project: PICO

PICO Chiller Samples (OSA-2083)

Future Prospects of FTIR at SNOLAB

Exploring advanced applications in material verification and contamination analysis.

Applications

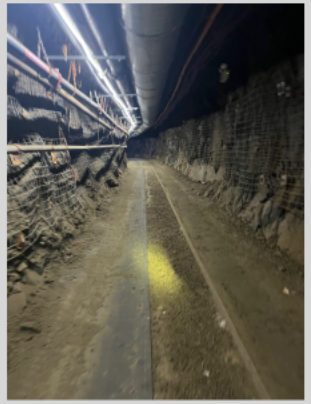
- Fingerprint more materials and reagents

Quantitative use:

- Verify supplier quality
- Degredation of chemicals with time

Enhanced Contamination Forensics

- Build signature database from past incidents



Training

- With the help of intuitive workflows, guided procedures, and the functional group recognition script, new users can be trained faster and with fewer errors.
- This lowers the barrier for entry and empowers researchers, technicians, and students alike to use FTIR as a standard tool in their investigations.

Applications

Enhance

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Enhanced Contamination Forensics

eagents

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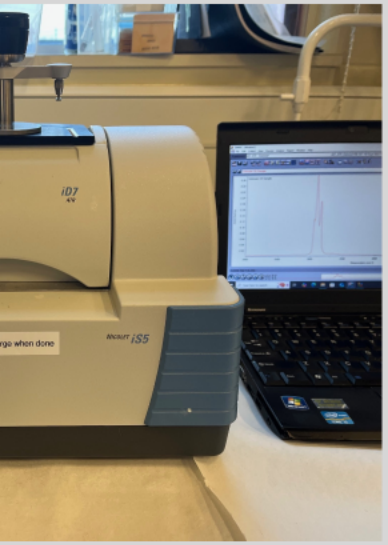

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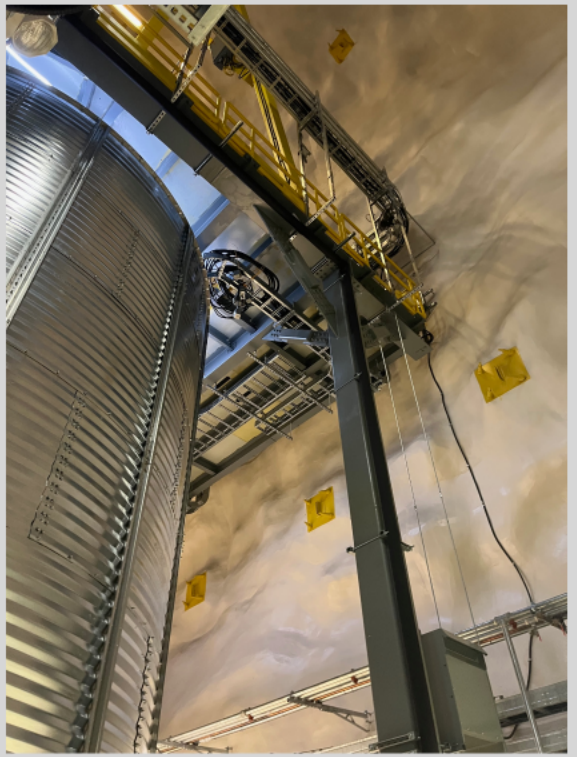

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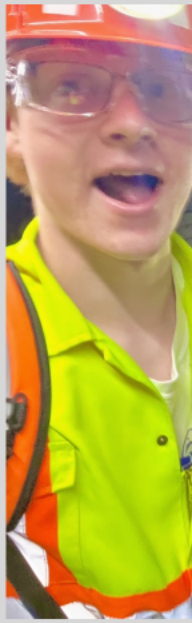

Forensics

incidents

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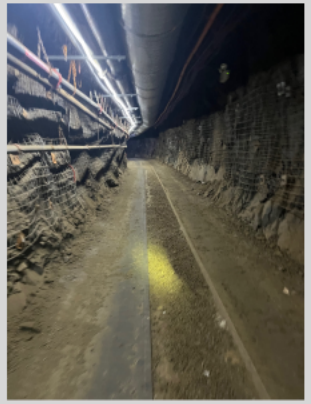

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The Indispensable Role of FTIR in Clean Science

The Indispensable Role of FTIR in Clean Science

FTIR spectroscopy has become a cornerstone in the pursuit of ultra-clean environments at SNOLAB. Its ability to rapidly identify trace-level contaminants, verify materials, and provide non-destructive analysis ensures that cleanliness is not just maintained — it is provable, repeatable, and continuously improvable.

By transforming a previously underutilized tool into a reliable frontline technique, FTIR empowers both research integrity and operational excellence. It bridges the gap between chemistry and contamination control, offering real-time insight where precision matters most.

As SNOLAB continues to push the boundaries of low-background physics, FTIR now stands as a guardian of purity — enabling cleaner science and stronger discoveries.

Applications Inquiry

Curious about how FTIR fits into your research or lab work? Let's talk use cases.

Results Discussion

Want to dive deeper into spectral interpretation or the script's logic? (maybe email me about this or pull me for a chat later on!)

Future Prospects

Interested in where FTIR could go next at SNOLAB or in clean science more broadly?

Q&A Session

Expanding FTIR Capabilities at SNOLAB: Building a Chemical and Materials Spectral Database

Utilizing FTIR Spectroscopy for Accurate Material Verification and Contamination Control at SNOLAB

Cameron Van Der Zyl

Analytical Chemistry Program Research Assistant