CHEMICAL SPECIATION OF AEROSOLS BY LASER RAMAN SPECTROSCOPY

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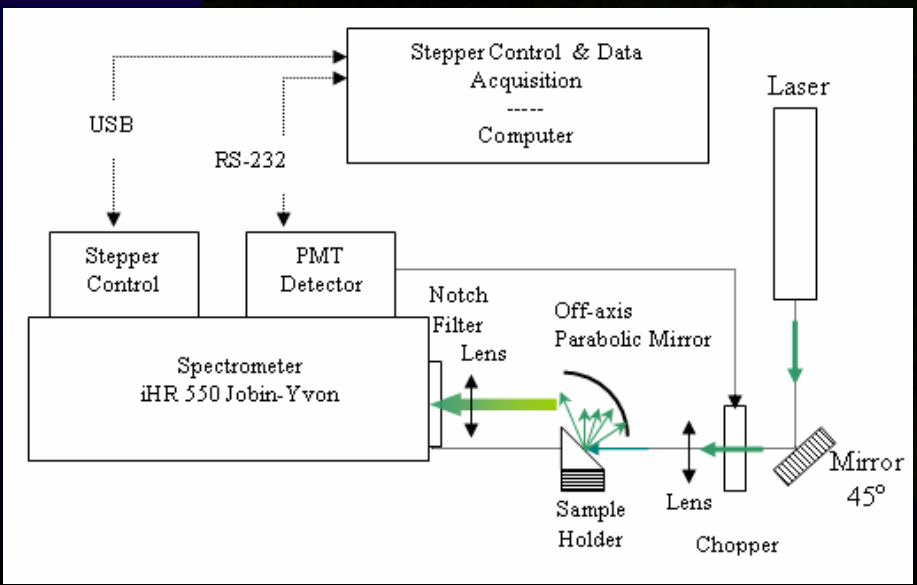
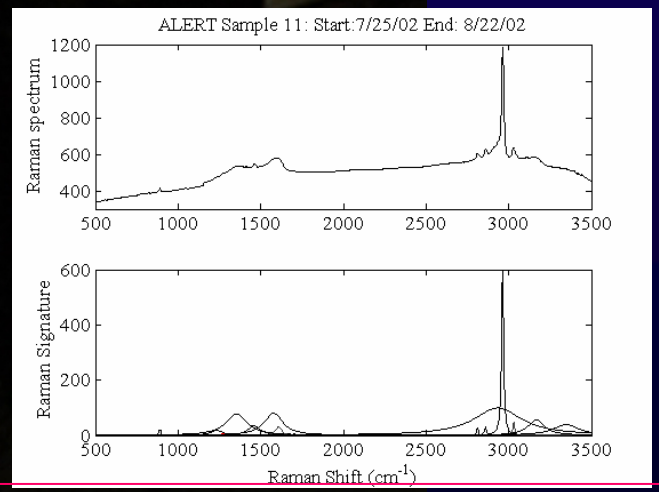
Laboratory Setup

- ✓Laser Emission CW-532 nm SLM Compass 315 Coherent Lasers
- ✓Computerized Imaging Spectrometer Jobin Yvon iHR550 (f/6.4 – 0.55 m focal)
- ✓Spectral resolution 0.0025 nm with 25 ms minimum time step
- ✓Aerosol samples fractioned in size ranges 0.2, 0.5, 1, 3 and 5 micron fraction.
- ✓Automatic algorithms for de-peaking, de-noising, baseline correction and chemical fingerprint identification



Chemical speciation of suspended aerosols

- ➢Carbonaceous aerosol composition (amorphous graphite-carbon Raman bands G,D, D' and their overtones)
- ➢Inorganic salts (e.g. Ammonium Sulfate, Ammonium Nitrate, etc)
- ➢PAH – Polycyclic Aromatic Hydrocarbons and organic components



Multi-component aerosol signature during boreal forest fire events at Arctic locations in Alert, Nunavut, Canada (summer time 2002).
Amorphous carbon Raman identification lines (cm^{-1}) 1356-D, 1580-G, 1610-D' overtones in the second order Raman spectra 2640-2D, 2937-D+G and 3200-2D'. Inorganic salts $(NH_4)_2 SO_4$ at 1238 cm^{-1}, $CaCO_3$ at 1463 cm^{-1} and hydrocarbons (C:H) at 2950 cm^{-1}.