Live Demo FTIR Microscope

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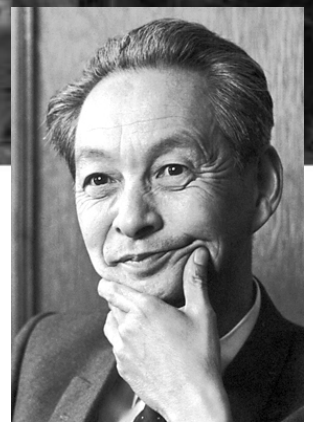
Founding Members

Established 1958 at the Optical Research Institute at Tsukuba University, Tokyo

Founding members include:

- World famous physicist Yoshio Fujioka
- Nobel Prize winner Shinichiro Tomonaga (1965 - Physics for QED with Richard Feynman)

JASCO in the USA, first incorporated in 1972.



Dr. Tomonaga

JASCO: Our Products

Live Demonstration Overview

What is an FTIR Microscope?

- JASCO FTIR Microscopes
  - IRT – 5200 with single detector (LN2 cooled MCT or DLaTGS)
  - IRT – 7200 with16 element linear array (LN2 cooled MCT or InGaAs)
- Measurement Examples
  - **Reflectance** (ink on a golden mirror)
  - **Attenuated Total Reflectance** (Multilayered polymer)
    - IQ Mapping™ – for static mapping with ATR (transmittance and reflectance)
    - ClearView™ Observe and measure through ATR
  - **Transmittance** (multilayered sample)

IRT-5200 IR Microscope

- Used with FT/IR-4000 and 6000 spectrometers
- ‘Static’ mapping analysis with IQ Mapping™ using a manual stage
- Automatic XYZ stage for high speed mapping
- Mid-band MCT detector – standard.
  - (Options for DLATGS, InSb, InGaAs)
- Up to 2 detectors can be installed.
- Single-element detectors can be easily exchange by the user.
- Up to 4 objectives on automatic carousel (with auto-recognition)

IRT-5000

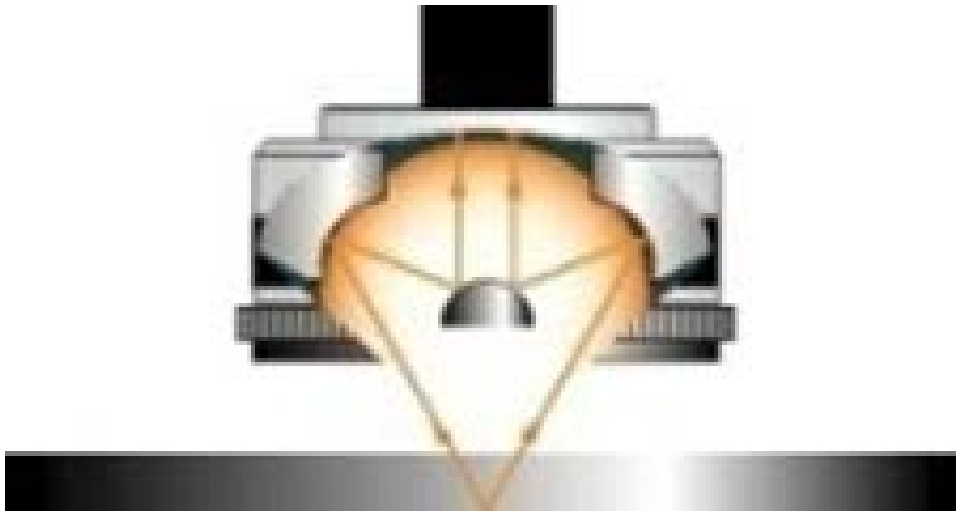
IRT-7200 Linear Array IR Microscope

- Used with FT/IR-4000/6000 products (rapid-scan required for IR Imaging)
- Linear array and single-element detectors (standard)
- User exchangeable single-element detector
- Up to 4 objectives on automatic carousel (with auto-recognition)
- High-performance Spectra Manager™ Imaging Suite with easy-to-use graphical user interface
- In addition to the mapping capability of the IRT-5000, IR Imaging and ATR imaging with IQ Mapping function
- Mapping, Imaging and ATR Imaging of wide area with automated XYZ stage
- Dynamic Imaging with FTIR step-scan (option)
- Multivariate analysis MCR, PCA (Principal Component Analysis) software (standard)

IRT-7000

Cassegrain Reflectance Optics

Collimated IR beam

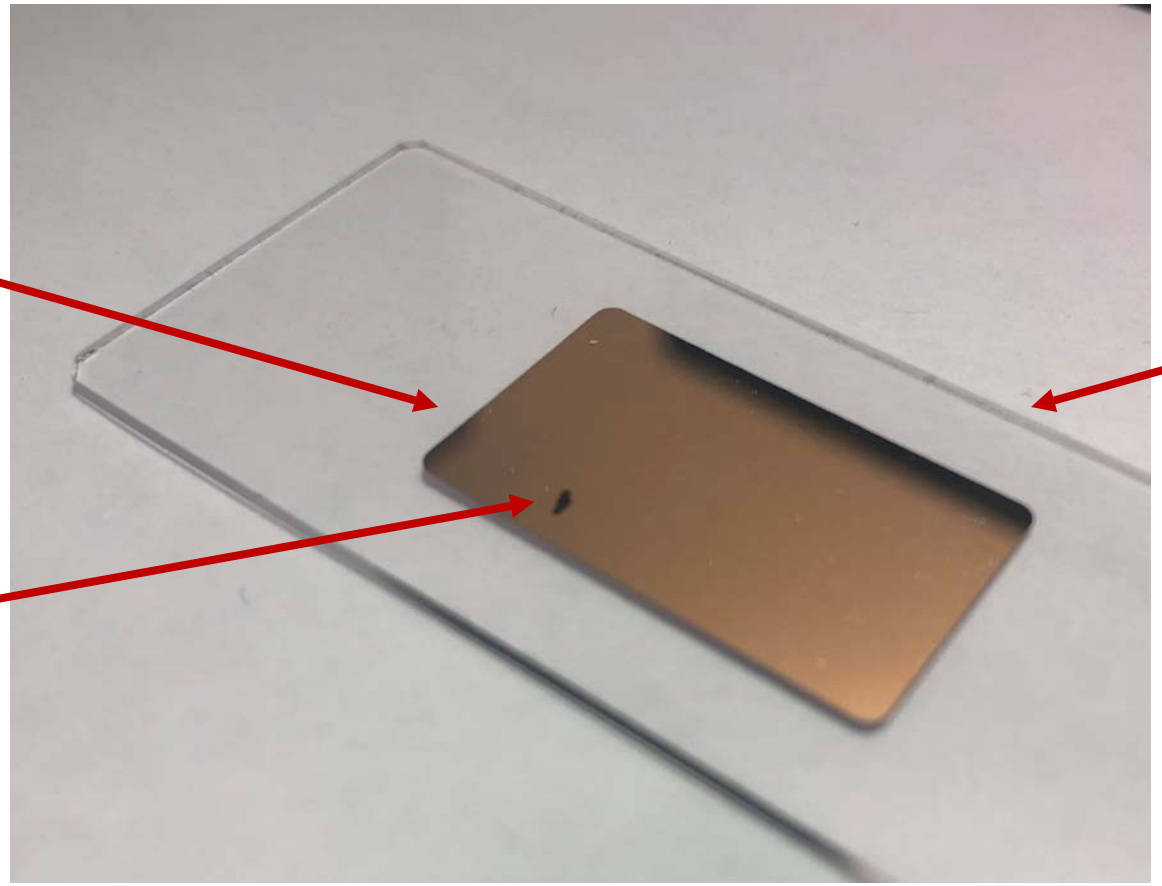


Cassegrain reflective optics provides high magnification with minimal distortion or aberration.

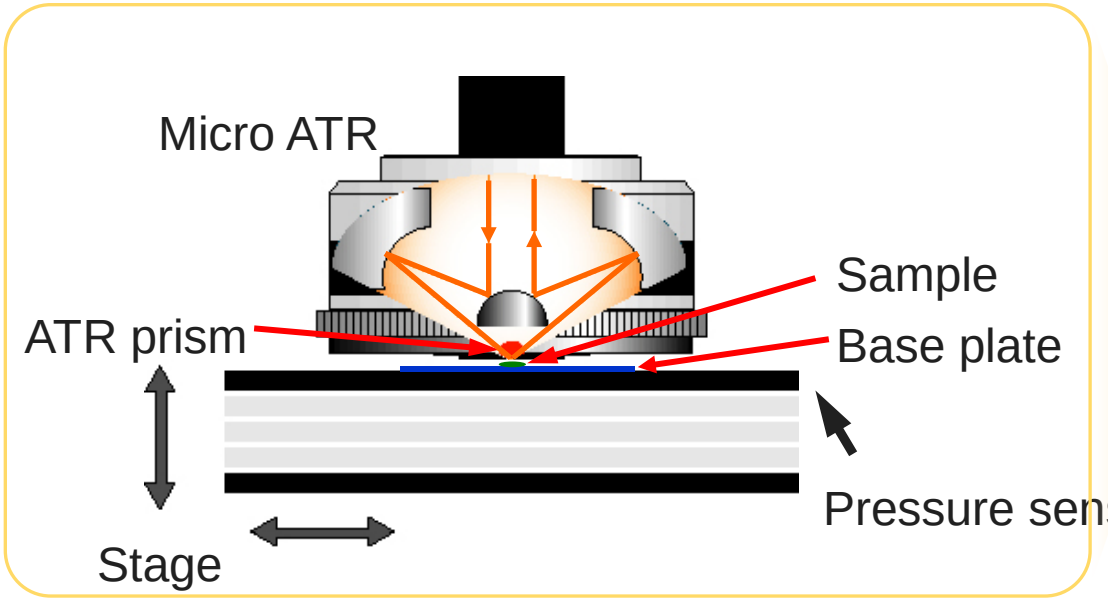
The optical system produces a focal plane, with the dimensions controlled by adjustable knife-edge slits.

In reflectance mode, the same objective Cassegrain is used to bring the beam to the sample, and return the reflected light to the detector.

Reflectance Measurement – Sample



FTIR Microscope Using ATR



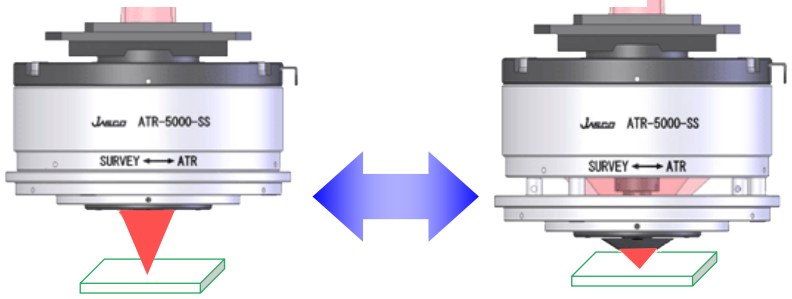
FT/IR-4700 + IRT-5200

Features of JASCO ATR microscope

- **μm spatial resolution (min. 2.2μm – limited by diffraction limit)**
- IQ Imaging without contamination or damage to samples (unique to JASCO)
- Prism contact with pressure control

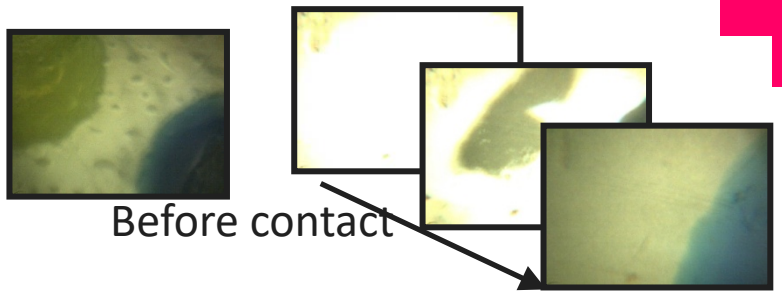
ATR Observation Type (View Through ATR)

<ClearView™ ATR>



Viewing mode

ATR mode

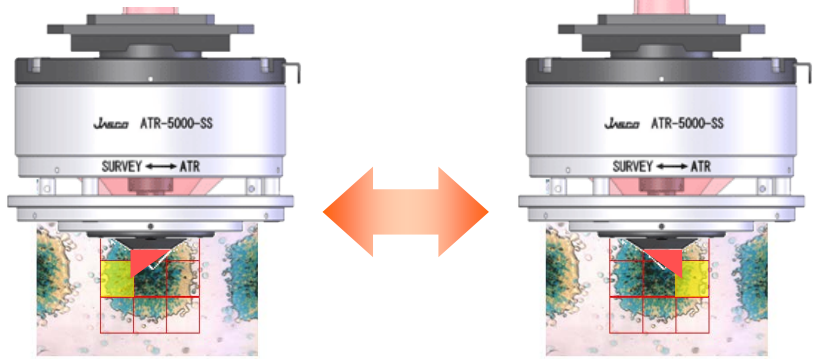


Before contact

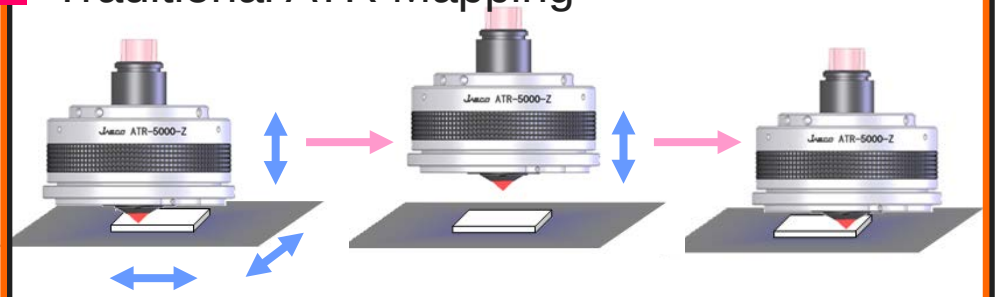
After contact

Sample can be observed after contact with ATR crystal

<IQ Mapping>



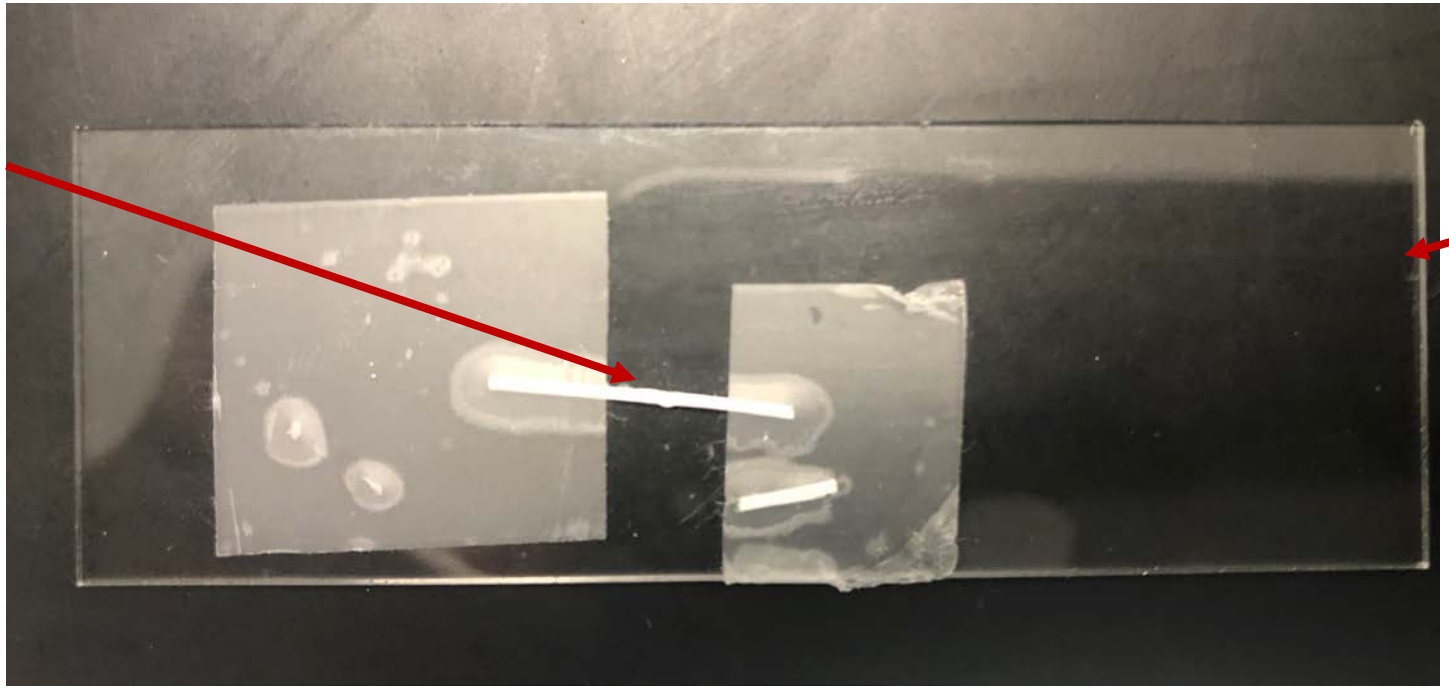
Traditional ATR Mapping



Multiple point imaging measurement can be made through the ATR crystal in a fixed position (up to 180μm x 180μm with WG type)

ATR Measurement - Sample

Multilayered polymer sliced



Microscope glass slide

Cassegrain Transmittance Optics

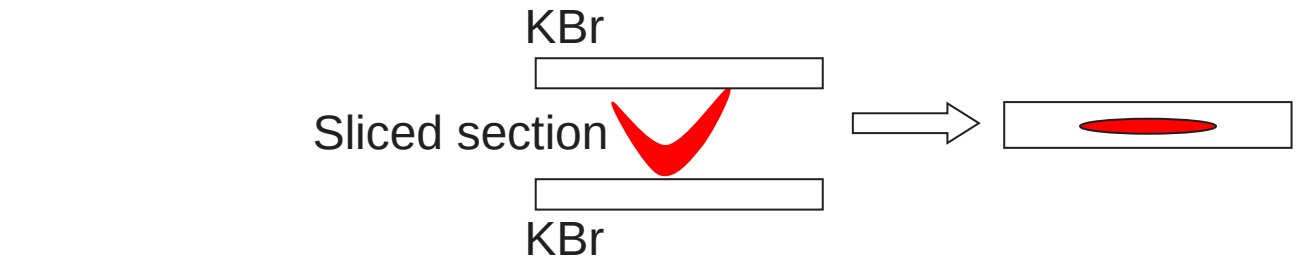
Two Cassegrain's are used together, one to condense, the other to ‘de-magnify’ the infrared light after it passes through the sample.

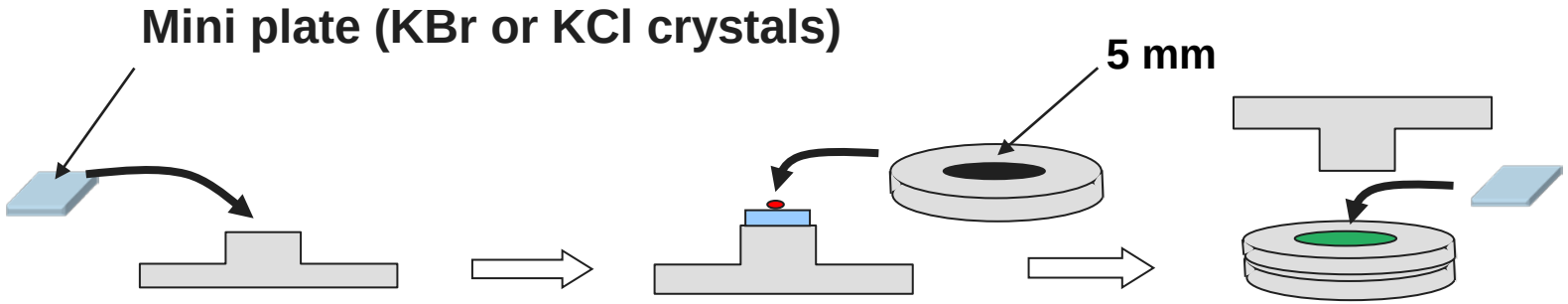
The magnification and focal planes of the two Cassegrain's are matched to examine the sample in transmittance.

SliceMaster™
IR Transmittance Sample Preparation

Sample is a laminated multi layer packaging material

Model HW-1 Multi-Angle Slicer





Place mini plate on pellet press.

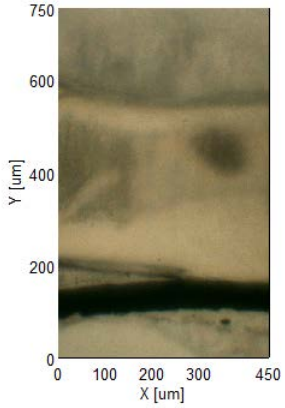
Place the sample on the plate and then cover with the pellet ring.

Cover with another mini pellet.

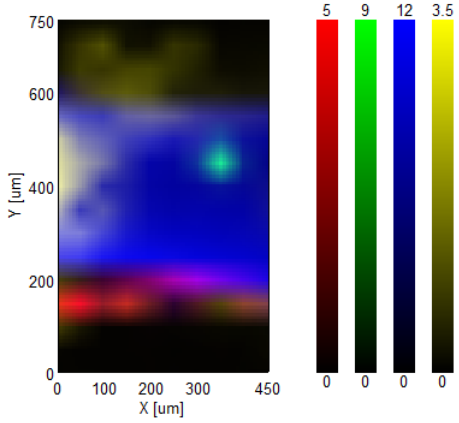
Imaging Maps Using Multivariate Curve Resolution

The cross section of multilayer films were measured by microscopic FTIR.
When MCR was performed, it turned out that it consists of four components of protein, PVC, polyester, and polyethylene.

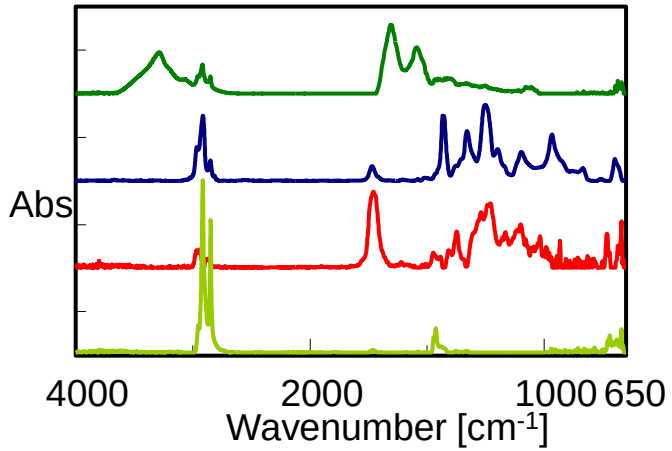
Imaging analysis results of multilayer film by MCR



Observation image



Chemical image (Green: Protein, Blue: PVC, Red: Polyester, Yellow: Polyethylene)



Principal component spectrum (Offset display)

Principal component A
⇒ Protein

Principal component B
⇒ PVC

Principal component C
⇒ Polyester

Principal component D
⇒ Polyethylene