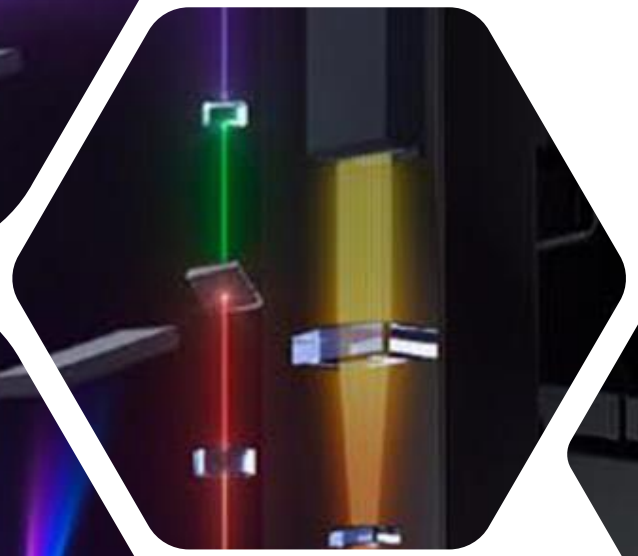
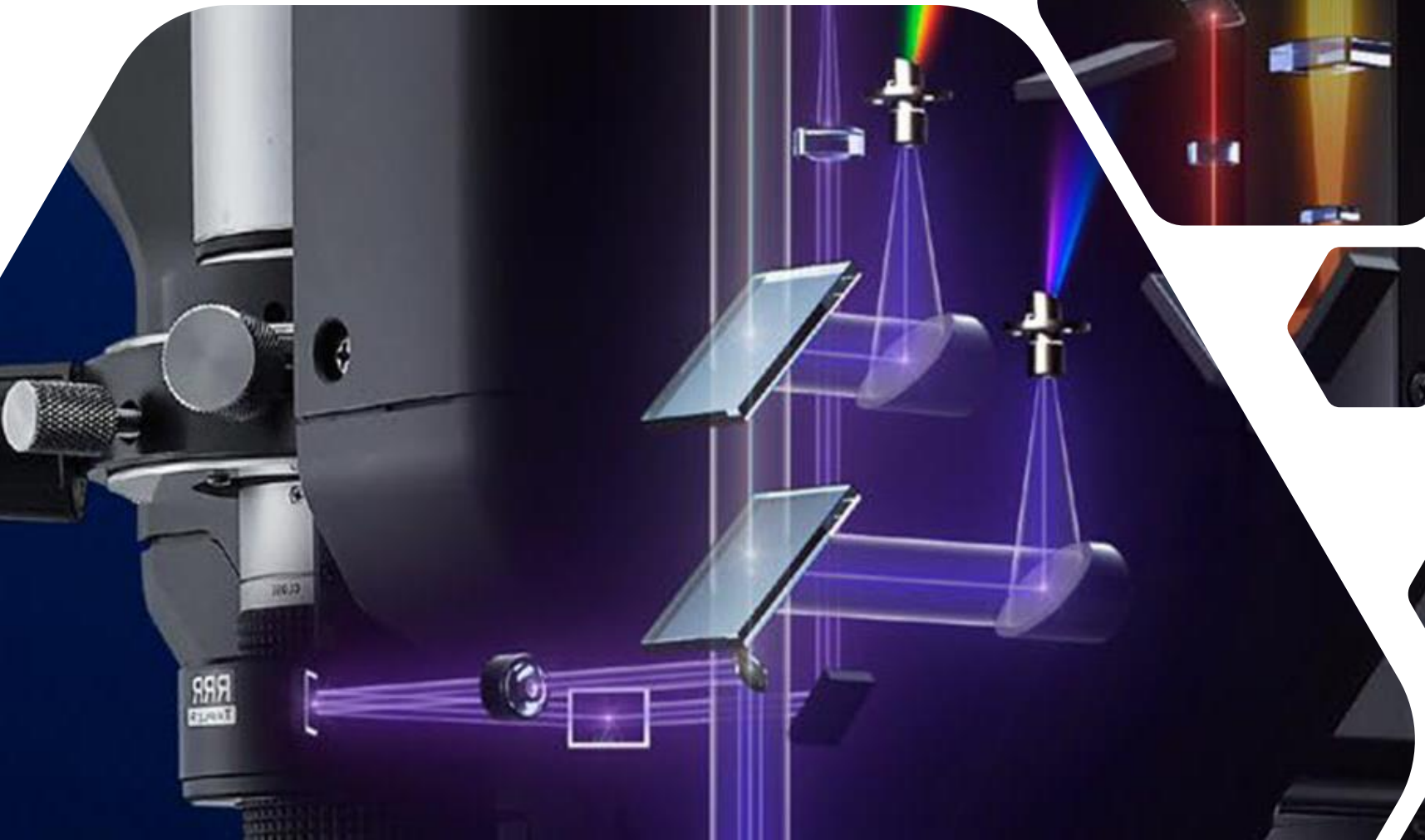
OSMIUM-INSTITUT

zur Inverkehrbringung und Zertifizierung von Osmium GmbH





Laser **I**nduced **B**reakdown **S**pectroscopy (1)

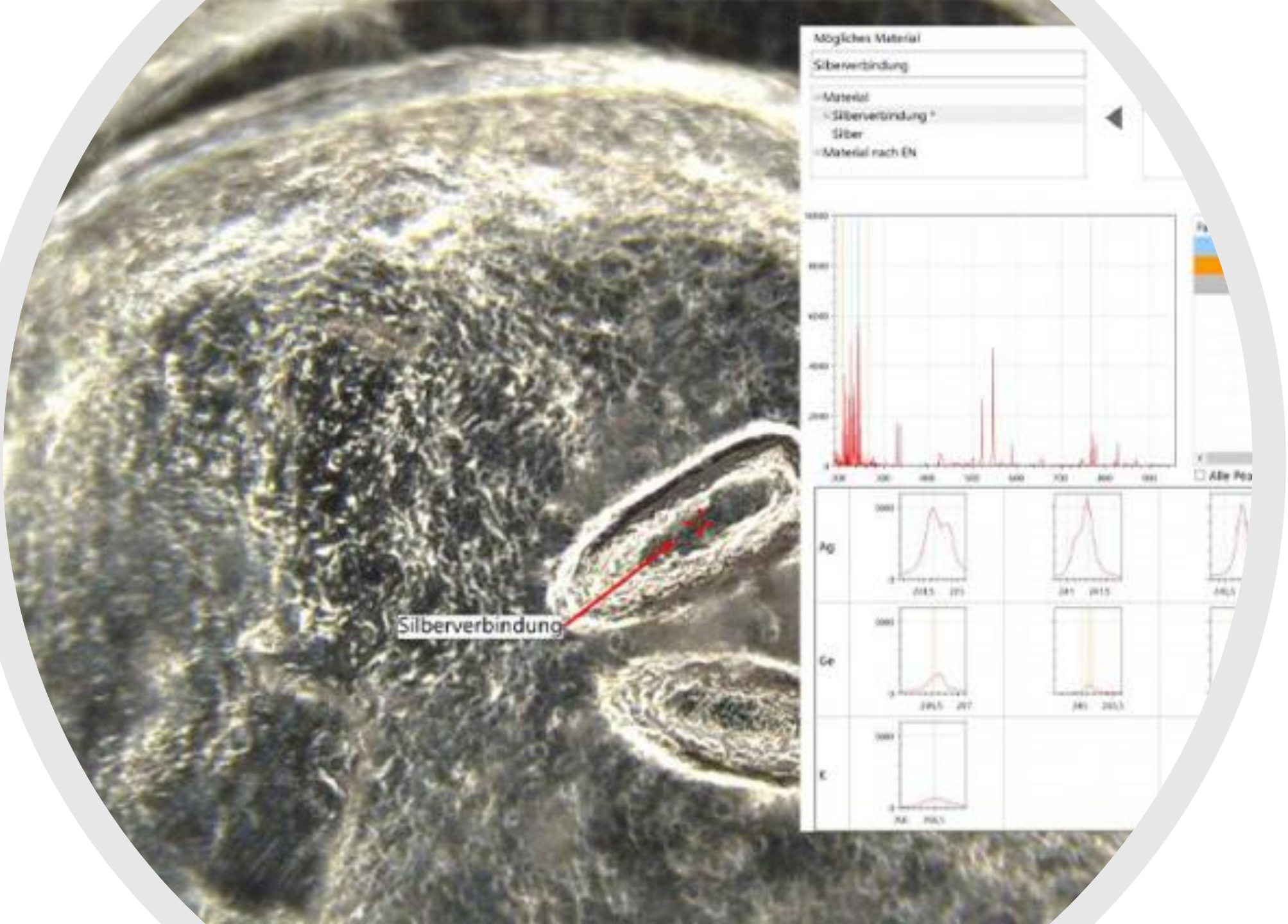
- A laser pulse with a length of one nanosecond generates a short-lived and focused high-energy plasma burst at a defined location on the sample.

- The burst has a radius of 0.005 mm due to its extreme energy density. The plasma is formed from the surface material, which is deposited in a narrow area and emits light.

- The procedure is much more accurate and faster than the classical methods of X-ray fluorescence analysis. Neither radiation protection, a radiation protection officer, nor complex preparation of the sample is necessary for measurement.

- The emitted light is split into its different wavelengths using a spectrometer. The light intensity of the different wavelengths is recorded in the detector and electronically processed.

- The sum of all spectra of the atoms contained in the sample is plotted in a wavelength diagram.


Mögliches Material
Silberverbindung
Material
Silberverbindung *
Silber
Material nach EN
Silberverbindung
Ag
Ge
C

Laser **I**nduced **B**reakdown **S**pectroscopy (2)

- The characteristic spectra are selected and quantified. A percentage of each element contained is calculated from the total sample.

- The resulting information is a qualitative and quantitative analysis of the sample's contained elements at the point of measurement. If one element is to be measured specifically, only the wavelengths of this element are considered in the measurement.

- It is also possible to exclude elements from the measurement to disregard their content in the analysis.

- A special variant of quantitative determination is the analysis of compositions at different depths below a surface. For this purpose, the laser penetrates the material several times in short pulses.

- In this way, up to 15 times the depth of a simple measurement can be achieved. In each of the 15 depth points, the selected analytical variant is performed qualitatively or quantitatively.

Material Analysis:

Qualitative and quantitative analysis of surfaces, coatings, particle analysis, contamination analysis, toxin analysis, and purity analysis. Most elements can be detected in solids as well as in liquids. Material analysis is usually used in the following areas:

Surveying and Documentation

- Microscopic particles and small objects, tools, machine parts and all other types of objects and components are measured, weighed, scanned, and stored as 2D images and 3D structures.

- Damage and wear can be observed and scanned at extreme resolutions. Materials from your suppliers can be subjected to an inspection.

- Manufacturing allowances on a micrometer scale are accurately sampled and documented. Mapping of particles on surfaces can be done and defined particle counts are performed.

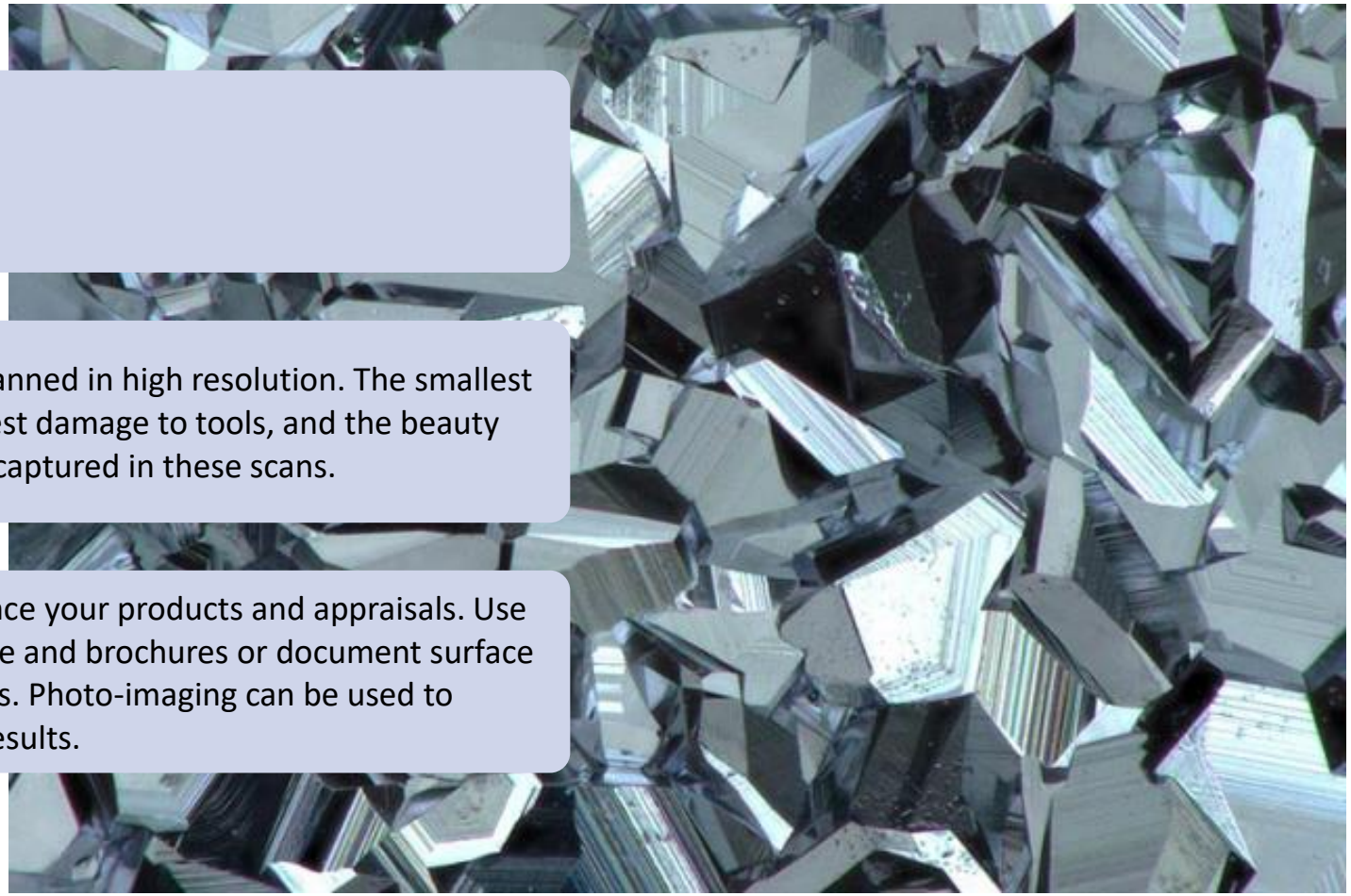
Forensics

- Have the smallest contaminants at a crime scene qualitatively tested for composition. Determine the quantitative composition of particles for thousands of objects on the smallest surfaces.

Nanoscale Imaging

Surfaces’ structures are scanned in high resolution. The smallest defects in coins, the smallest damage to tools, and the beauty of the micro world can be captured in these scans.

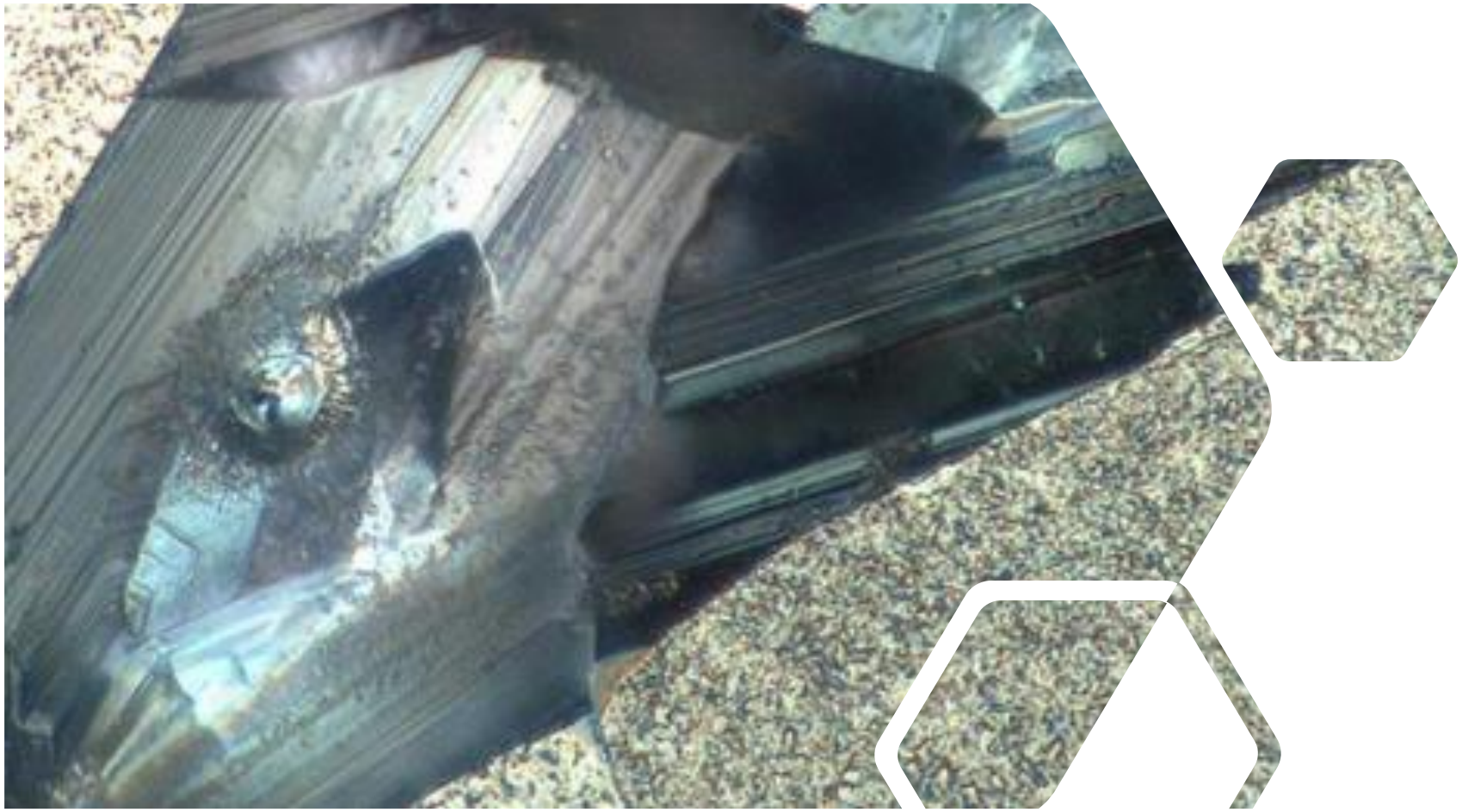
Scans are created to enhance your products and appraisals. Use the images for your website and brochures or document surface defects and alloy impurities. Photo-imaging can be used to clarify the measurement results.



Damage Analysis

Material testing and material analysis in the event of damage to goods are essential to discover causes of damage, understand the mechanism of the damage, and to take remedial action quickly in production.

For legal proceedings, the documentation of the material properties is part of the scope of an expert opinion. The better this documentation, the better the chances in a trial.



Databases

Osmium institutes are set up to operate quality control databases.

- You will receive a high-security database tailored to your needs, in which your scans, analyses, and evaluations of your products will be stored.
-
- Document incoming and outgoing materials on your premises. Perform sample analysis or check all materials used during production.
-
- This way, you, your customers, and all persons who should have access to the data can view the necessary information in an orderly manner.

- High-resolution data is backed up multiple times and made available to your target groups online.

Our task is the qualitative and quantitative analysis of the surface and composition of pure materials, alloys, ores, and mixtures.

- In earlier times, photoelectron spectroscopy (PES) or secondary ion mass spectrometry (SIMS) were the primary methods used for material analyses of surfaces. For thin-film analyses, a scanning electron microscope (SEM) and X-ray micro analysis (EDX) or infrared spectroscopy (IR/ATR) were also frequently used.

- All these methods are nowadays replaced by laser-based material analysis, which allows one to work under much simpler laboratory conditions and reduces necessary material preparation. The speed and accuracy of the method are particularly substantial.

- In the past, additional methods had to be used for the analysis of a surface if the material properties under one or more coatings were to be analyzed in addition to the surface.

Detectable Elements

We analyze the composition of base materials and their impurities. For this purpose, the proportions of the following elements are detected. Additionally, we can create an overview of the quantitative proportions of all contained and detected elements of the individual sample. Individual elements can be excluded as targets of the analysis if required.

Main Group Elements:

H, Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, Ba, B, Al, Ga, In, Tl, C, Si, Ge, Sn, Pb, P, As, Sb, Bi, O, Se, Te, F, Cl, Br, J

Subgroup Elements:

Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Re, Fe, Co, Ni, Pd, Pt, Cu, Zn, Cd, Hg

Precious Metals:

Ru, Os, Pd, Pt, Rh, Ir, Ag, Au

Lanthanoids:

La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu

In the analysis of precious metals for you, we can safely and quickly determine:

For years, our institute has focused on the analysis of the eight precious metals. Special attention has been paid to the quantitative analysis of osmium. The qualitative and quantitative analysis of the precious metals was extended to most of the elements of the periodic table using the latest laboratory technology.

We prioritize analysis of tangible assets in the field of critical metals, refractory metals, and the analysis of ores.

- Alloy contents
- Purity of the base metal of an alloy
- Jewelry authenticity
- Contents of individual precious metals
- Surface coatings
- Core metals of ingots under coatings
- Cross sections of objects from precious metals
- Analysis of multiple coatings

There is a wide range of methods on the analytical market.

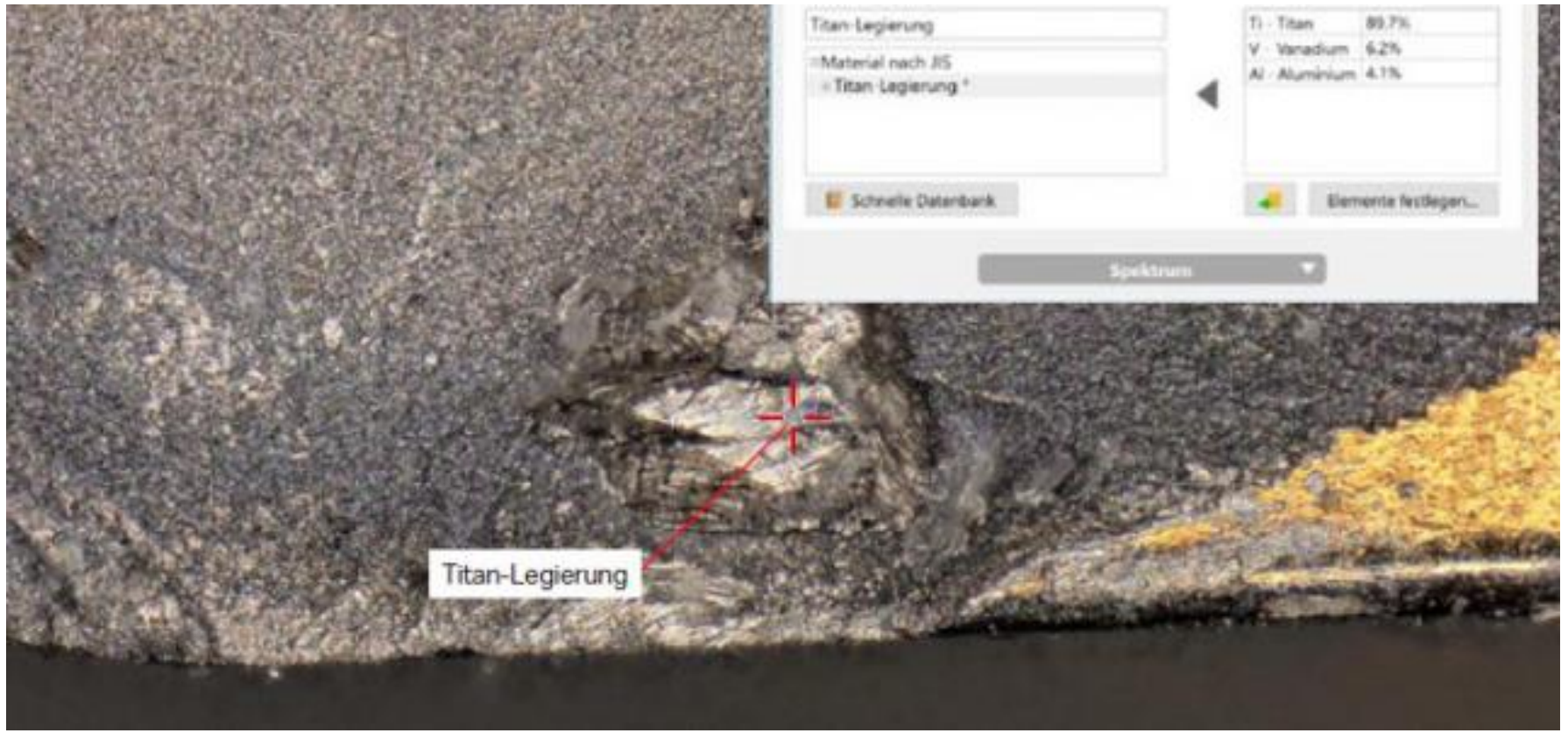
We have therefore set ourselves the following requirements when selecting our analysis and measurement technology:

- Best price-performance ratio for our customers
- Easy to understand evaluations
- Vacuum-free analytics
- Abstaining from using methods that require radiation protection
- High operating speed
- Easy sample preparation
- Option offered to further study solid and liquid samples
- Wide range of detectable elements
- Minimally invasive effects on the sample
- Possibility of using calibration bodies
- High penetration measurement depth
- Affordable pricing, even with express services

Automotive and Metal Industry

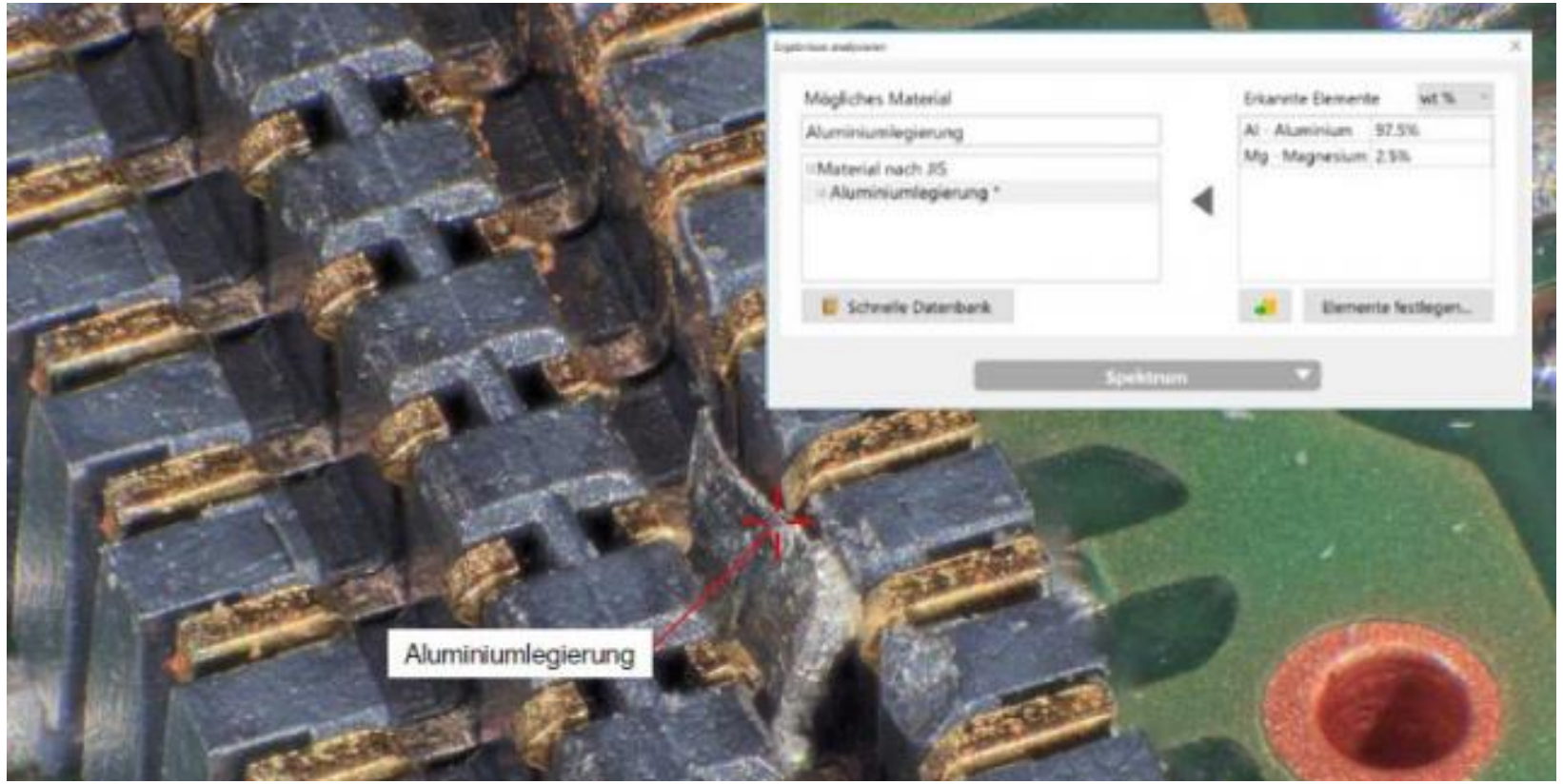
- Analysis of the metals incorporated into a cutting tool detected the elements titanium (Ti) and vanadium (V). This indicates that the metal is a titanium alloy (Ti-Al-V).

- The ability to immediately determine whether the contamination is part of the machined target or originates from the machining process significantly reduces the time required to determine countermeasures.



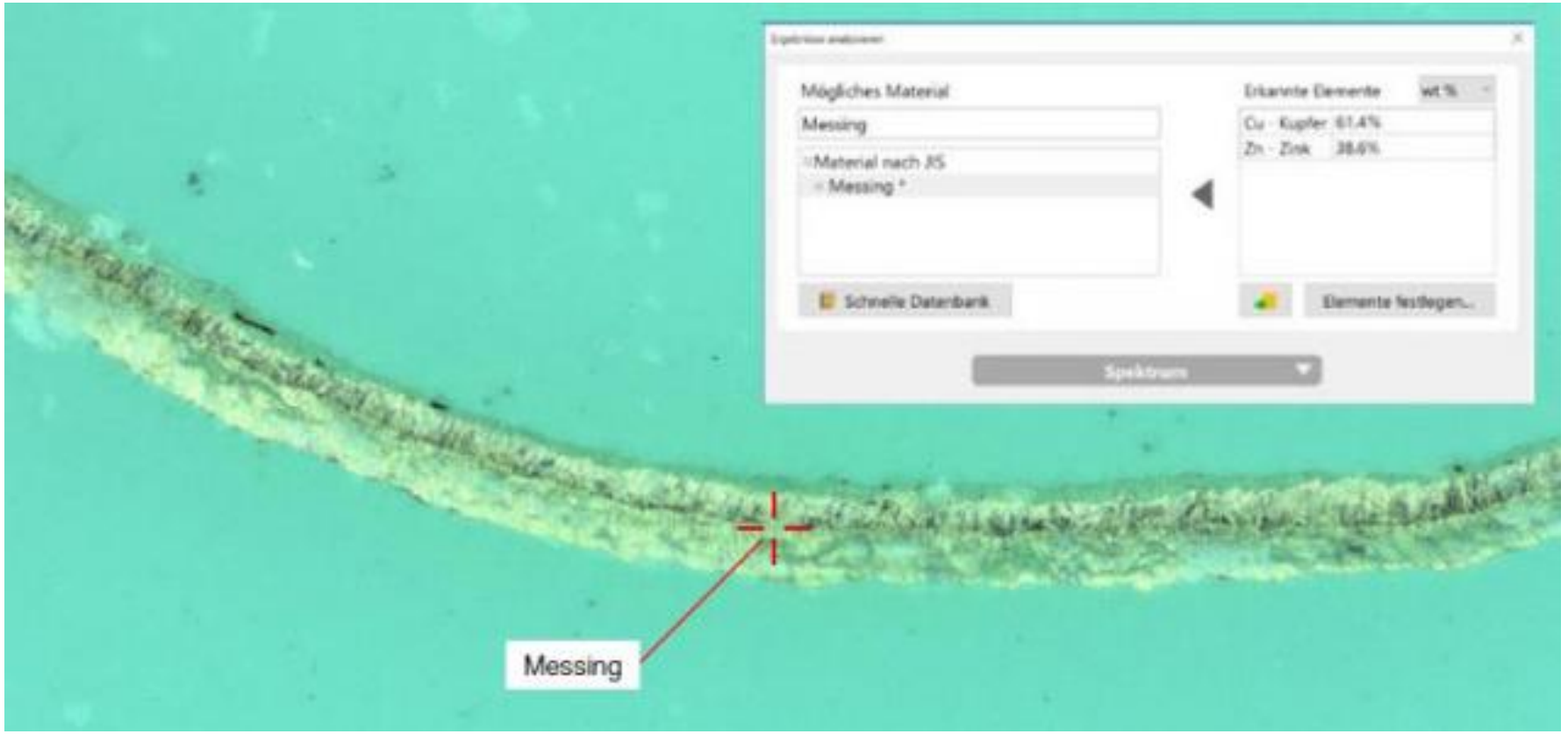
Electrical and Solar Industry

- Analysis of foreign particles on a PCB slot revealed aluminum (Al) and magnesium (Mg), indicating an aluminum alloy (Al-Mg).
- By determining that the problem is not caused by the product itself, the usage environment and methods can subsequently be controlled. This allows the cause of the problem to be quickly corrected.



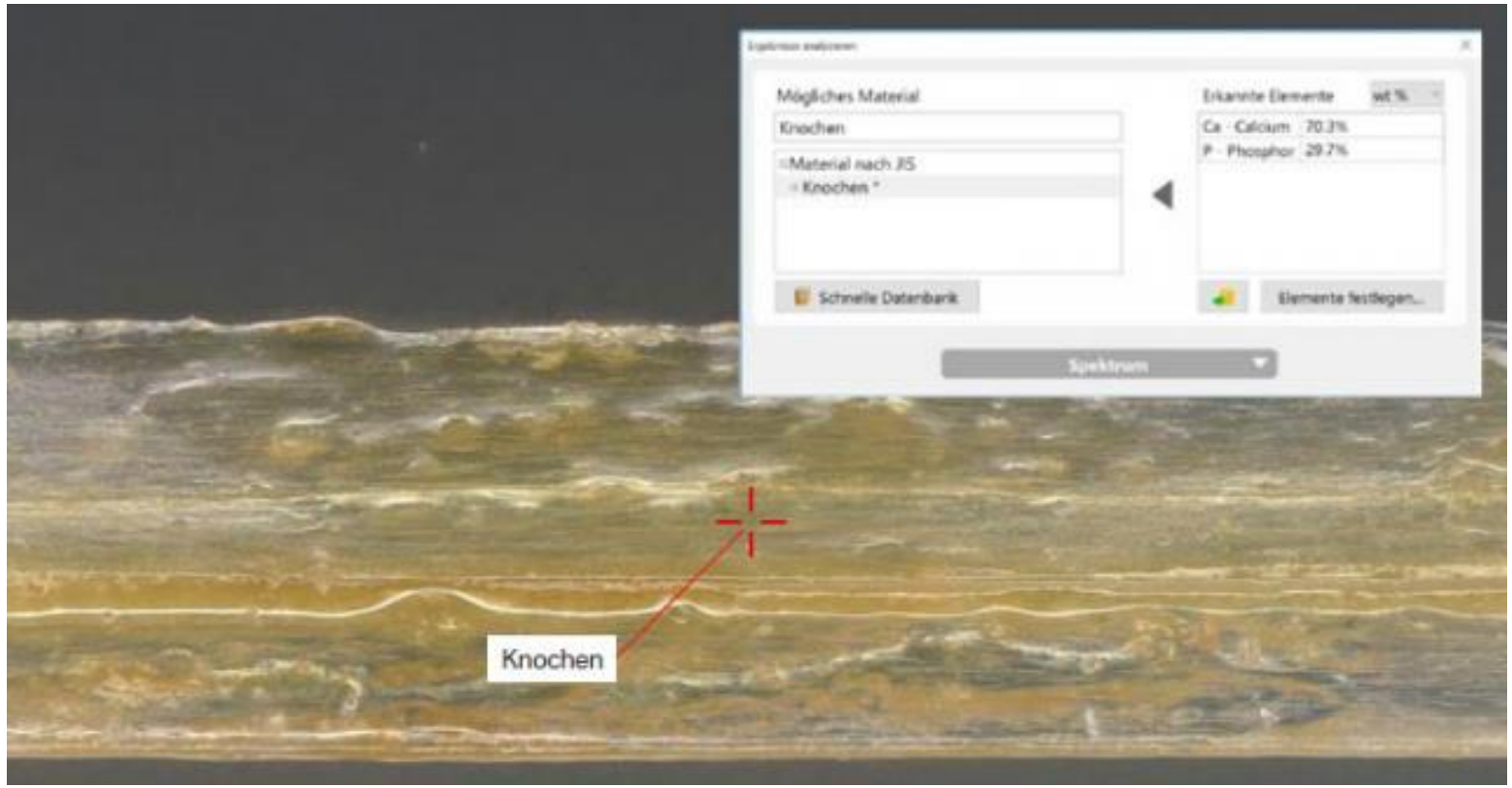
Chemical and Raw Materials Industry

- Material analysis in a multilayer film revealed copper (Cu) and zinc (Zn), indicating brass.
- This made it possible to identify which processes needed to be improved, thus requiring much less time to define countermeasures.



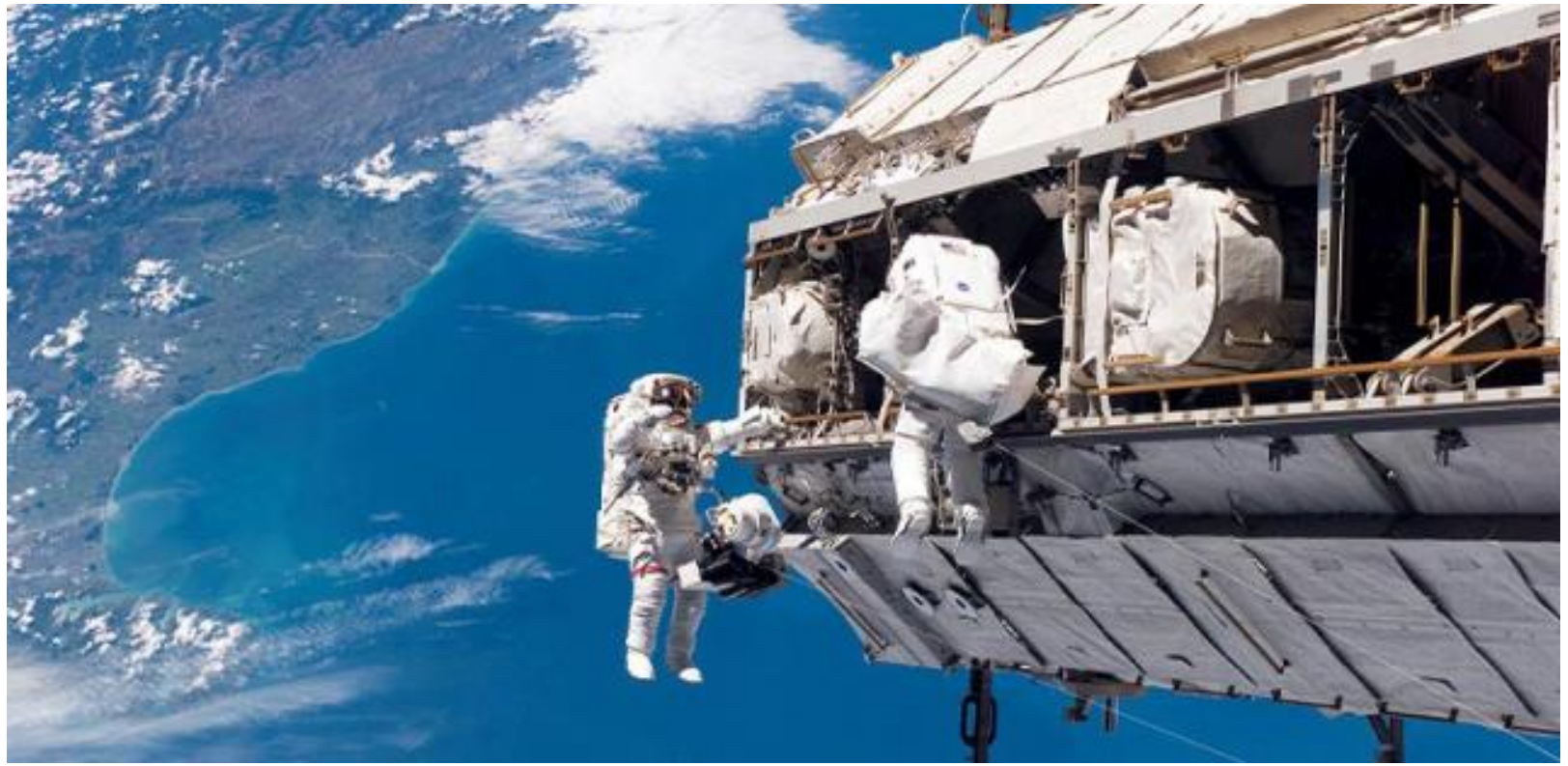
Food and Pharmaceutical Industry

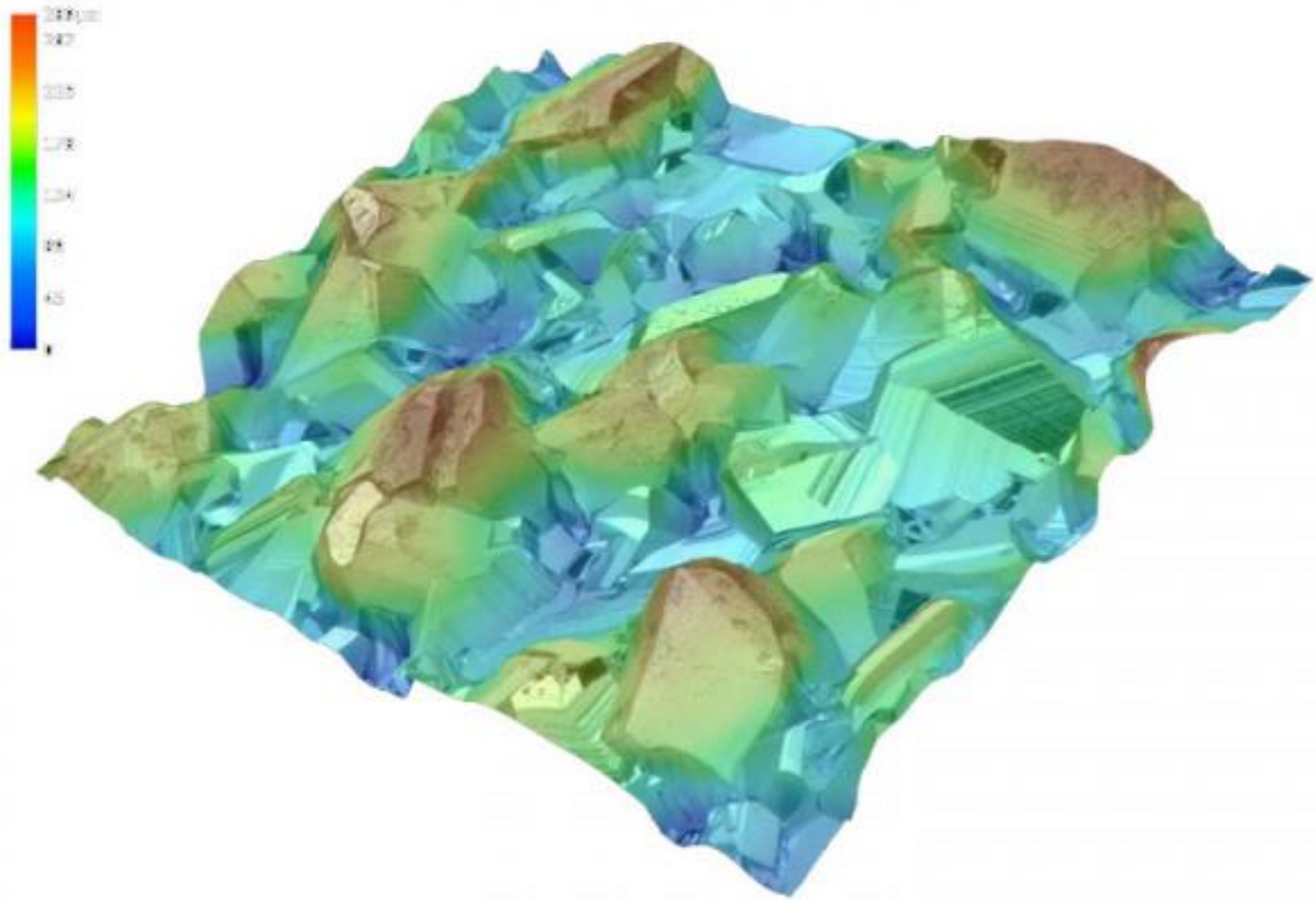
- The detection of calcium (Ca) and phosphorus (P) indicates contamination by bone material in the food.
- While previous models only allowed guesses about foreign particles based on color and shape, identifying foreign particles on the spot enables improved quality assurance and production.

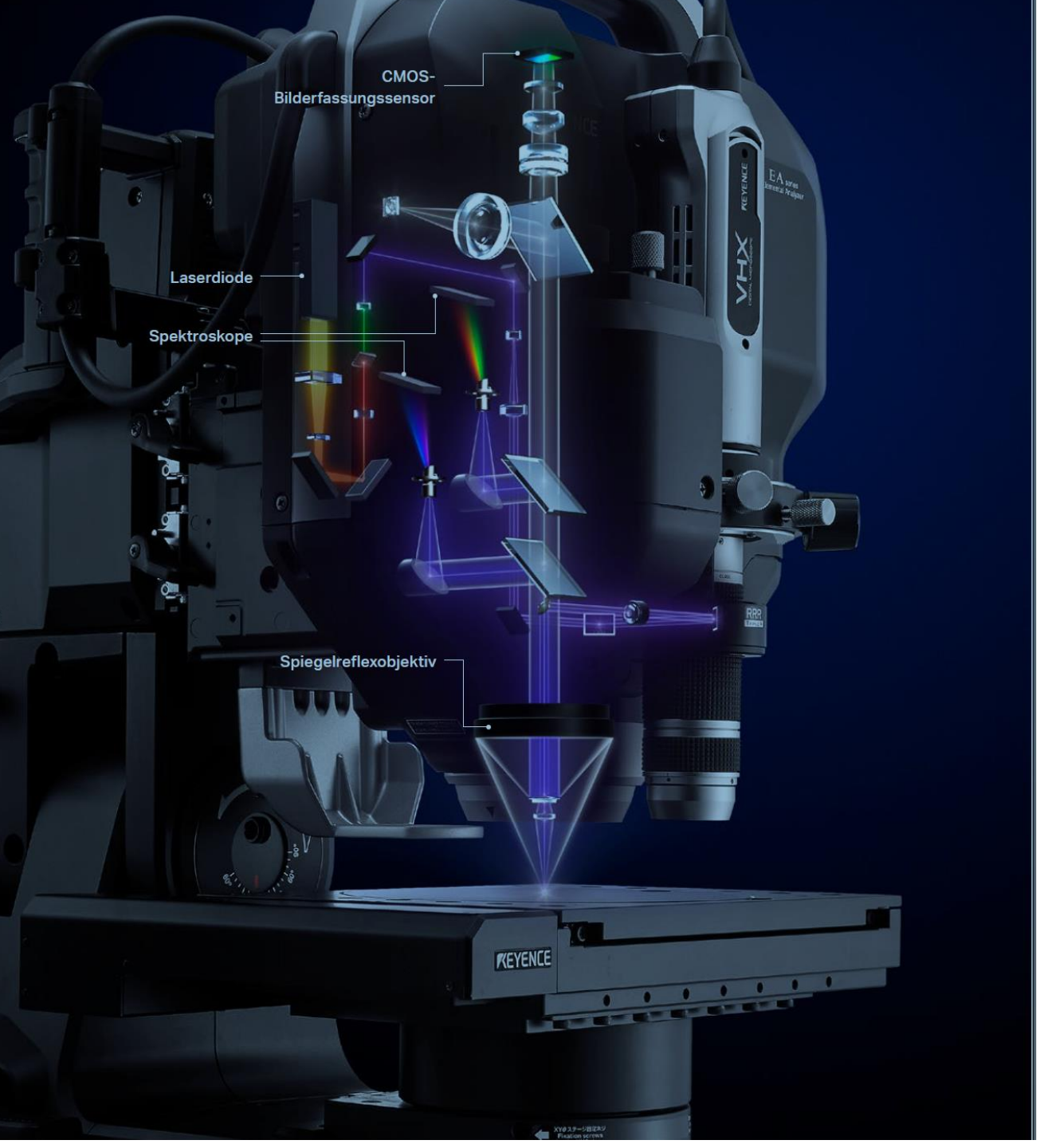


Aerospace Industry

- Whenever human lives depend on the technical flawlessness of a device, analytics is essential early in the development process. Materials are exposed to extreme conditions in the aerospace industry.
- In this industry, therefore, measurements of the layer structure, examination of defects, determination of fiber orientations, particle analysis and the measurement of geometric structures that are under severe stress are important tools of the trade.







Hybrid aus Digitalmikroskopie und Materialanalyse mit einer kompakten, aufsteckbaren Einheit

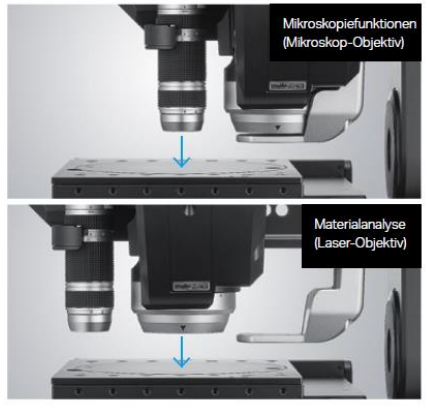
Materialanalyse-Einheit mit Dreifachoptik

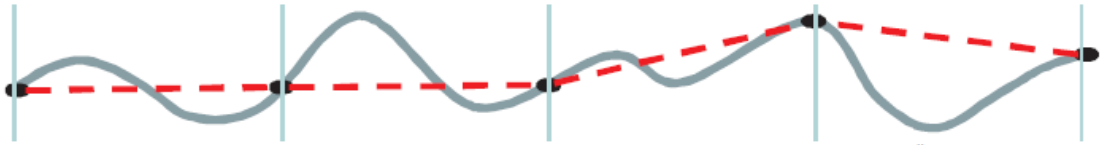
In der kompakten, abnehmbaren Einheit befinden sich Optiken für Betrachtung, Laser und Spektroskopie. Diese speziell entwickelte Dreifachoptik verfügt über einen zentralen Lasertransmissionspfad mit einer Spiegelreflexoptik in der Nähe des Objektivs zur leistungsstarken Fokussierung der Plasmaemission. Die Kombination der von KEYENCE entwickelten Technologien für Optik, Laser und Spektroskopie ermöglicht eine deutliche Miniaturisierung der Komponenten sowie eine beeindruckende Leistungsstärke.

Einfache Identifizierung von Materialien

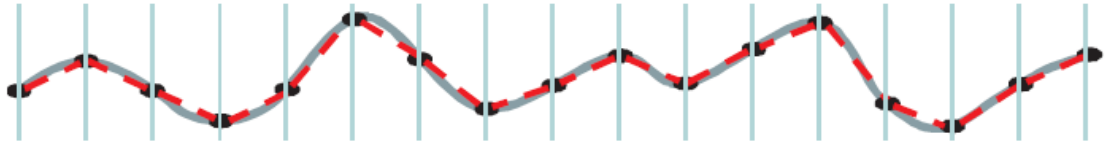
Verknüpfungsfunktion für Sichtfeld und Fokus NEU

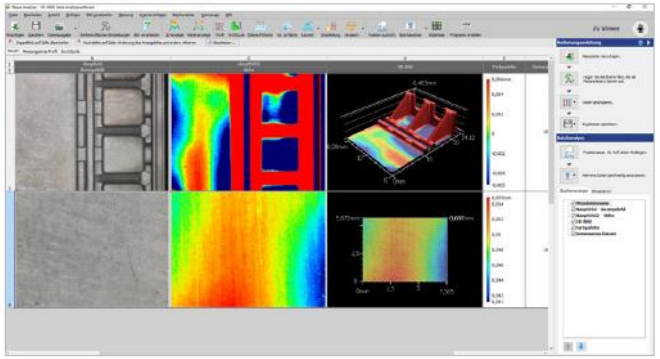
Mit der Verknüpfungsfunktion für Sichtfeld und Fokus können das Mikroskop-Objektiv und das Laser-Objektiv durch Verschieben der beiden Objektive dasselbe Sichtfeld nutzen. Dadurch ist während der Materialanalyse keine Ausrichtung und keine Fokuseinstellung mehr erforderlich. Das Verschieben und Anschließen des für die jeweilige Anwendung am besten geeigneten Objektivs gewährleistet eine effiziente Analyse in jeder Situation, sowohl bei geringer als auch hoher Vergrößerung.

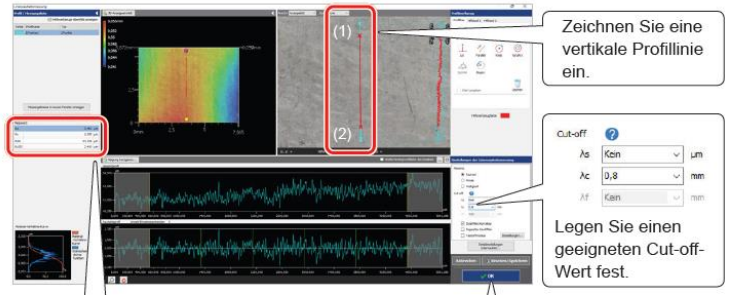




Wenn Sie bei der Rauheitsmessung eine andere Option als „Hohe Auflösung“ verwenden, kann die Spitze nicht ermittelt werden.







24h service

Analytics can also be carried out with all due care in an express procedure.

- Our normal response time after sample receipt is two working days until the finished result.
- However, the osmium institutes also offer the analysis services with a 24-hour service.
- Upon receipt of the samples at the institute, we assure our customers that the analysis will be performed within 24 hours.
- The extra charge for this service is 30% on top of the normal price. If the work must be done on weekends, the surcharge is 50%.

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