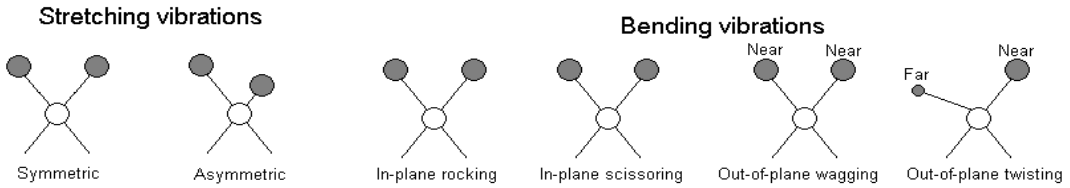
Infrared Vibrational Microspectroscopy

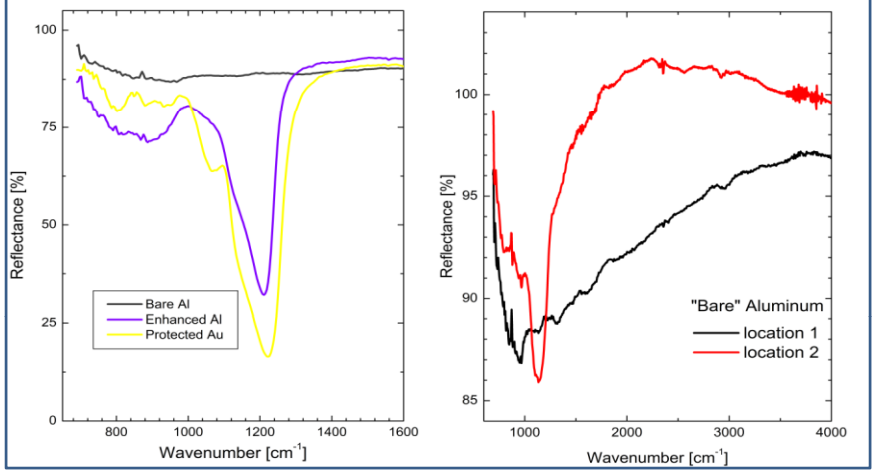
Vibrational IR spectroscopy from <100 cm^{-1} to >5000 cm^{-1}

- molecules have characteristic vibrational frequencies
- sensitive to molecular composition, bonding, structure



- Allows many techniques (transmission, reflection, microscopy)
- Grazing Incidence for sensing molecules at metal surfaces

grazing incidence microscopy spectra of thin oxide layers on aluminum and gold



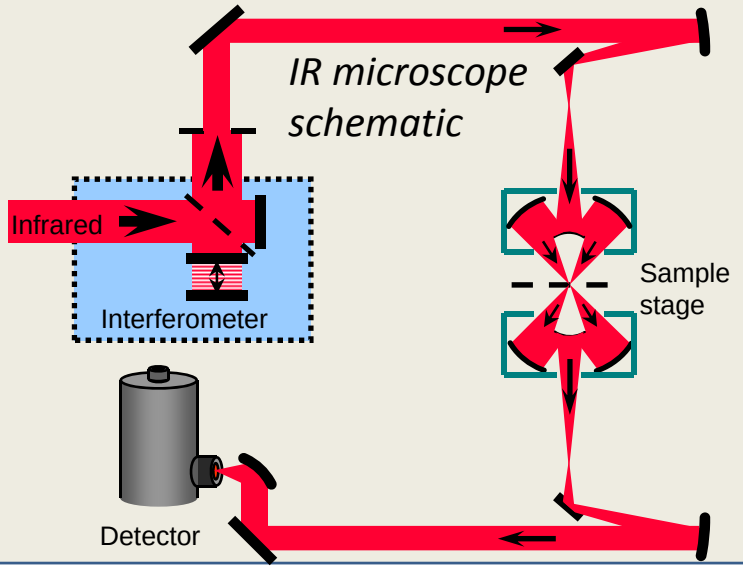
High-brightness infrared synchrotron source

- up to 3 orders of magnitude higher brightness than thermal source
- excellent signal-to-noise when focused to diffraction limit (~λ)
- full spectral coverage from THz through visible
- well-suited to microspectroscopy and low-throughput techniques (e.g. grazing incidence)

NSLS operates several infrared beamlines

- many with microspectrometer systems

IR microscope schematic



NSLS Infrared Microspectrometer Systems

Beamlines with IR microspectrometers

U2A (ultra high-pressure diamond cells)

U2B (mid-IR w/UV fluorescence)

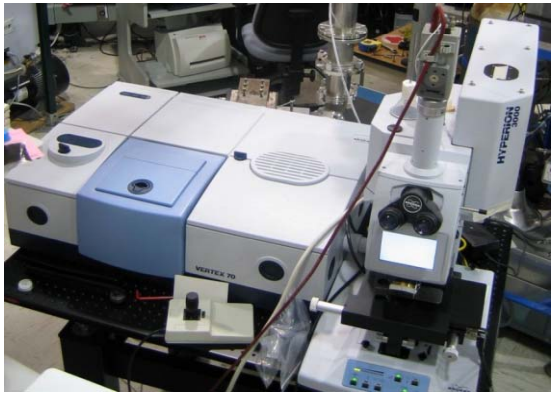
U10 (full-field imaging with FPA detector)

U12IR (far-IR & THz microspectroscopy

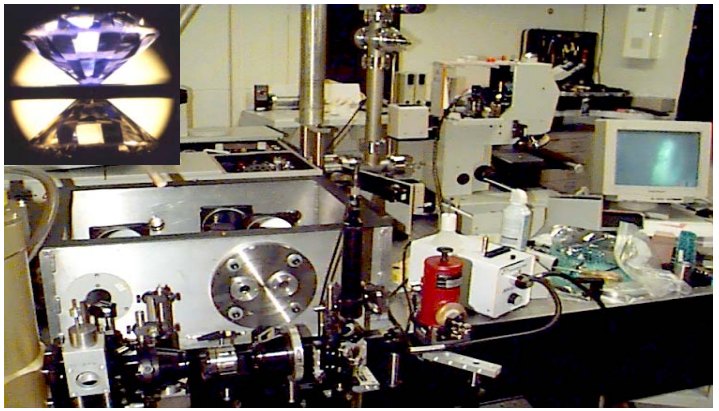
- *can be used for transmission or reflection including grazing incidence*
- *most have scanning stage for mapping*

U2B: Microspectrometer w/UV fluorescence

U10B: Imaging microspectrometer



U2A: Microspectrometer for extreme pressures



U12IR: Far-IR / THz microspectrometer

contacts:

L. Carr	U12IR	carr@bnl.gov
L. Miller	U2B & U10	lmiller@bnl.gov
Z. Liu	U2A	zxliu@bnl.gov