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Automated data collection and analysis with WiRE™ software

Collecting and analysing Raman data with a manual step-by-step workflow can be labour intensive. In contrast, Renishaw's Raman systems provide automated Raman analysis, allowing you to maximise system activity and minimise operator time investment. When studying large numbers of samples or conducting multiple and very long measurements, this offers significant advantages, including the elimination of human error and the ability to dramatically speed up research.

Renishaw's WiRE™ software can help with automating your experimental workflow using some key technologies, from sample positioning and focussing, to data collection and analysis.

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#renishawraman

A fully automated workflow

Save time and get the most out of your Raman system, using Renishaw WiRE software's set of automation options.

Measurement templates

- Easily save, load and repeat measurements
- Supports most measurement types including, single spectra, series measurements (time, temperature) and mapping measurements (discrete, line and area)
- Save optimised measurement templates for different materials

Batch measurements

- Repeatedly perform a measurement centred at specific locations
- Define locations as a coordinate list, either manually or by importing from other software packages
- Automatically detect particle locations from a microscope image

LiveTrack™ focus-tracking technology

- Maintain focus in real time for optimum Raman signal
- Essential for samples that are rough or not flat
- Z-height control for safe movement and collision protection

Chains processing and analysis templates

- Repeat a saved sequence of data processing and analysis steps with one click
- Automatically correct spectral artefacts such as cosmic rays or fluorescent backgrounds
- Consistently perform complex data analysis

Each option can be used independently, and together they enable the ability to completely automate complex processes

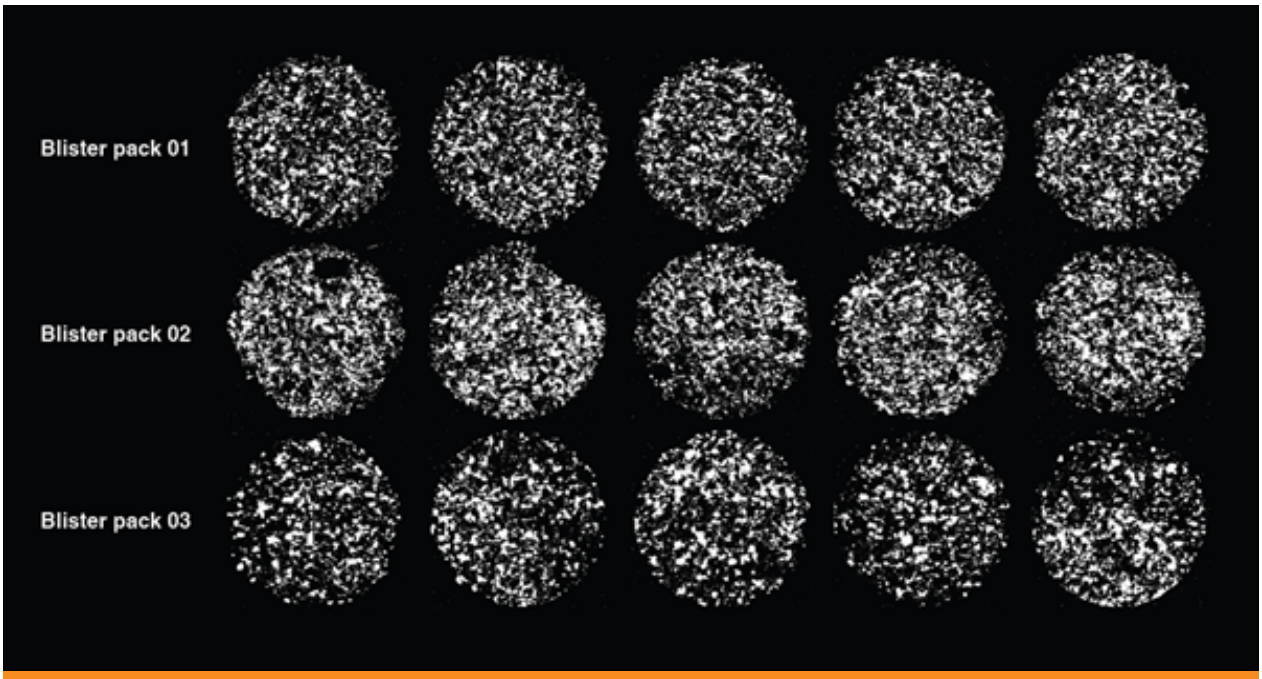
Example 1: Automated analysis of multiple pharmaceutical tablets

The Renishaw WiRE software automation tools allow analysis of multiple samples without any need for user interaction.

Analysis was performed on a set of fifteen pharmaceutical tablets. Each set represents a different production batch. We used batch measurement to repeatedly apply a measurement template for Raman imaging with Renishaw's LiveTrack™ technology. A tablet holder enabled the centre positions of each measurement to be pre-defined.

The data from each tablet was then processed and analysed using a Chain. This automated:

- The removal of cosmic ray features
- The truncation of the spectral range
- The removal of spectral (fluorescence) background
- The generation of Raman images (Component Analysis method) based on previously collected reference spectra



An example of an automated process for the Raman imaging of 15 pharmaceutical tablets. This was performed using measurement templates, batch measurements, LiveTrack technology, and Chains. White indicates the location of the active pharmaceutical ingredient (API). Human operator time required to load the sample and begin the measurement was less than 2 minutes, highlighting the power and time saving provided by the automation process.

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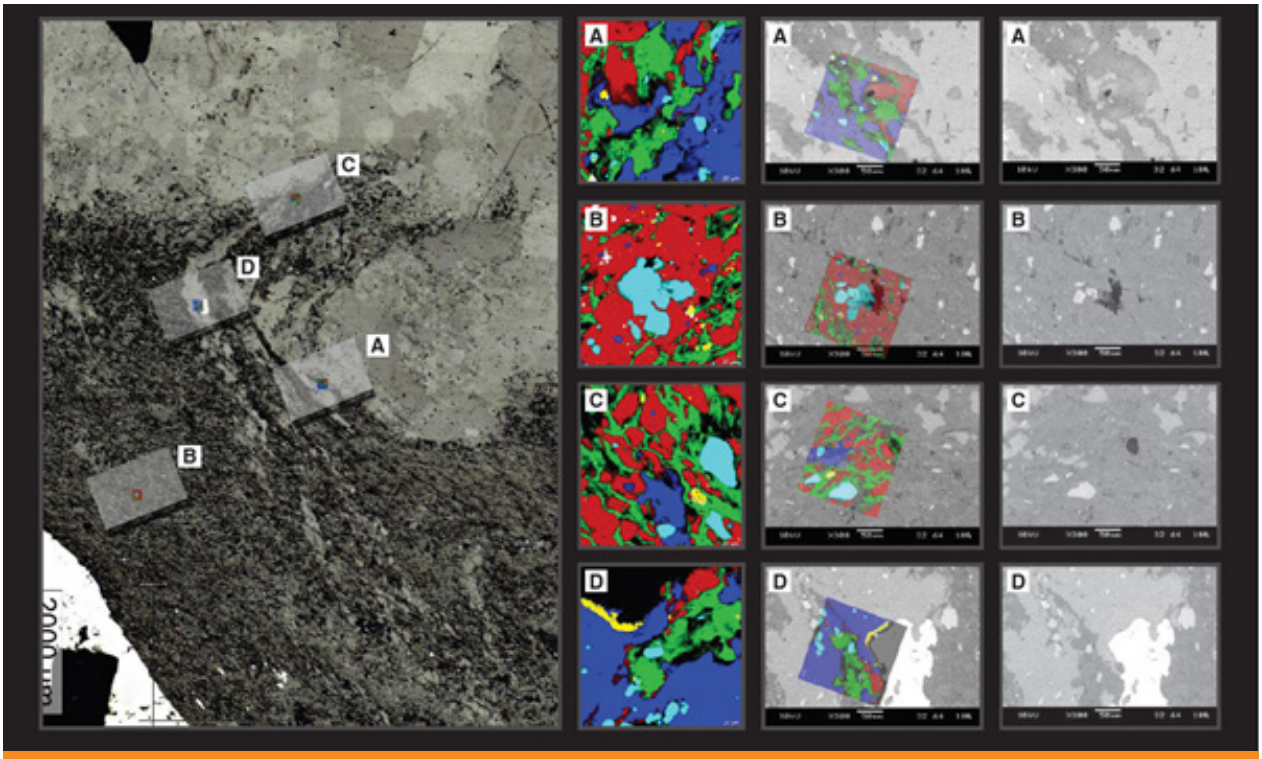
Example 2: Raman imaging multiple features of interest

We often want to analyse multiple features of interest within a sample using the same measurement conditions. The measurement template and batch measurement options are the perfect way to achieve this. This approach has been used to collect four Raman images showing the change in chemistry and crystallography occurring across a geological sample. Each Raman image is shown alongside the corresponding scanning electron microscope (SEM) image to provide multi-modal analysis. Here the operator spent less than 5 minutes specifying the analysis coordinates and initiating the batch measurements.



SEM image with overlaid Raman images acquired using a batch measurement at four positions (A to D) on a geological sample. The colours in the Raman images correspond to the identified components: rutile (yellow), anatase (white), apatite (light blue), carbon (green), quartz (red) and calcite (dark blue).

Achieve efficient Raman analysis with Renishaw's suite of automation technologies

With WiRE software's automation tools, you can confidently maximise the use of your Renishaw Raman system with minimal human intervention. Users can easily analyse large numbers of samples to gain statistically significant Raman data, while enjoying the freedom to focus on the scientific results.

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