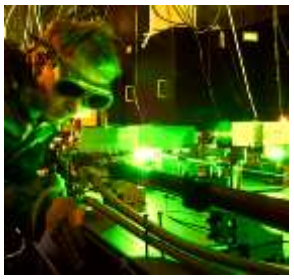
Application to Air Quality

GEMINI



VULCAN

ULTRA

OCTOPUS

CLEAN AIR TECNHOLOGY

AEROSOL STUDIES

?

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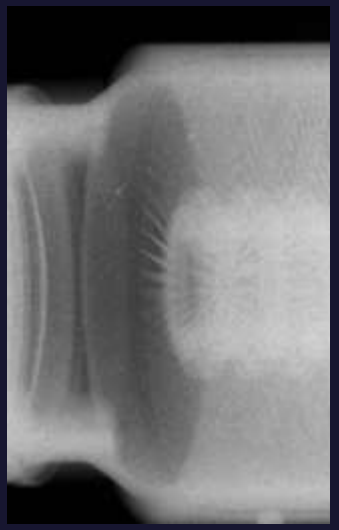
SAQN STFC AIR QUALITY NETWORK

Flash Radiography

X-ray imaging of engine components

- Imaging through high density materials
- X-rays generated from short (fs) high intensity laser pulses on foil targets
- Aluminium blades @ 42,000 rpm
- With 100 micron resolution



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Kerr-Gated Raman Spectroscopy

ULTRA

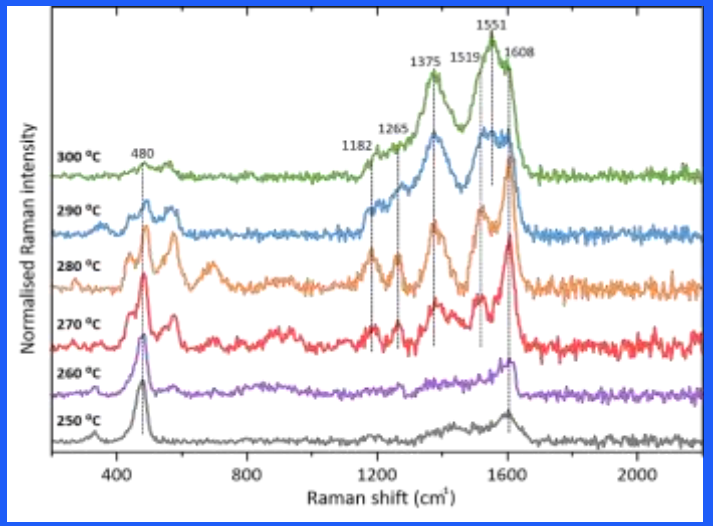
Andrew Beale
UCL/RC@H

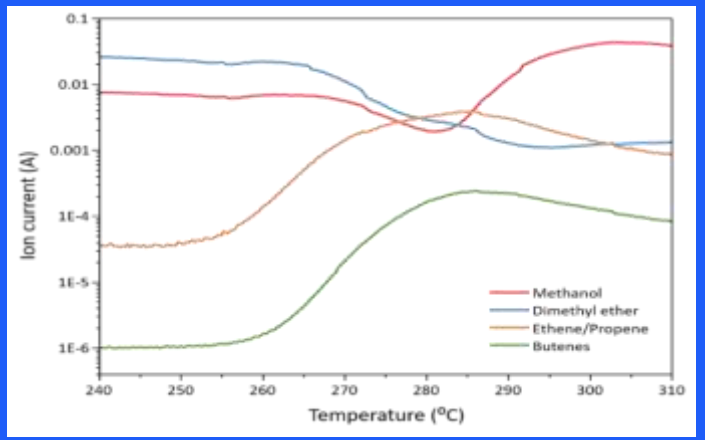
CatalysisHub

UCL

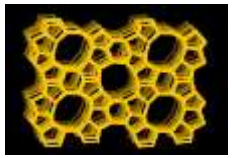
Catalytic reactions in zeolites

- Raman spectra measured during reaction process
- Fluorescence rejected by a timing gate (Kerr gate)
- Aim to resolve active sites on the surface of the catalyst





SSZ-13



ZSM-5

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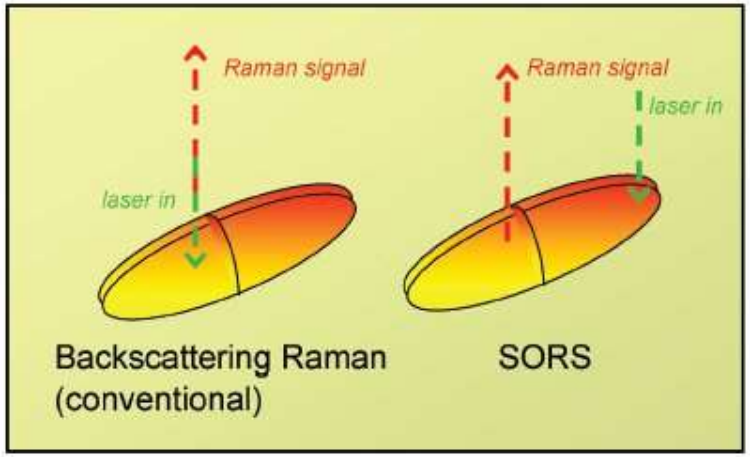
Spatially Off-set Raman Spectroscopy

Detection and analysis of materials in plastic bottles



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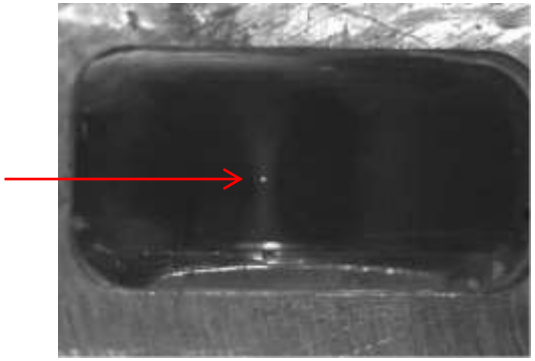
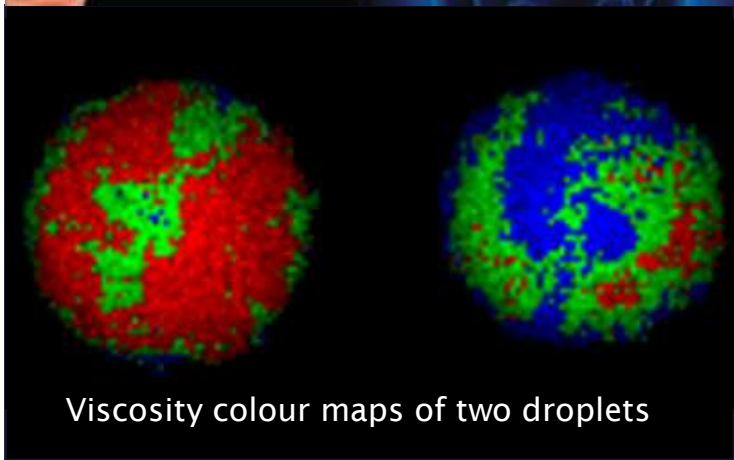
Spectroscopic studies of laser levitated micro-particles

A micron-sized aerosol droplet (white dot) levitated using lasers at the CLF Octopus Facility.



- Studying the chemistry and optical properties of cloud droplets and pollution
- Simulating the respiratory environment of pharmaceuticals in the lung



Viscosity colour maps of two droplets

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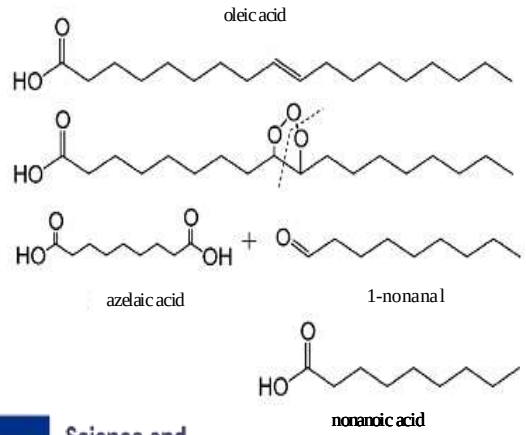
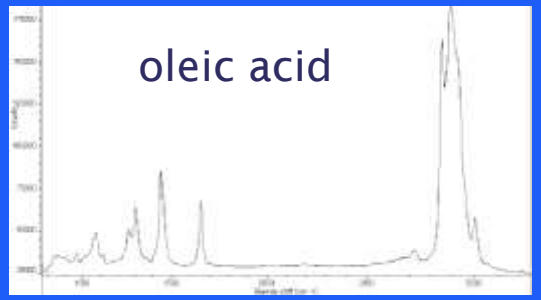
Micro-Raman Spectroscopy

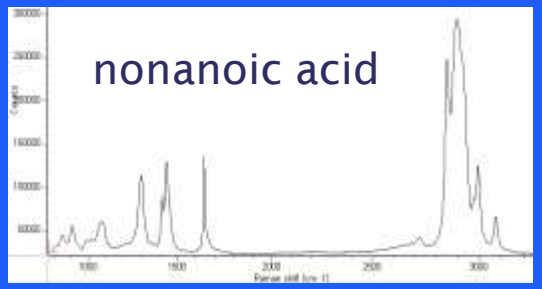
Martin King, Royal Holloway
Katherine Thompson, Birkbeck

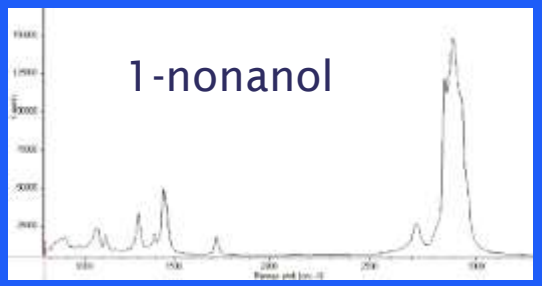
- For example: airborne droplet consisting of oleic acid and water
- Droplet is exposed to a dilute flow of humidified ozone in oxygen
- Acquire and analyse spectra

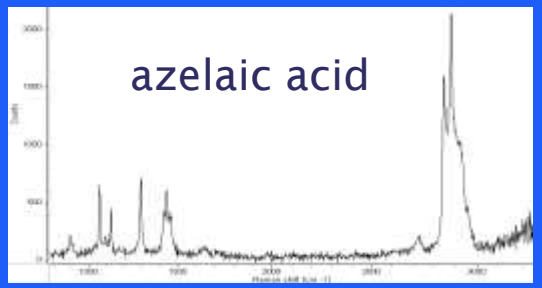


Reactants and products followed during the oxidation of oleic acid by ozone.









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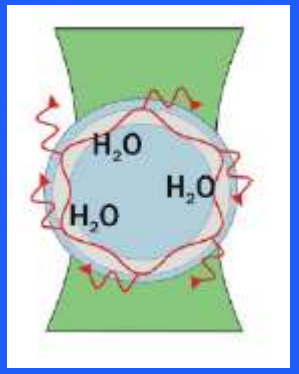
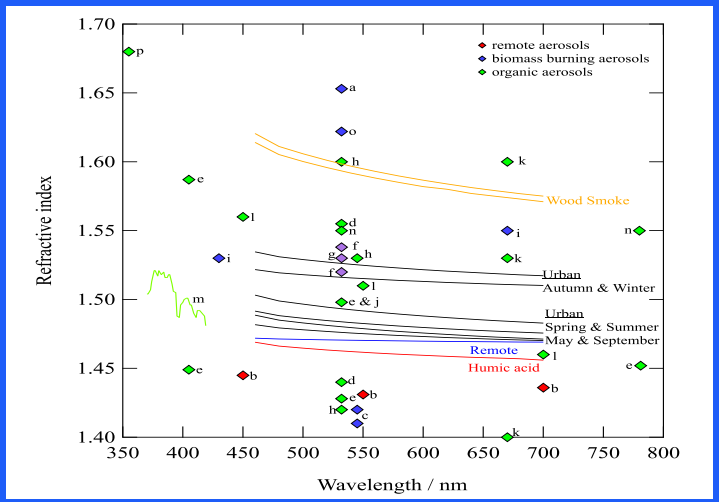
Mie Scattering Spectroscopy

- The droplets act as cavities or whispering gallery modes (WGMs)
- At specific wavelengths light can circulate for timescales of nanoseconds, giving rise to metres of pathlength in a droplet that may be only a few microns in diameter.
- Use spontaneous Raman or broadband white light
- Optical properties: **Droplet size**, **Refractive index, Core shell**

Jonathan Reid,
Bristol University

Martin King,
Royal Holloway





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