

ParticleScout

Find, Classify and Identify Particles

- Automated particle analysis
- Sensitive microparticle detection
- Raman-based chemical identification
- Precise physical and chemical characterisation
- High-throughput particle measurements
- Comprehensive, quantitative reporting



ParticleScout

Raman-based microparticle analysis

ParticleScout is an advanced software tool that finds, classifies, identifies, and quantifies particulate sample components. It leverages the speed, sensitivity, and resolution of Oxford Instruments' witec360 Raman microscopes to accelerate microparticle analysis by moving seamlessly from overview survey, through categorisation by physical attribute, to spectral acquisition and chemical characterisation.

Catalogues of particles and quantitative reports can be created for reference and evaluation. Integration-time optimisation and TrueMatch Raman spectral database integration deliver the high sample measurement rate and chemical specificity required by researchers in some of today's most dynamic application fields.

ParticleScout will help with analyses of:



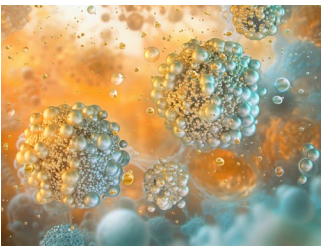
Minerals



Microplastics



Cosmetics



Nanomaterials



Pharmaceuticals



Environmental samples



Food and beverages

"We are impressed every day by how reliably and precisely the confocal Raman system from Oxford Instruments performs in particle analysis. The analysis of even the smallest plastic particles, for example in milk, places the highest demands on the system. With the CONTROL software used to operate the system in combination with ParticleScout, however, we are optimally equipped and achieve excellent results."

Dr. Felix Thier, Environment Agency Austria, Vienna, Austria

ParticleScout is...

Specific

Easy and fast particle selection

Fast

- Measure up to 1000 particles per hour
- Analyse thousands of spectra per minute

Automated

- High throughput
- High reproducibility

Precise

Target 0.5 µm particles

Raman > 0.5 µm

FTIR > 20 µm

Sensitive

- Compatible with aqueous samples
- Specialised substrates not required

Comprehensive

Individual report generation

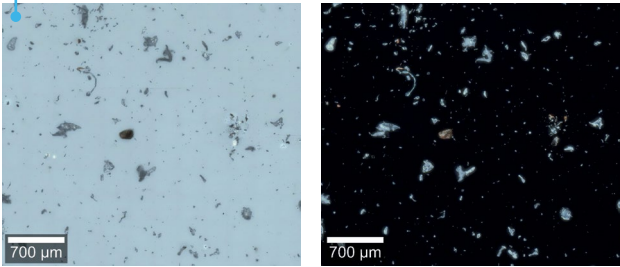
Conclusive

Identify particles with integrated Raman database software

Benefits

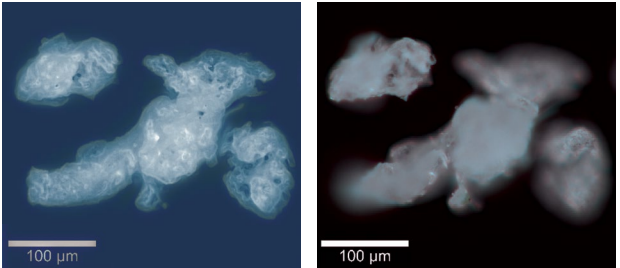
1 SAMPLE SURVEY

- Sample illumination options: bright-field, dark-field, epifluorescence and transmission
- Objectives for sample survey and Raman measurements independently selectable
- Image Stitching for large-area overview
- Focus Stacking for sharp and defined particle outlines
- Vignetting correction for uniform brightness
- Region of interest selection (including multiple region targeting and wedge sectioning of round samples)



Bright-field

Dark-field

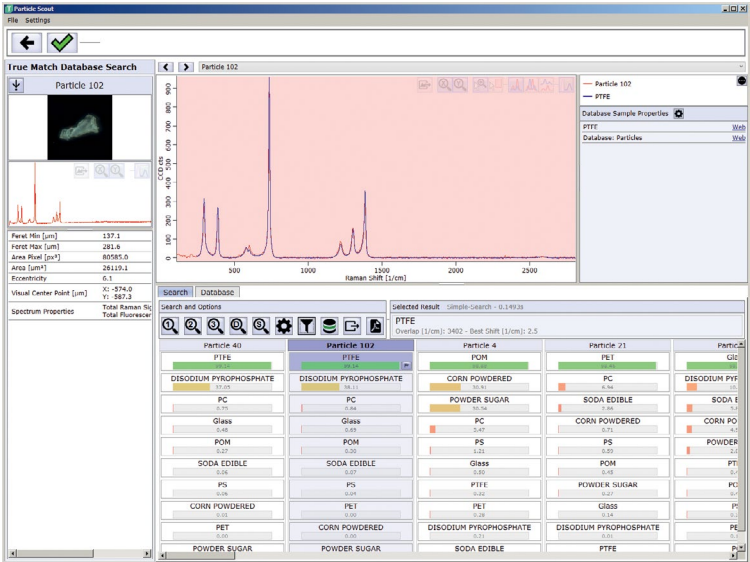
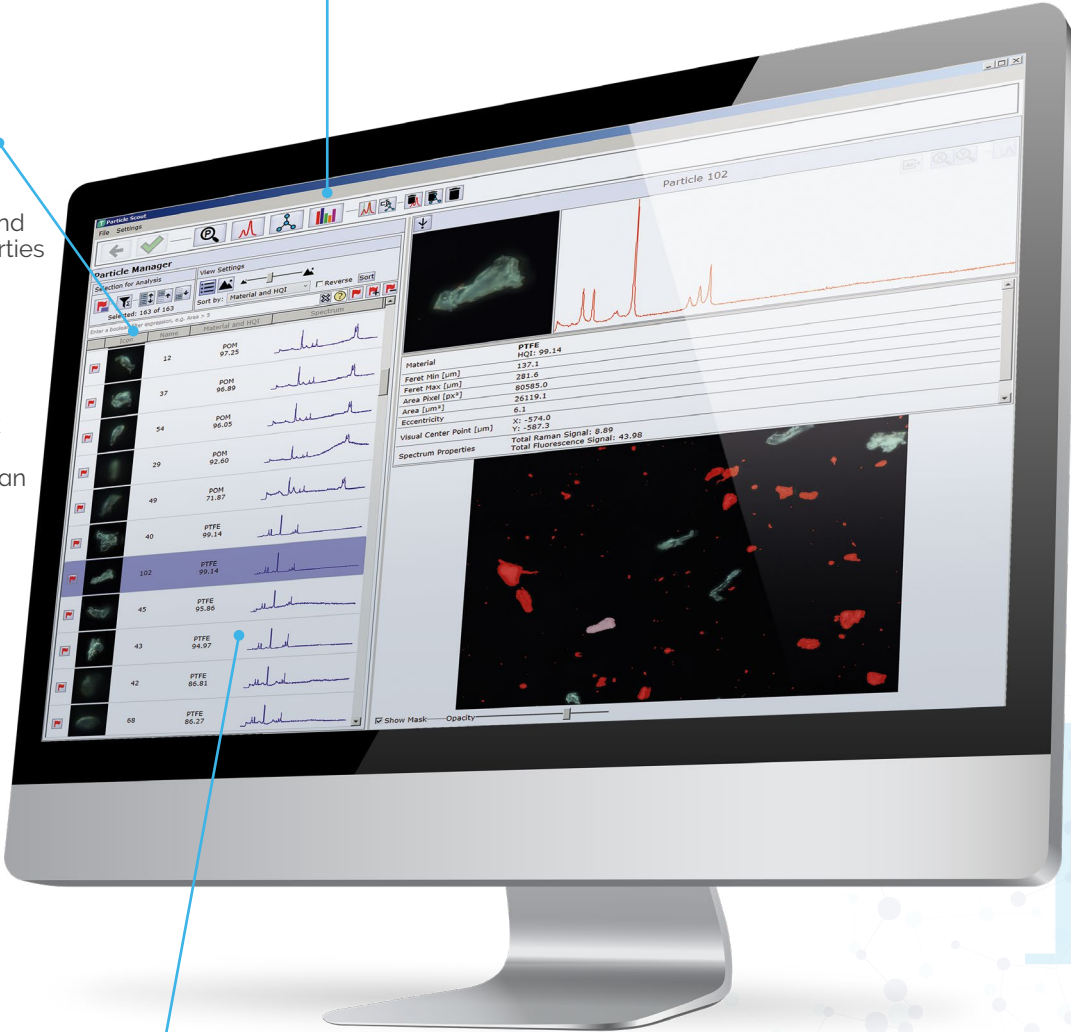


with Focus Stacking

without Focus Stacking

2 CATEGORISATION OF PARTICLES

- Selection by physical shape and size (many properties accessible)
- Application of Boolean filters for precise categorisation
- Automated mask creation for subsequent Raman analysis
- Smart separation of particles in densely packed, heterogeneous samples



TrueMatch spectral database management software

3 IDENTIFICATION

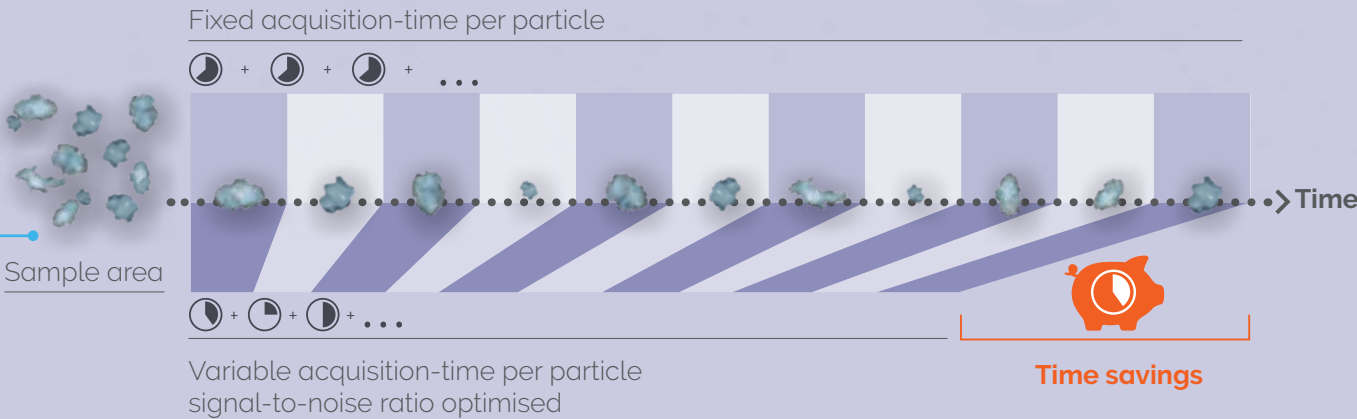
- Automated Raman spectral acquisition from each selected particle
- Fast autofocus procedure using Raman signal
- Integration time optimisation for each particle based on signal-to-noise ratio
- Fast chemical identification of all particles with integrated spectral database
- Use of extracted information for detailed follow-up measurements

4 REPORT GENERATION

- Quantitative reports of particles by category that link physical and chemical properties
- Filters for more precise conclusions
- Templates in table, bar graph histogram and pie chart formats for clear and easy data presentation

Composition and size analysis of a microplastic particle mixture

	Σ	5 - 10 µm	10 - 20 µm	20 - 50 µm	50 - 100 µm	>100 µm
PS	89	47	12	8	17	5
POM	59	34	12	8	4	1
PET	217	106	70	20	17	4
PC	87	18	45	17	7	0
PTFE	913	417	297	103	77	19
Unknown	150	45	78	8	19	0
Σ	1515	667	514	164	141	29

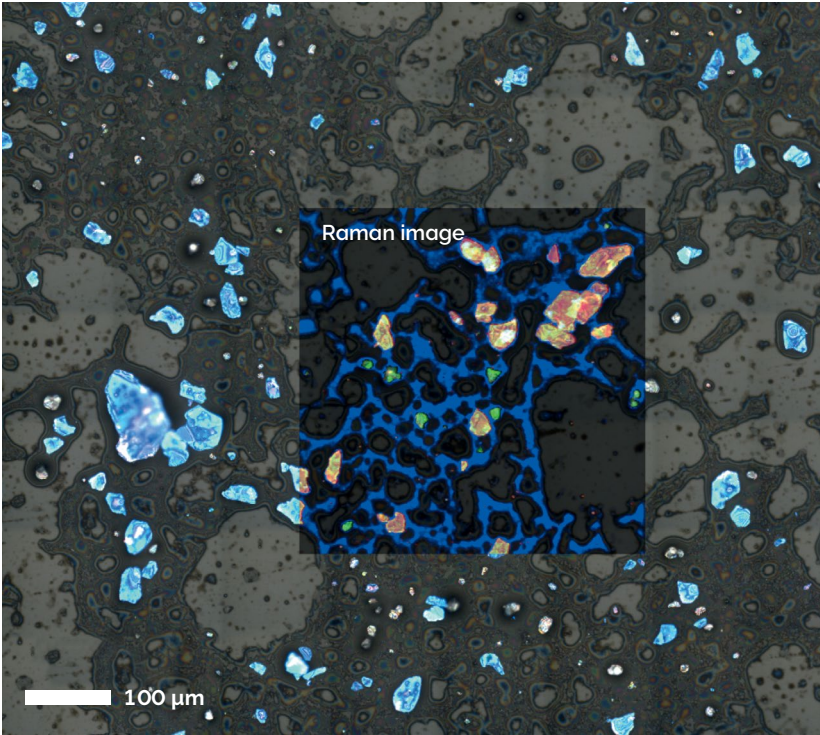


Applications

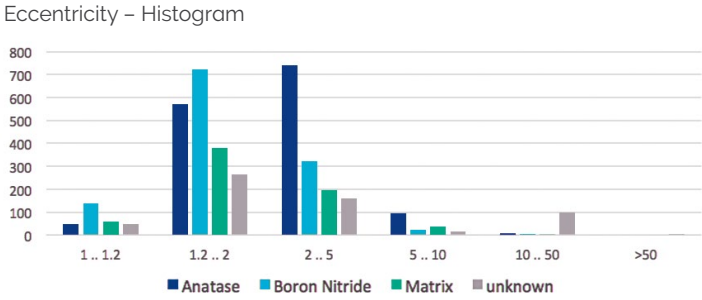
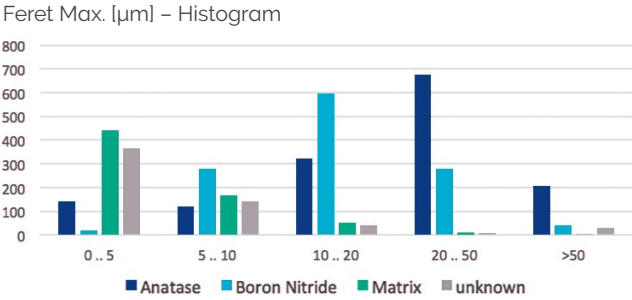
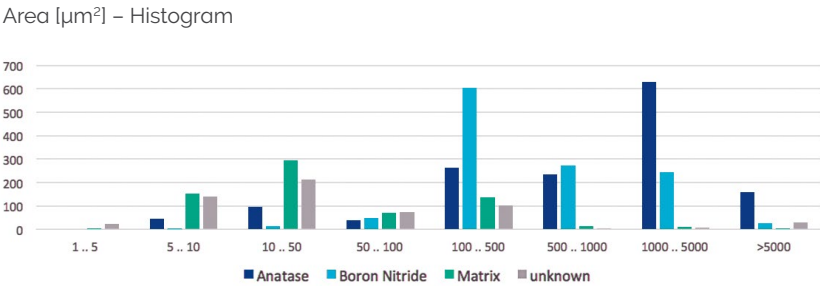
Cosmetic peeling cream measurement

A cosmetic peeling cream was analysed with ParticleScout. Using dark- and bright-field images, particles were located and categorised as shown in the report examples that detail their physical and chemical properties.

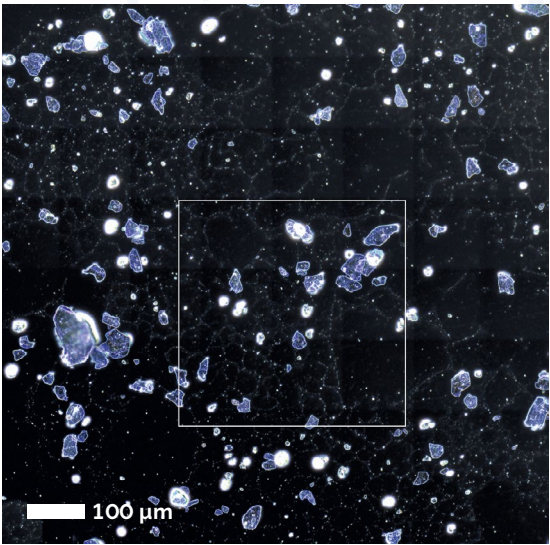
The sample was then investigated further with confocal Raman imaging. The overlay image shows the Raman measurement within the bright-field image.



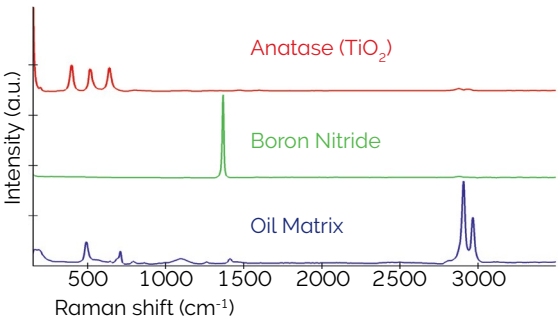
Bright-field image with overlaid Raman image



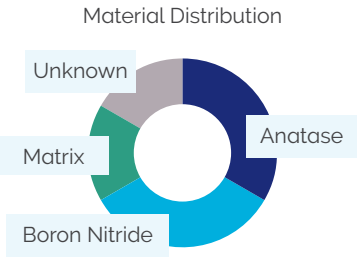
ParticleScout reports describing particle properties (3941 particles analysed)



Dark-field image



Corresponding Raman spectra



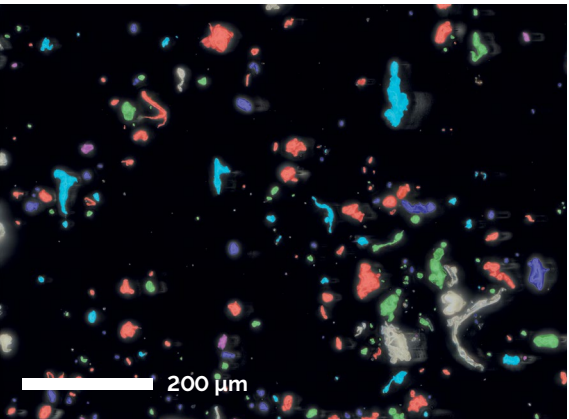
Introduction

Features & Benefits

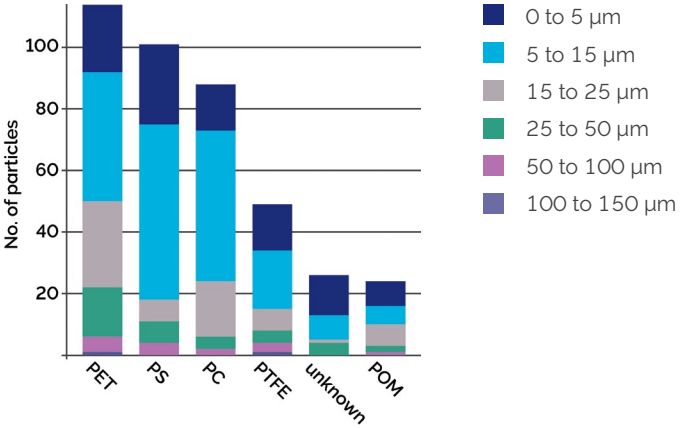
Applications

Microplastics analysis with ParticleScout

The detection, characterisation, and quantification of microplastic particles is especially important in environmental research and food sciences. A mixture of different microplastic particles was analysed. The Raman spectra of about 400 particles were measured in only about 45 minutes, and then identified using the TrueMatch database software. ParticleScout generated a comprehensive report. A map colour-coded according to the material of the identified particles was overlaid on the dark-field image. The size distributions for the different plastic particle types were also quantified.



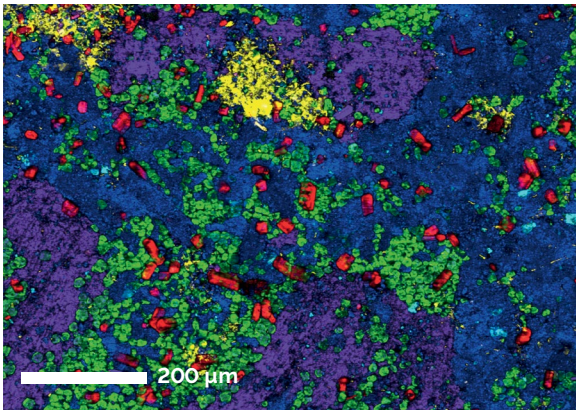
Dark-field image with overlaid map of identified materials



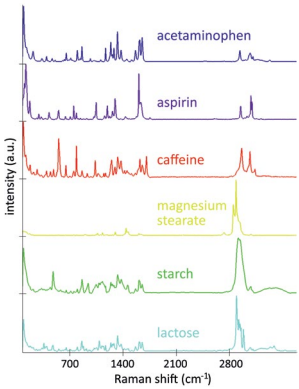
Size distribution (maximum Feret diameter) of different plastic particles

Analysing grain size distributions in a pharmaceutical tablet

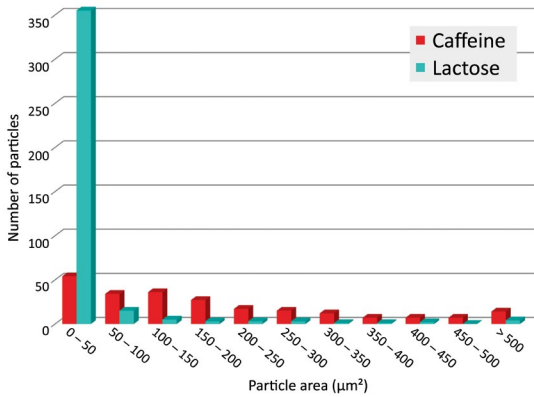
ParticleScout can be applied to overviews obtained by different imaging modes, such as bright-field, dark-field or confocal Raman imaging. The high-resolution, large-area Raman image of a painkiller tablet's surface was colour-coded according to the Raman spectra of the identified compounds. The individual Raman images of two components were analysed and their grain size distributions were depicted in a histogram.



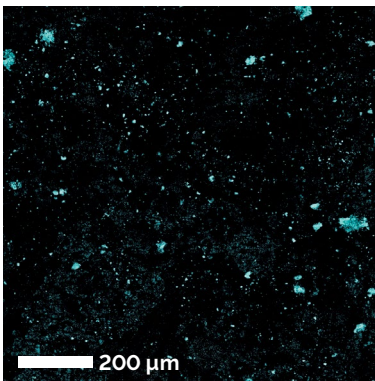
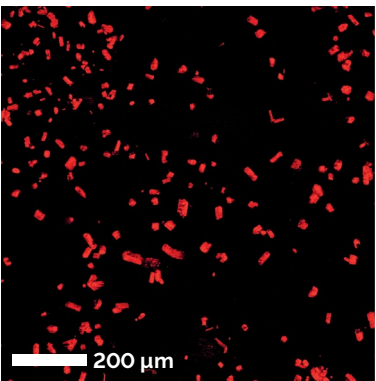
Raman image of the painkiller tablet's surface



Raman spectra in corresponding colours



Grain size distributions for caffeine and lactose



Individual Raman images of caffeine and lactose

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