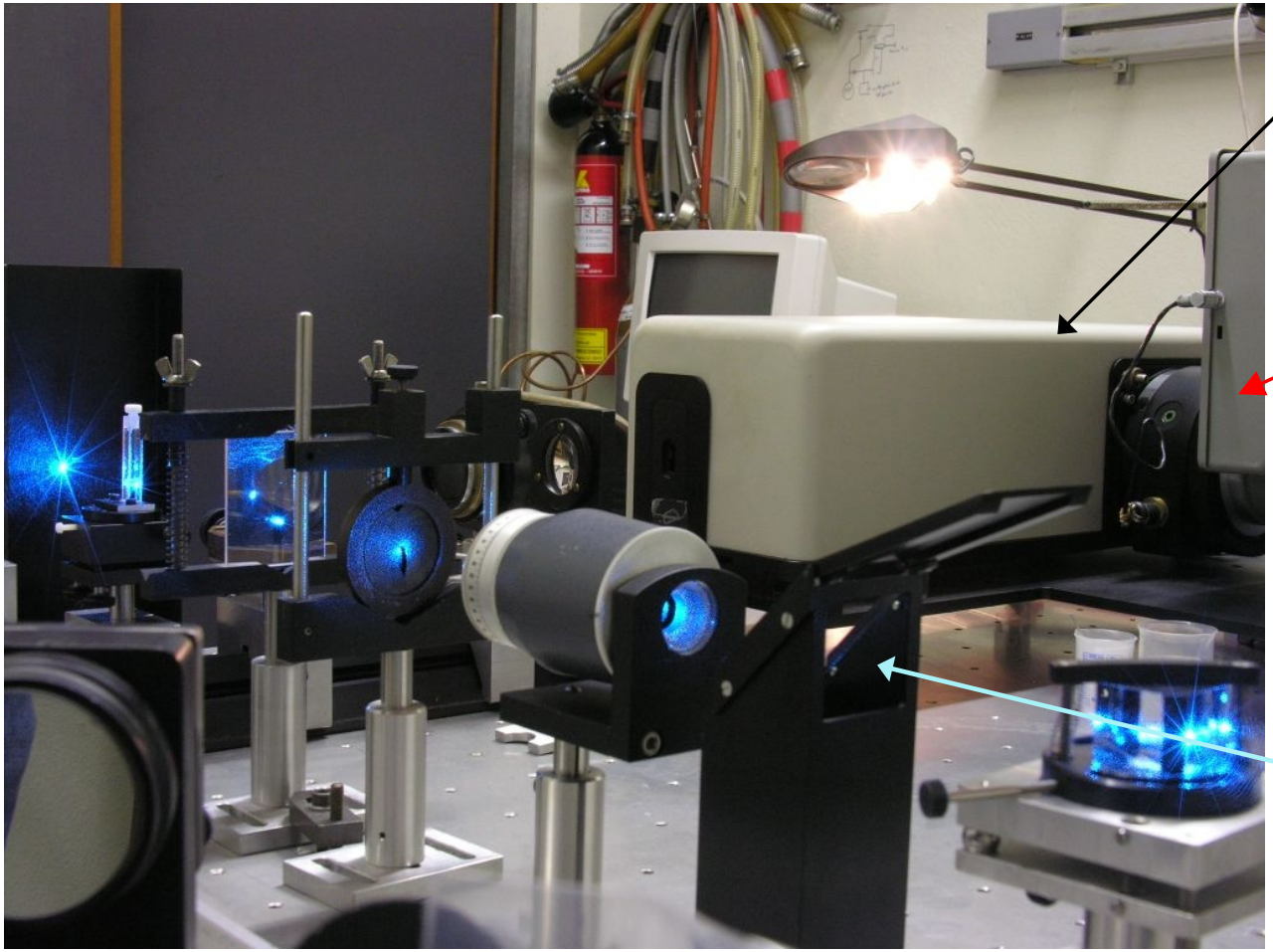
Raman set-up

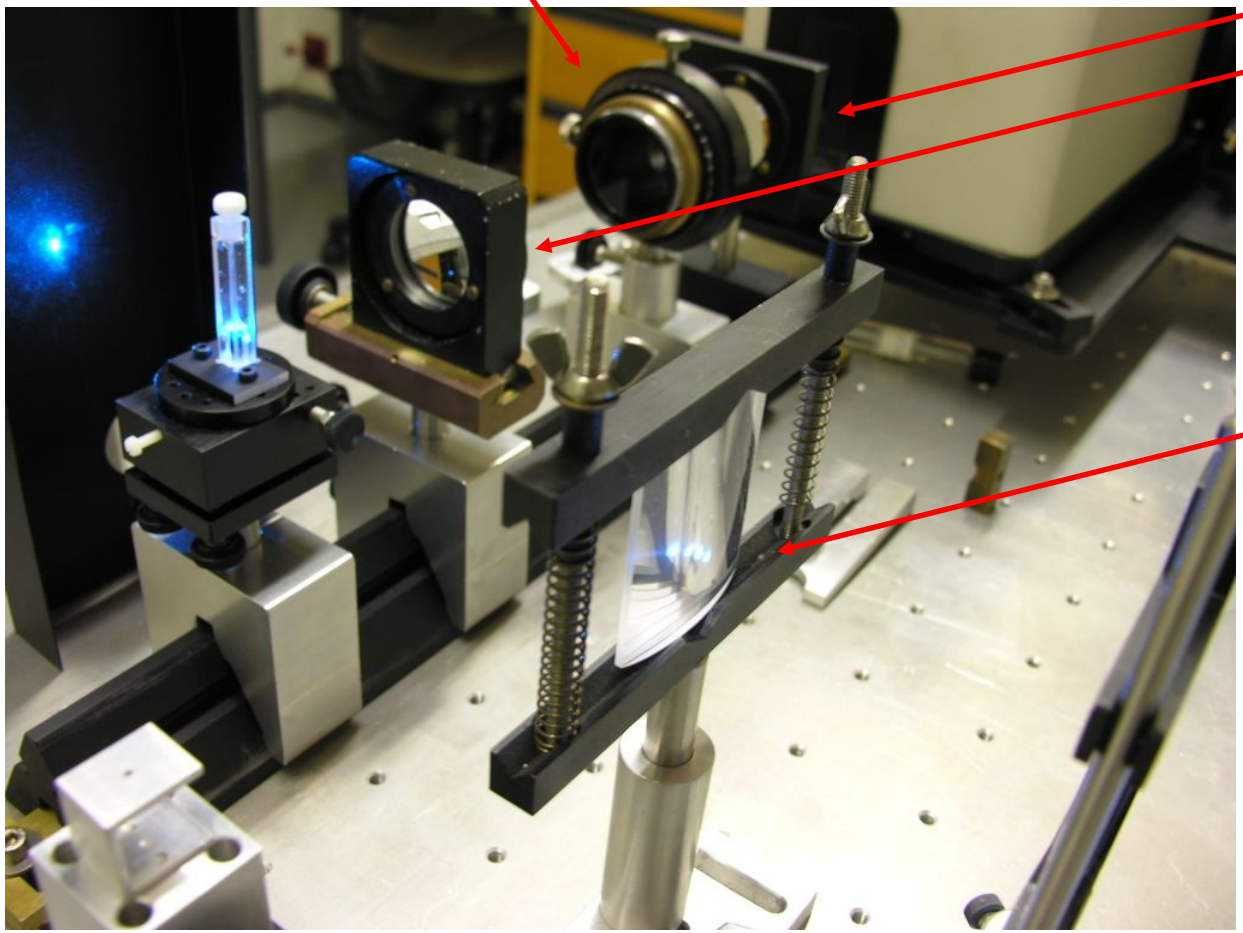
- The instrument
- Experimental advantages
- Accessories
- Examples of spectra

Raman set-up

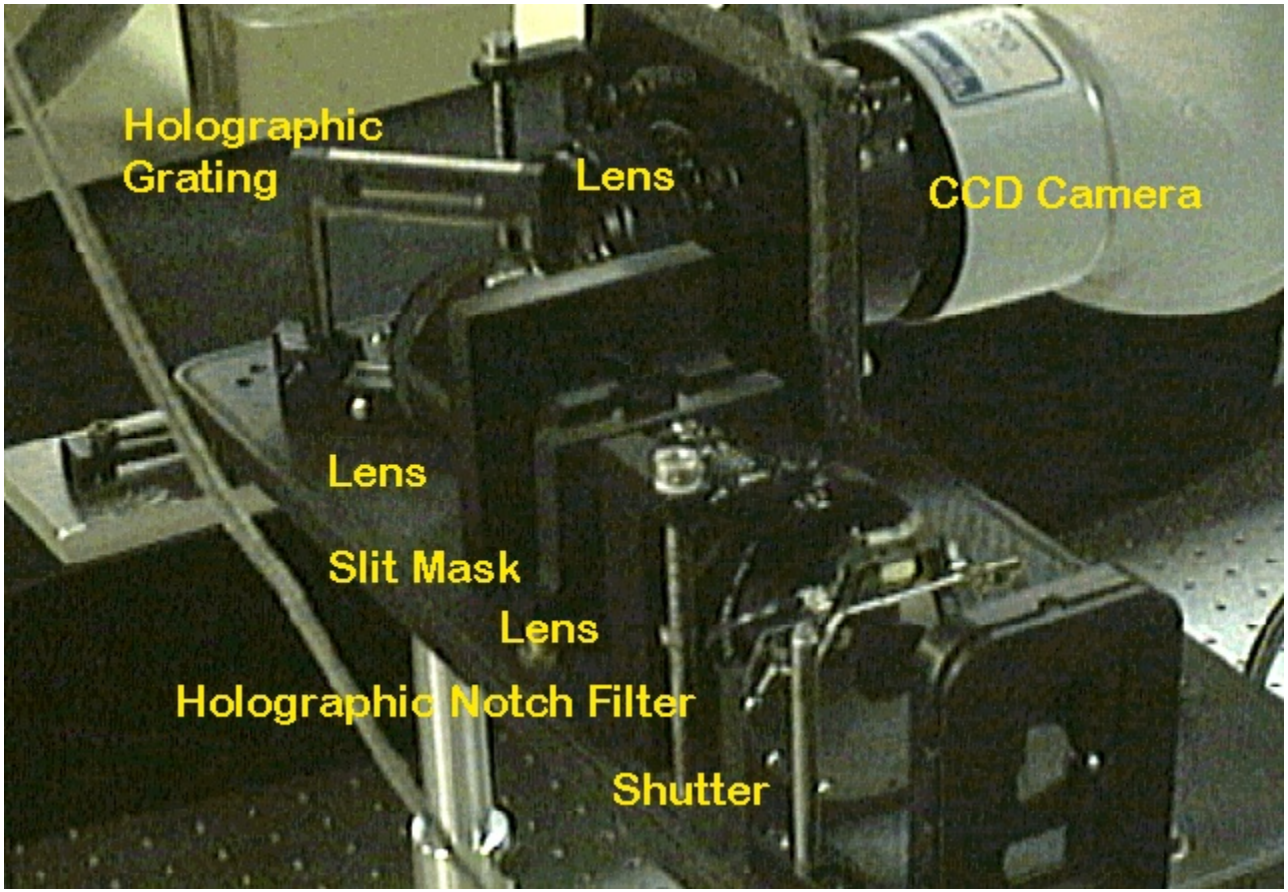
- Diode Laser(488nm), He-Ne Laser (632nm)
- Holospec f/1.8 spectrometer
- LN2-cooled CCD camera
- Home-built computer control (D. Lovy)

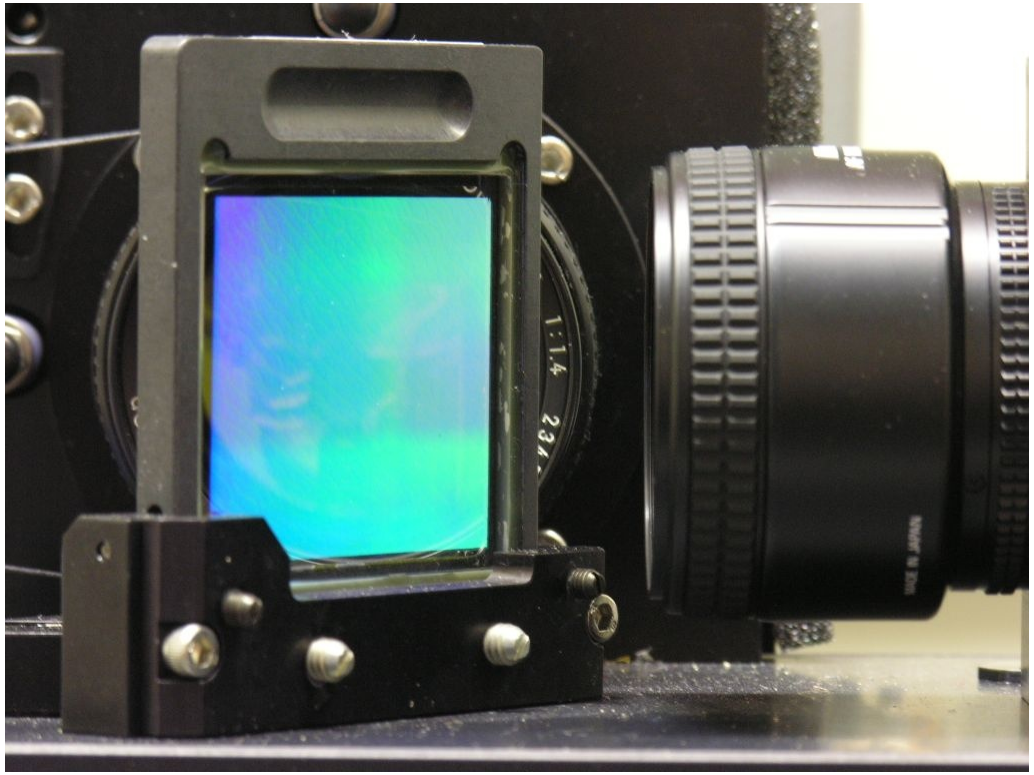
Spectromètre Raman




Polarizer
Achromatic collection lenses
Cylindrical focussing lens

Kaiser Optical Holospec Spectrometer





Transmission gratings:

Low frequency Stokes gratings	488nm	100 – 2600 cm^{-1}
	632.8nm	100 – 2020 cm^{-1}

Computer control

- Program WROA (D. Lovy) (PC)
  - Define acquisition window on CCD
  - Set binning (max 1500 counts/pixel, total 65k)
  - Define exposure time, number of accumulations
  - Data saved as ascii files (extension .w1), experimental data in header part ($text etc)
  - Program extended for R.O.A.
  - Compatible with data treatment program « Spectraw » by D. Lovy

Experimental advantages

- No moving parts
- High light throughput (f/1.8)
- Shot noise detection (long accumulations possible)
- Raman spectrum from 150 to 2500 cm^{-1}
- Easy to use

Experimental disadvantages

- Limited spectral range C-H, N-H and O-H stretching vibrations not accessible
- Lattice modes below 150 cm^{-1} not accessibles

Accessories

Polarization rotator

Polarizer

Rotating quarter-wave plate for Raman Optical Activity

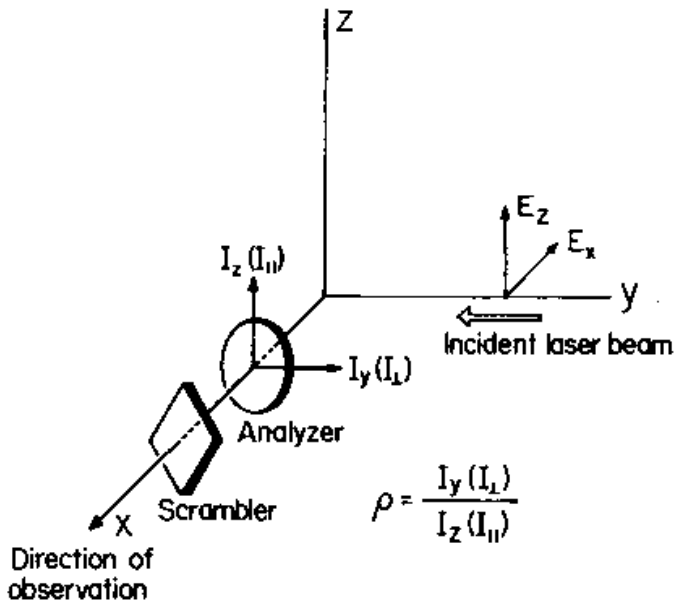


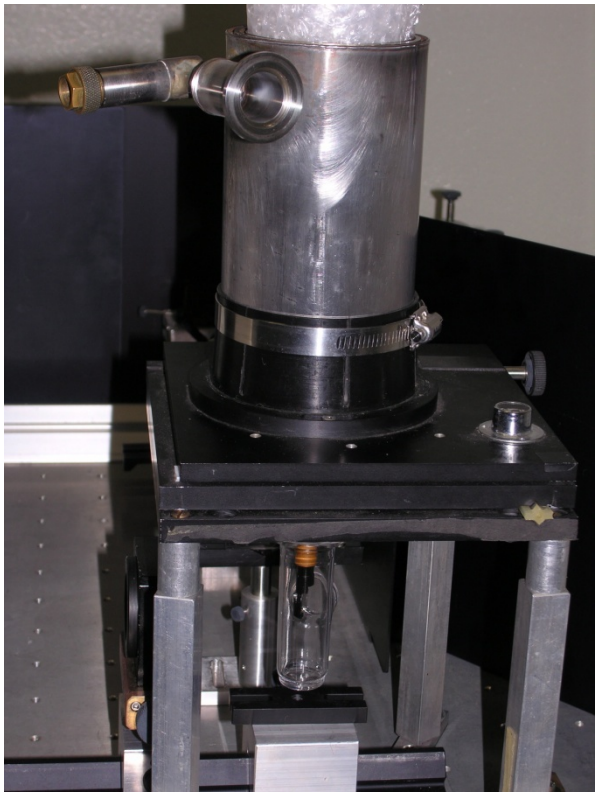
Fig. I-27. Experimental configuration for measuring depolarization ratios. The scrambler is placed after the analyzer because the monochromator gratings show different efficiencies for $\perp$ and $\parallel$ directions.

Accessories

Thermostatted cell holder 1cm cells

Helium flow cryostat

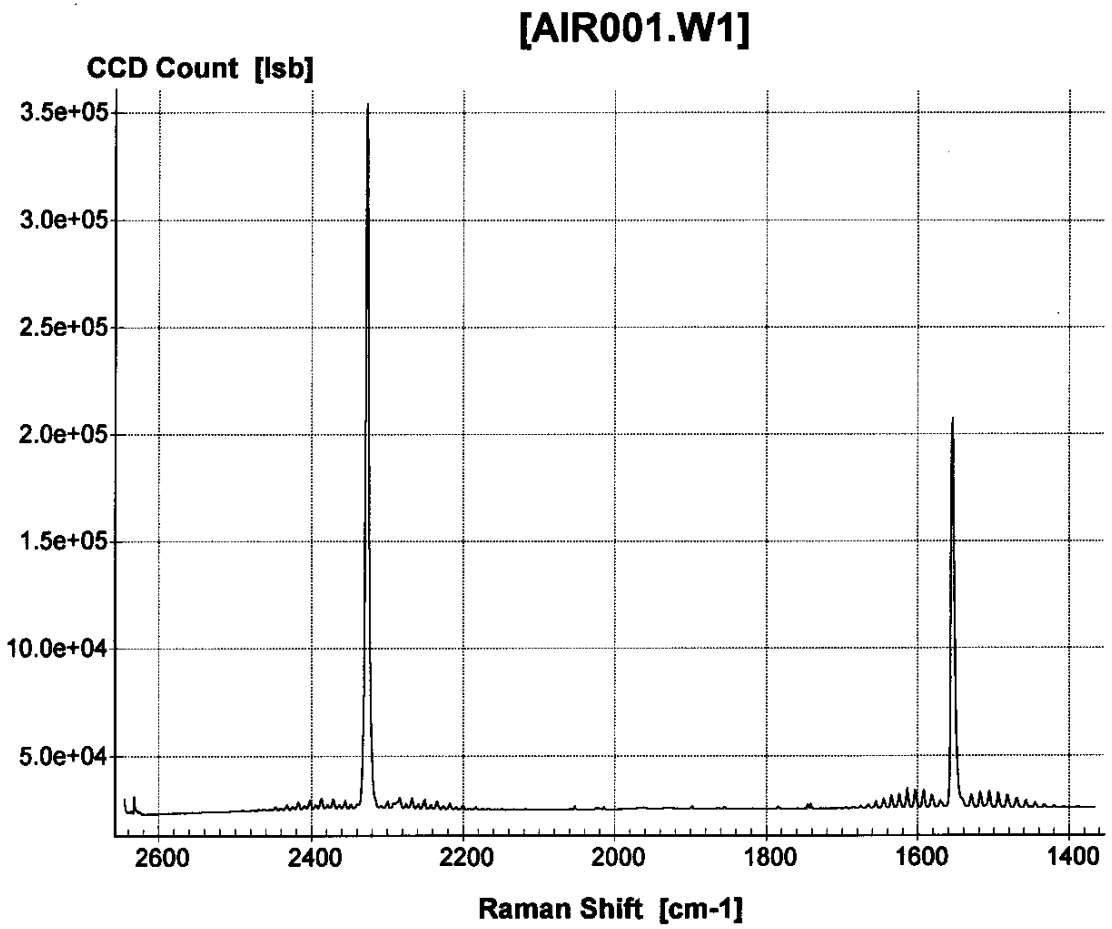
Liquid nitrogen dewar



Circulating bath heated cell (up to 200°C) for powder samples in capillaries

Backscattering geometry

Examples



Spectre Raman rovibrationnel de l'oxygène (vers 1600 cm^{-1}) et de l'azote (vers 2300 cm^{-1})

Acquisition time : 30 x 60 sec

Resonance Raman

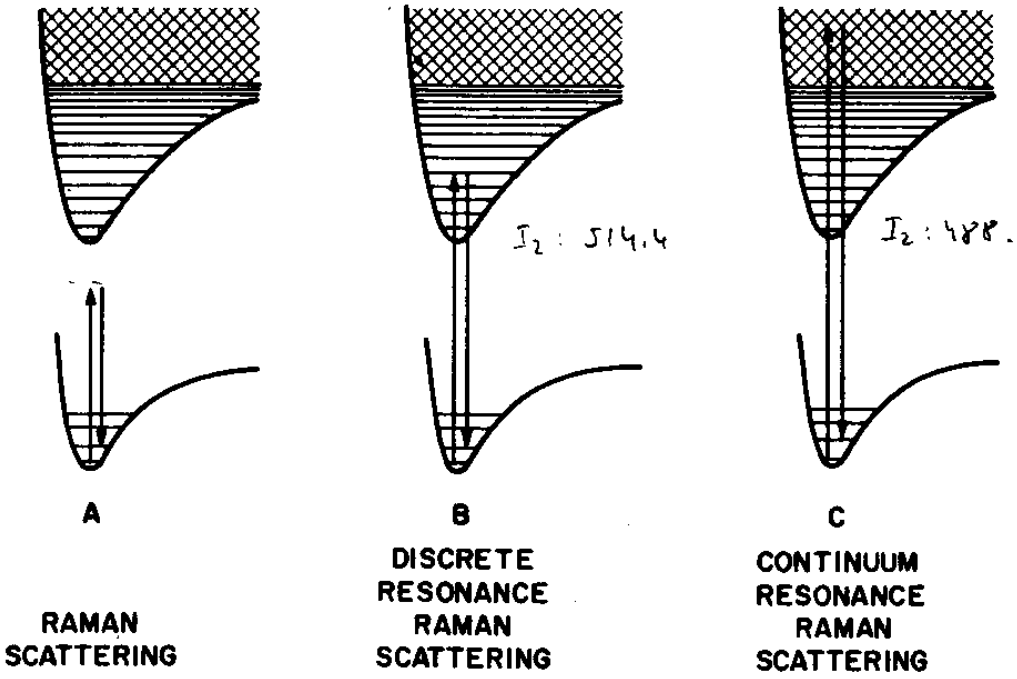


FIG. 1. Classification of Raman scattering according to laser frequency. A. The incident laser frequency is far from resonance with any real electronic transition, so normal Raman scattering is observed. B. The incident laser frequency is in the region of discrete levels of a single electronic intermediate state. We term this process discrete resonance Raman scattering. C. The incident frequency is in the range of a dissociative continuum. We label this process continuum resonance Raman scattering.

Resonance Raman

Charge transfer complex (Chem. Eur. J. 2009, 15, 63 – 66)

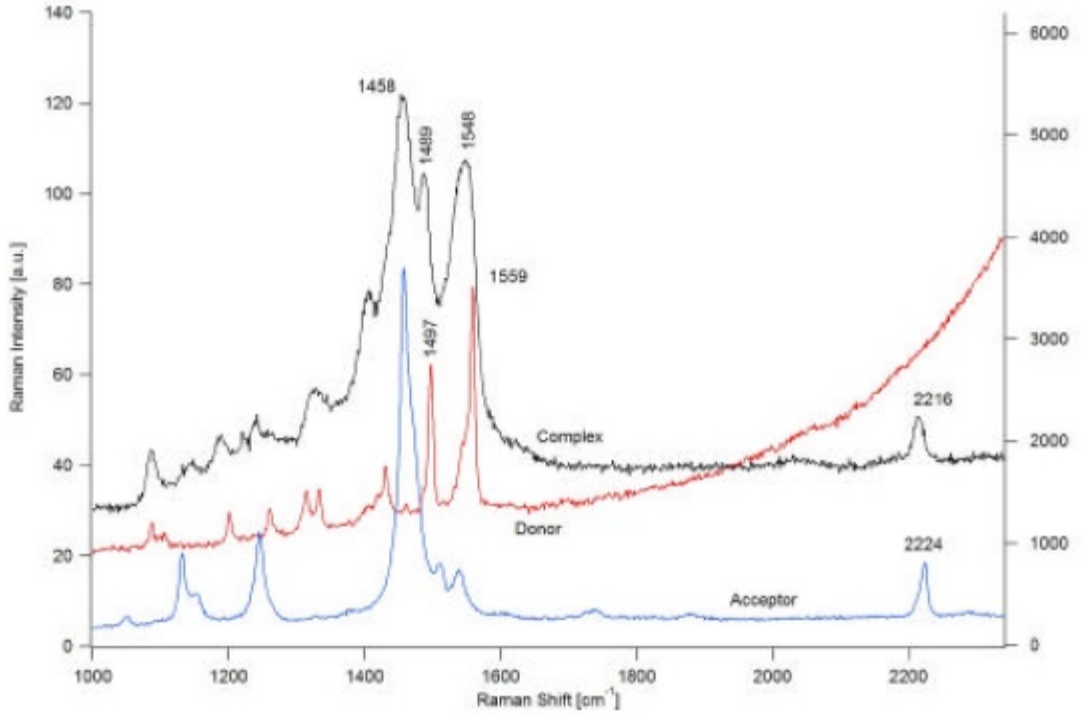
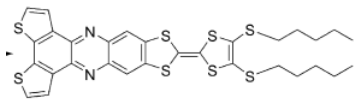
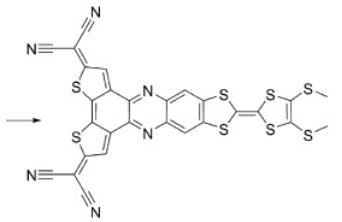


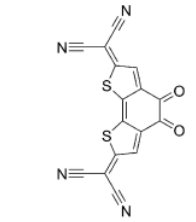
Figure S5. Raman Spectra of **1** (black line), **2** (red line) and **P3** (blue line).



2



1



P3

Other Raman instruments available

- Spex 1404 or 1403 (for measurements of lattice vibrations)
- Labram Raman Microscope (in the geology department)