

LATEST INNOVATIONS IN RAMAN MICROSCOPY FOR ULTRA FAST RAMAN IMAGING AND MACRO-MAPPING

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Raman microscopy has become an important tool for the analysis of materials on the micron scale, providing crucial information to experimentalists working in the fields of pharmaceutical research, semiconductors, geology, etc.

The unique confocal and spatial resolution of micro-Raman systems has enabled optical far field resolution to be pushed to its limits with often sub-micron resolution achievable for chemical imaging of small structures or isolated objects. The non destructive and non contact aspects of this technique, plus the fact that it requires no sample preparation, makes it an ideal analytical tool, which is more and more acknowledged by the research and industrial communities.

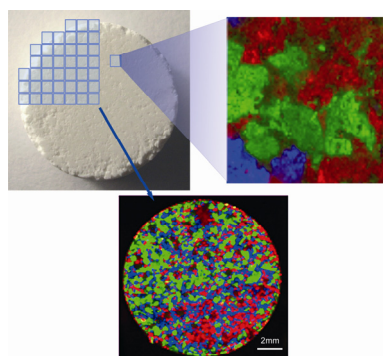
Although Raman Imaging is widely used already, it is sometimes seen as rather slow in comparison to other imaging techniques such as NIR or fluorescence microscopy. With the patented LineScan technique where the laser beam is raster-scanned along a line, one could already produce faster acquisition times as all spectra along the line are taken simultaneously.

Now, things have evolved much further, pushing the limits of systems to obtain high quality Raman images with unprecedented speeds of acquisition. Now, we have taken things much further, pushing the limits of our systems to obtain high quality Raman images with unprecedented speeds of acquisition. Indeed, with point-by-point Raman mapping, a lot of the acquisition time is wasted in communication between the hardware and the software.

Recent advances in detection and hardware communication have enabled us to reach measurement times as low as a few ms/point, opening the door to quasi-instantaneous chemical imaging. This revolution has a name: SWIFT™ mapping.

In addition, HORIBA Jobin Yvon has launched a new imaging mode, the revolutionary DuoScan™ (patent pending), which offers the best of both the micro and the macro world, as it generates Raman maps across both μm -scale and cm-scale areas with FULL coverage of your sample. When looking at large sample surfaces, whether it is to measure component distribution or to search for contaminants, it often comes down to finding a needle in a haystack. The DuoScan allows you to vary the spot size from 1 μm to 300 μm to match your image pixel size, ensuring that you don't miss a spot even on very large sample areas. The images produced are fully confocal, to better reject fluorescence or signals coming from beneath the analyzed surface.

Discussions around the state of the art and new trends for Raman Imaging will be made, illustrated by application examples that emphasize the real interest in Raman Imaging, pushing further the limits in either spatial resolution or mapping speed.



- (a) White light image of a Pharmaceutical tablet*
- (b) DuoScan™ large area mapping on a full tablet. 100% of this 12.5 mm diameter tablet was imaged in about 10 minutes*
- (c) DuoScan™ point-by-point mapping on a region of interest for finer analysis, pixel size: 1 μm*