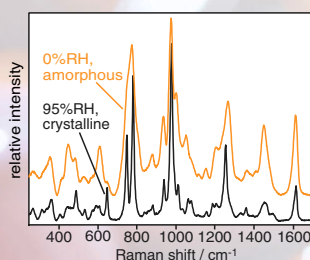


Using Raman spectroscopy for polymorph differentiation and chemical imaging

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Polymorph differentiation

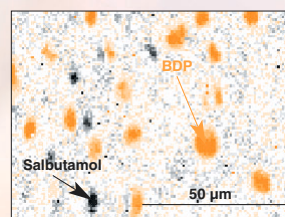
Raman spectroscopy has been successfully employed to investigate the variation in drug polymorphism at specific temperatures and humidities. Raman spectra were collected using a Renishaw Raman microscope (Renishaw plc), whilst the humidity and temperature were varied by a VGI2000M humidity cell (Surface Measurement Systems), which fits on the sample stage of the microscope. Shown here are the spectra obtained from salbutamol sulfate before hydration at 0% relative humidity (RH), and after hydration at 95%RH.



Clear variations in the Raman spectra illustrate salbutamol sulfate becoming more crystalline as the water content is increased.

Chemical imaging

The distribution of components deposited from a commercially available combination asthma treatment (Ventide™) was studied using a Raman microscope (Renishaw plc) fitted with a software-controlled motorised sample stage (Prior Scientific). Spectra were acquired sequentially from a series of positions on the sample and analysed to produce a chemical image representing the distribution of active ingredients.



The Raman images indicate discrete particles of either BDP or salbutamol with particle sizes and counts in good agreement with previous studies from *in vitro* lung modelling (Anderson cascade impactor) and chromatography, respectively.

Renishaw's Raman spectroscopy

Flexible

- 1 μm spatial resolution
- Remote analysis with optical fibre probe (over 100 m long)
- No sample preparation
- Analysis of aqueous and non-aqueous samples
- Analysis through transparent packaging

Versatile

- Locate and identify components and contaminants
- Monitor processes
- Verify the identity of raw materials
- Create maps and images of chemical and structural distribution