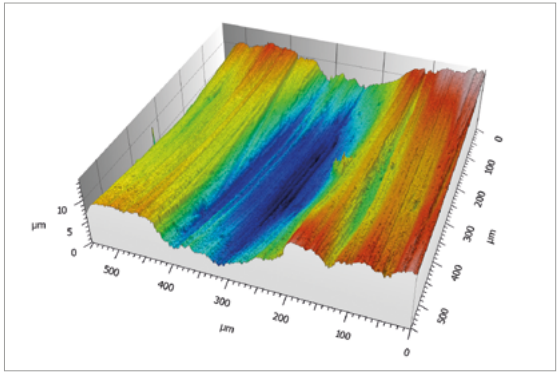
Product Information
Version 1.0

ZEISS LSM 900 for Materials

Your Versatile Confocal Microscope
for Advanced Imaging and Surface Topography

Your Versatile Confocal Microscope for Advanced Imaging and Surface Topography

Welcome to the fascinating world of confocal imaging. LSM 900, the confocal laser scanning microscope from ZEISS, is the one instrument you will need for materials research and analysis. Use it to characterize 3D microstructures and surfaces in your lab or multi-user facility. When you upgrade your ZEISS Axio Imager.Z2m upright light microscope or ZEISS Axio Observer 7 inverted microscope with LSM 900, you will be combining all essential light microscopy contrasting methods for materials with high precision topography—on a single instrument. With no need to change microscopes, you'll save time on set-up. You'll also have the benefit of automation, not only during data acquisition but in post-processing, too. In addition, LSM 900 always gives you the advantage of non-contact confocal imaging—for example, when evaluating surface roughness.



Simpler. More Intelligent. More Integrated.

Combine Light Microscopical and Confocal Imaging to Get More Information

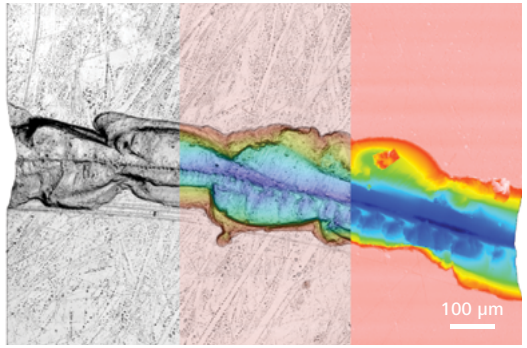
ZEISS LSM 900, your high-end confocal platform, is made for demanding materials applications in both 2D and 3D. All you need is one microscope to perform multi-modal analyses. You can characterize topographic structures of your sample and evaluate surface roughness with non-contact confocal imaging. Determine the thickness of coatings and films non-destructively. Solve microscopy tasks with the market-leading range of contrast techniques, including polarization and fluorescence in both reflected and transmitted light. Characterize metallographic specimens in reflected light as well as thin sections of rock or polymer in transmitted light.

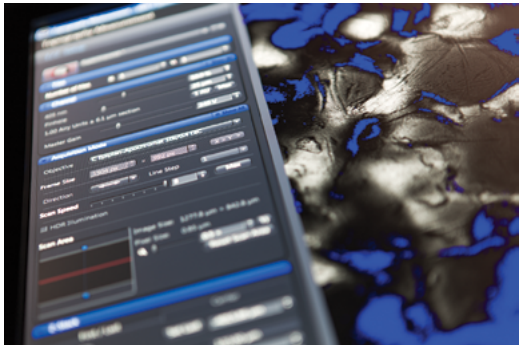
Investigate Your Sample Efficiently

Being able to perform analyses and imaging on new materials and structures without having to change microscopes will reduce set-up times and also speed up your time-to-result. Optimize your processes with automated data acquisition at multiple positions on your sample. Take full control of your data and its post-processing. A scanning field with up to 6,144 × 6,144 pixels gives you the advantage of full flexibility in size and orientation of the scanning region. You'll acquire only the region of interest.

Expand Your Imaging Range

A confocal unit extends your capacity for widefield investigations. When you upgrade your Axio Imager.Z2m upright microscope or your Axio Observer 7 inverted microscope with LSM 900, you'll gain the added advantage of its versatility in hardware—for example, objectives, stages and illumination—as well as software and interfaces. Use the optional ZEISS ZEN Intellesis software, a machine learning-based solution for image segmentation, to identify different phases of your complex samples. Add ZEISS ZEN Connect and ZEISS ZEN Data Storage to perform smart data management and enjoy the benefits of a central database solution. In this way, you'll bring all your data into context over different imaging modalities, instruments or multi-user experiments.

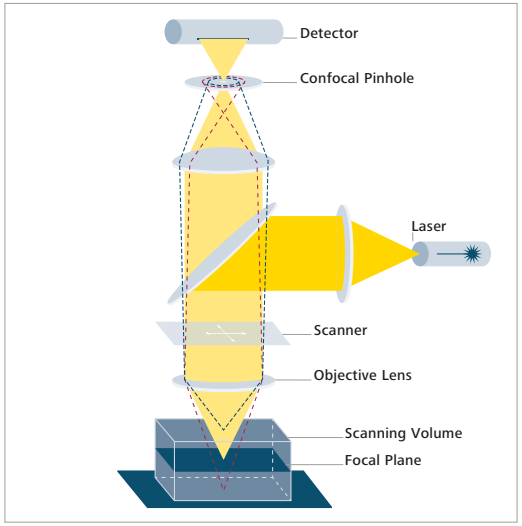




Your Insight into the Technology Behind It

The Confocal Priniciple – Image Your Entire Sample in 3D

LSM 900 is a microscope system that uses laser light in a confocal beam path to capture defined optical sections of your sample and combine them in a three-dimensional image stack. The main feature of a confocal microscope is its aperture (usually called a pinhole) which is arranged in such a way that out-of-focus information will be blocked and only in-focus information can be detected. An image is generated by scanning in the x,y-direction. In-focus information appears bright while out-of-focus information is dark. By changing the distance between sample and objective lens, the sample is non-destructively optically sectioned and an image stack is generated. By analyzing the intensity distribution of a single pixel through the image stack, you can calculate the corresponding height of the object. The height information over the whole field of view can then be combined to form a height map.



Schematic of confocal principle. In-focus information (yellow). Out-of-focus information (red and blue dotted lines).

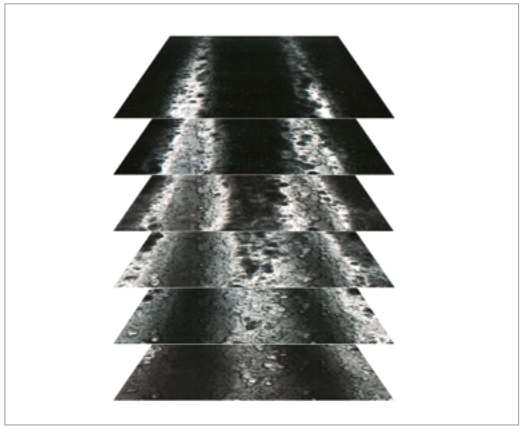
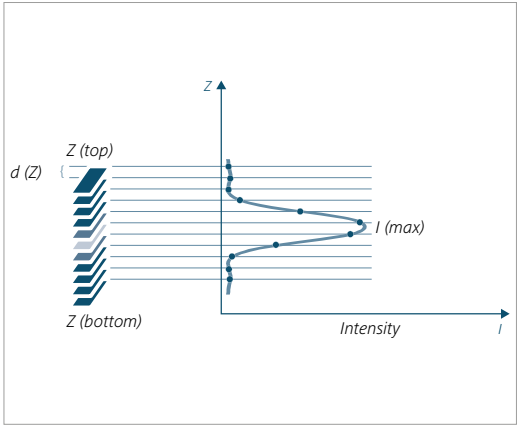
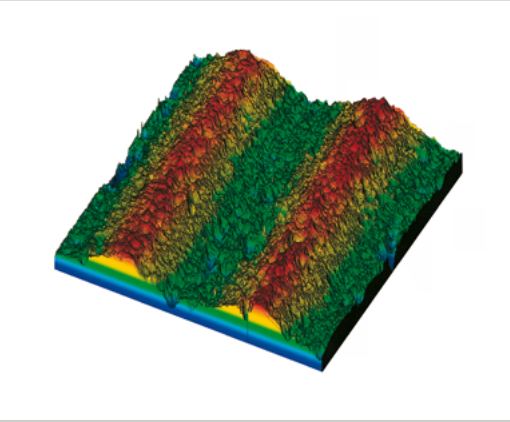


Image stack.



Intensity distribution of one pixel through the image stack.

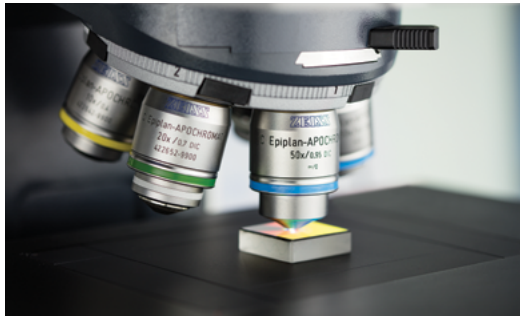


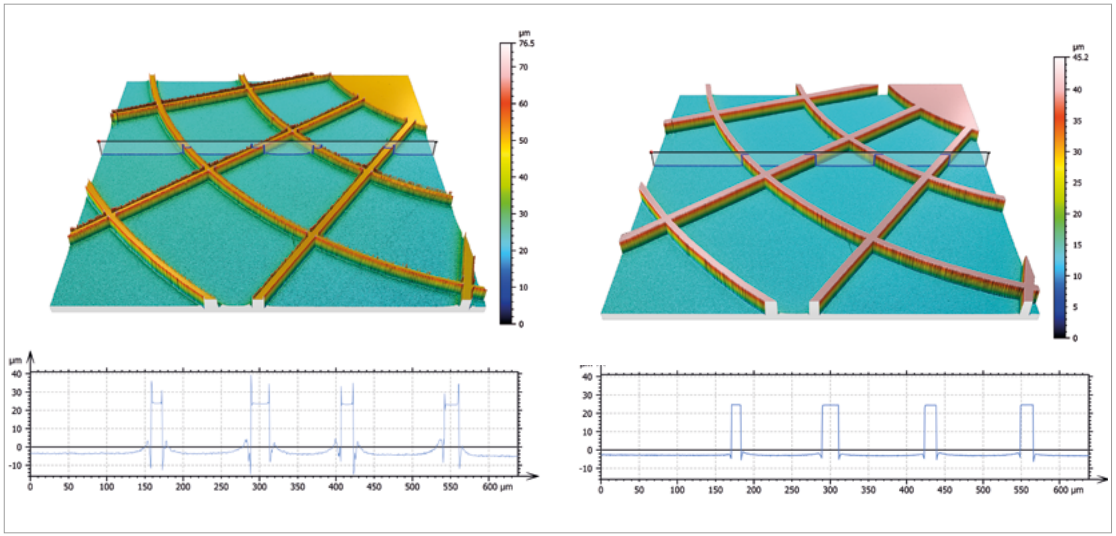
Sample surface, 2.5D representation.

Your Insight into the Technology Behind It

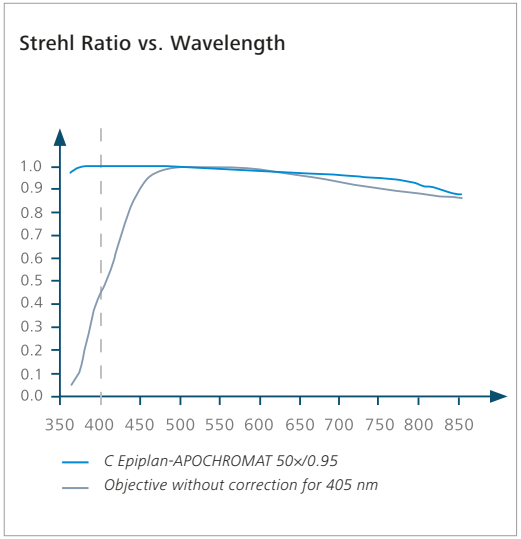
Rely on C Epiplan-APOCHROMAT Objectives

Use the high-power, apochromatically and flat-field-corrected C Epiplan-APOCHROMAT objective series to satisfy exacting demands for reflected light applications. This will give you the benefit of imaging with enhanced contrast and high transmission in the visible spectral range. Get optimum results in conventional widefield microscopy, differential interference contrast (DIC) and fluorescence. C Epiplan-APOCHROMAT objectives are specially designed for confocal microscopy, achieving minimum aberrations at 405 nm over the full field of view. Optimized objectives produce accurate topography data with less distraction noise and artifacts, thus revealing more details of your surface.





See the effect of specially-designed objectives for confocal microscopy. Left: Result imaged with an objective without correction for 405 nm. Right: Result imaged with C Epiplan-APOCHROMAT objective for a 3D-view with an extracted profile line. While both the artifacts at the edges and noise on the plane surface are clearly visible in the left image, the artifacts are not observed on the right.



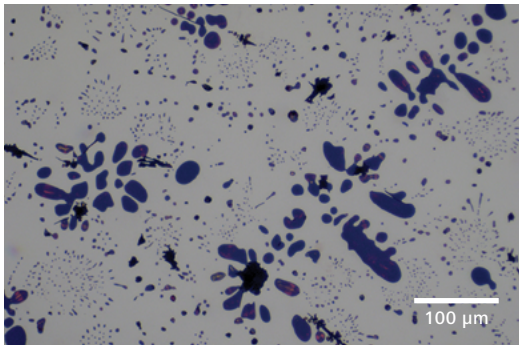
Assessment of the optical quality of C Epiplan–APOCHROMAT objectives by the Strehl ratio. It gives the performance of a real system relative to a theoretically perfect system with a value of 1.
Dotted line: 405 nm, optimized confocal laser wavelength.

Expand Your Possibilities

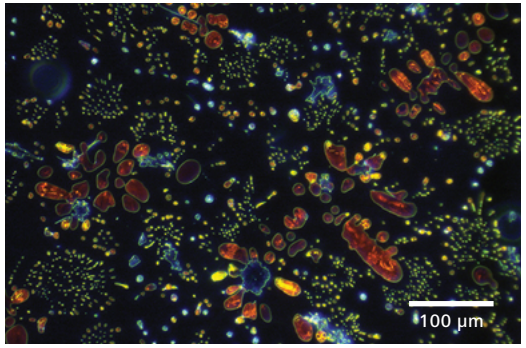
Experience Competence in All Contrasting Techniques

Brightfield and Darkfield:
Maximum Homogeneity and a Stray Light Free Background

In brightfield, Axio Imager 2 provides homogeneous illumination and exceptional contrast. By minimizing disturbing stray light and reducing the longitudinal color aberration of the illumination optics, the darkfield illumination contrast is suitable for the most challenging samples and impresses even when faced with the finest of structures. Switching between the techniques only requires a simple turn. The motorized stands allow you to work particularly quickly and conveniently.



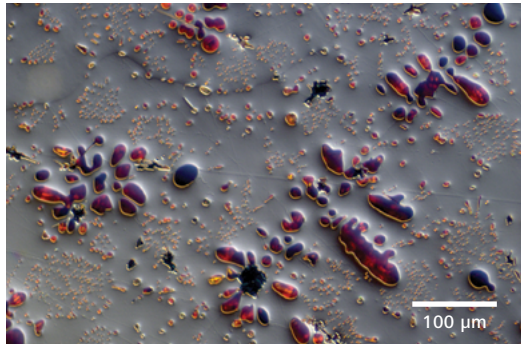
Copper casting, brightfield.
Objective: EC Epiplan-NEOFLUAR 20×/0.5



Copper casting, darkfield.
Objective: EC Epiplan-NEOFLUAR 20×/0.5

C-DIC: Perfect for All Structures

Circular Differential Interference Contrast (C-DIC) is a polarization-optical technique which, in contrast to ordinary Differential Interference Contrast (DIC), uses circularly polarized light. This technique has a number of decisive advantages for the contrasting of differently aligned object structures. The specimen no longer has to be rotated for best image contrast and quality, as is the case in basic DIC. With C-DIC it is simply enough to adjust the position of the C-DIC prism to achieve best image quality whether it is for contrast and/or resolution independent of sample orientation. And all this is possible using one C-DIC prism for a homogeneous unsurpassed quality image.

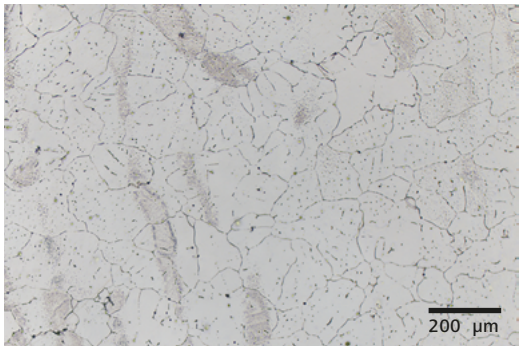


Copper casting, C-DIC.
Objective: EC Epiplan-NEOFLUAR 20×/0.5

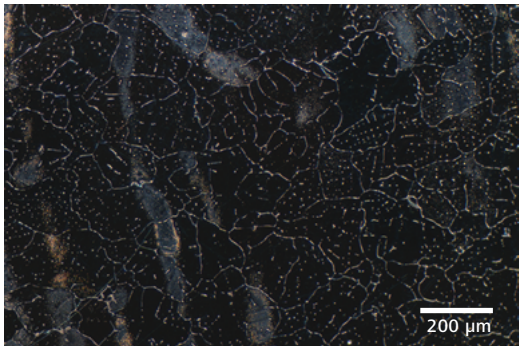
Expand Your Possibilities

Experience Competence in All Contrasting Techniques

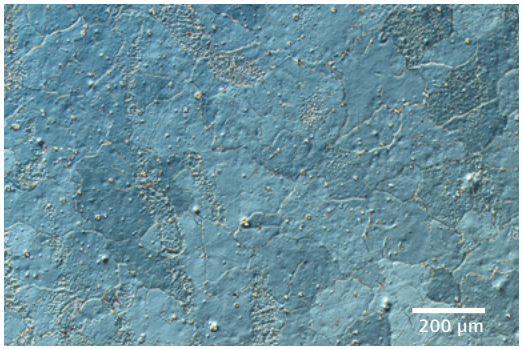
Brightfield



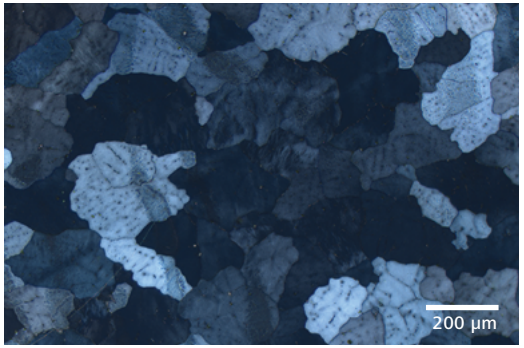
Darkfield



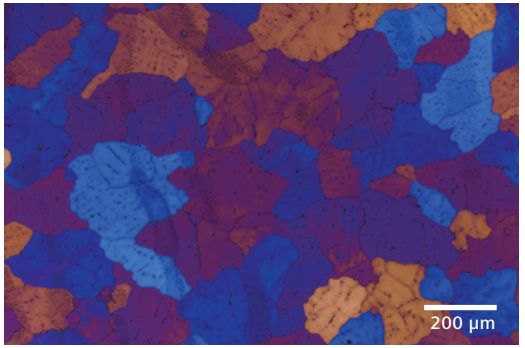
C-DIC



Polarization Contrast



Polarization with Additional Lambda Plate



Contrasting Technique	Reflected Light	Transmitted Light
Brightfield	●	●
Darkfield	●	●
DIC	●	●
C-DIC	●	
Fluorescence	●	
Phase contrast		●
Polarization	●	●

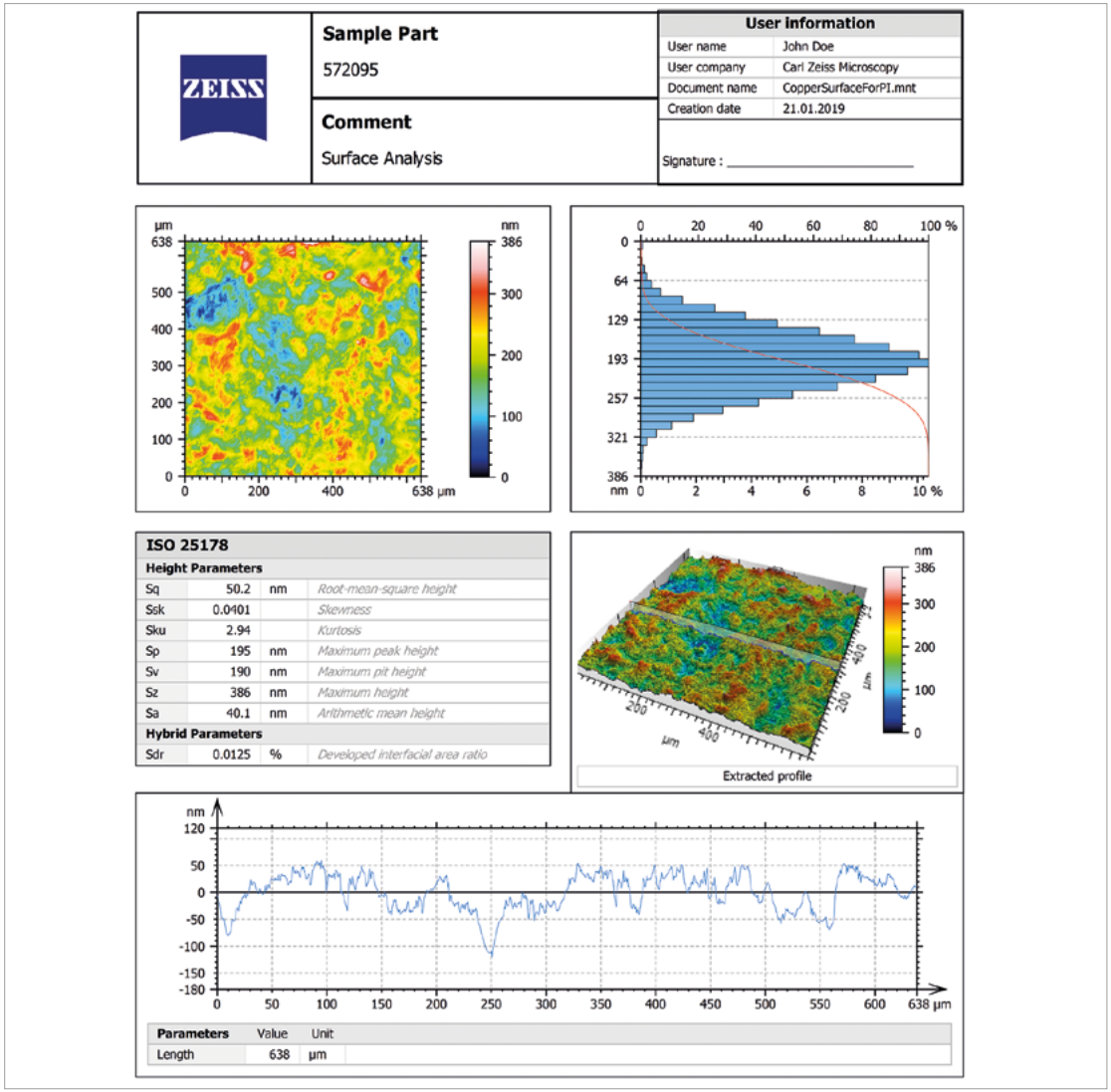
Sample: pure aluminum; Objective: EC Epiplan-NEOFLUAR 10×/0.25, same position acquired with different contrasting techniques

Expand Your Possibilities

Inspect Surfaces in 3D with ConfoMap

ConfoMap is the ideal option to visualize and inspect measured surfaces in 3D. It lets you evaluate the quality and functional performance of surfaces in accordance with the latest metrology standards, e.g. ISO 25178. You can include comprehensive geometric, functional and roughness studies—and create detailed surface analysis reports. Add optional modules for advanced surface texture analysis, contour analysis, grains and particle analysis, 3D Fourier analysis, analysis of surface evolution, and statistics.

Visualize topography with height maps.

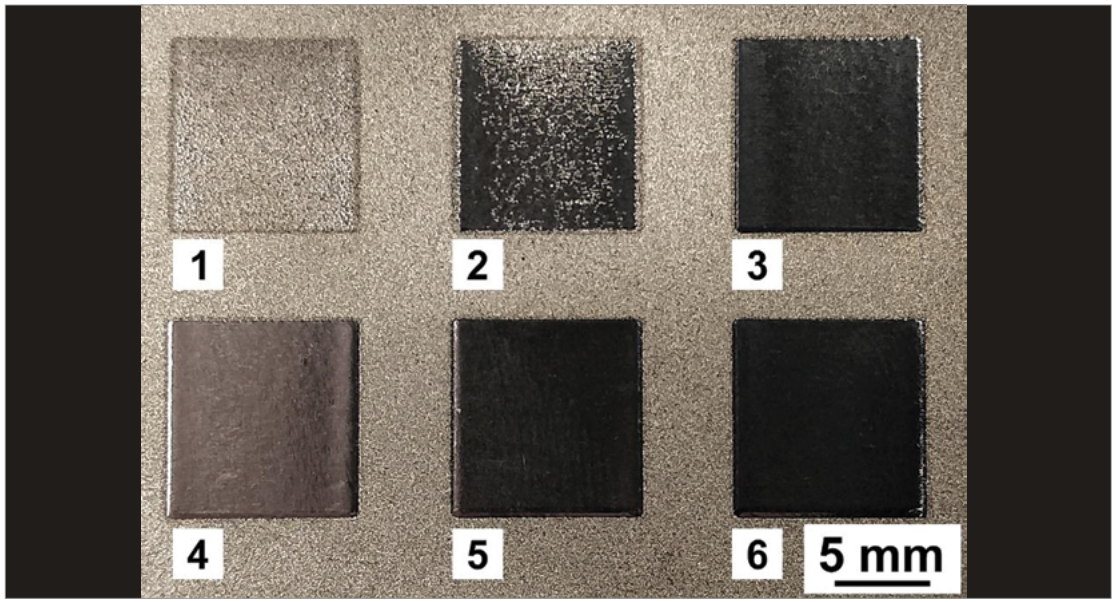


Profit from the functionality of ConfoMap. Perform analyses and find out more about your sample: color-coded height map (top left), Abbott-Firestone curve (top right), table of roughness parameters (mid left), location of extracted profile in 3D height map (mid right), profile from 3D height map (bottom).

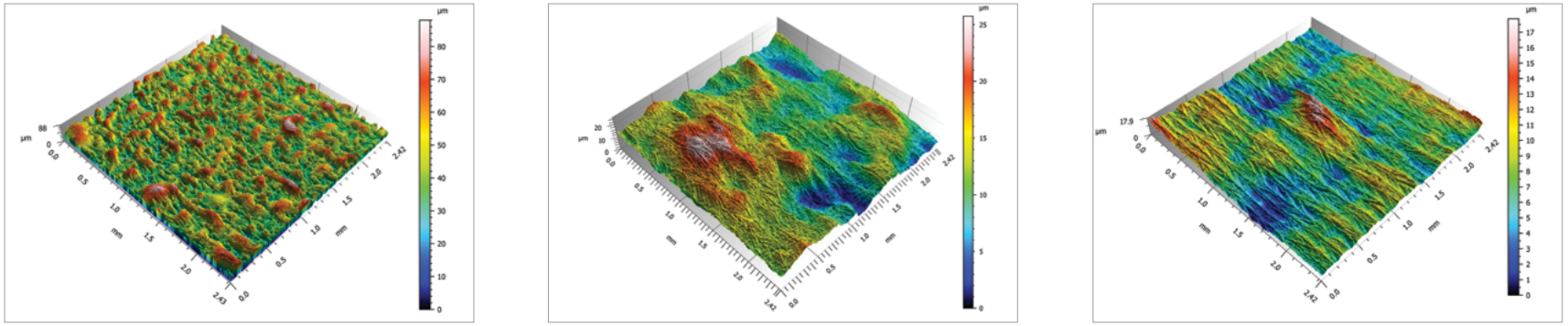
Expand Your Possibilities

Work More Efficiently with Automated Data Acquisition

Surface structure depends, among other things, on the machining process. To find the optimal process parameters, you will typically create sample surfaces and evaluate the surface structure. With LSM 900, you can now record measurement data at several points on your sample and thus get statistical information about the distribution of the surface structures. Or measure a large number of samples on the scanning stage. And you can do it all in a single process—certain of the comparability of your results thanks to the high repeatability of the recording conditions. Use the time you save through automation to plan new experiments.



Laser polishing parameter study on 316L test piece, field 1-6 with increasing in laser power.



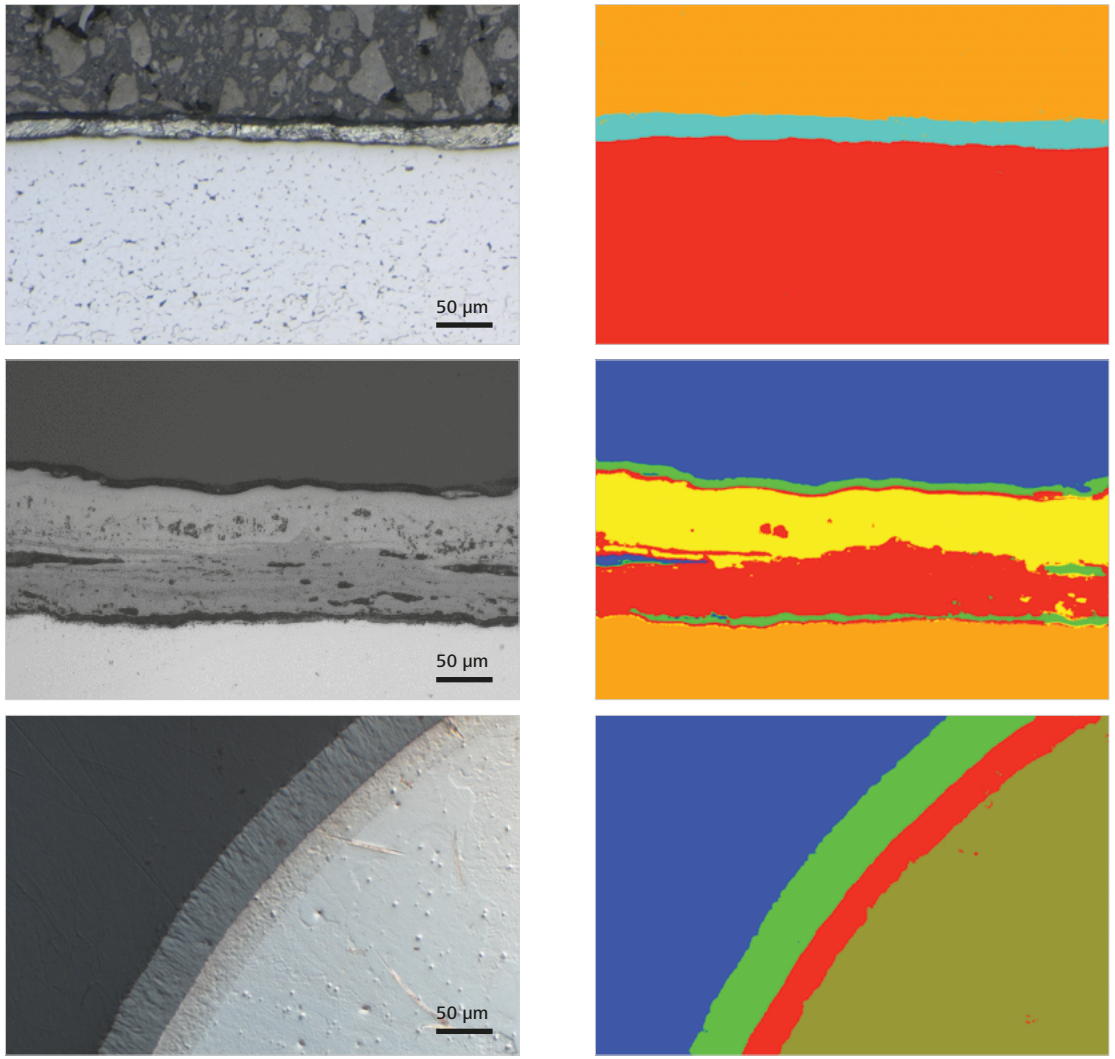
Laser polished surface of stainless steel test piece. 3D view of color-coded height map shows surface texture of areas with different process parameter. Surface of detail in field 2 (left), surface of detail in field 4 (center), surface of detail in field 6 (right). Area imaged: 2x2 tiles, objective: C Epiplan-APOCHROMAT 10x/0.4.

Expand Your Possibilities

Perform Advanced Image Processing across Microscopy Methods with ZEISS ZEN Intellesis

ZEISS ZEN Intellesis, a module of ZEISS ZEN digital imaging software, overcomes the bottleneck of segmenting your materials science images. The algorithm of ZEN Intellesis works independently of the microscope you used to acquire the image data, providing you with a model for automated segmentation. Once trained, the model can be used again and again on the same kind of data, with the benefit of consistent and repeatable segmentation, irrespective of the operator. ZEN Intellesis gives you a straightforward, easy-to-use workflow that lets every microscope user perform advanced segmentation tasks rapidly.

- Use powerful machine learning algorithms for pixel-based classification
- Just label objects, train your model and segment your images—there is no need for expert image analysis skills
- Segment any kind of image data in 2D or 3D. Use data from light, electron, ion or X-ray microscopy, or even from your mobile phone
- Speed up your segmentation task by built-in parallelization and GPU (graphics processing unit) acceleration
- Increase tolerance to low signal-to-noise and artifact-ridden data



Segmentation of coating cross-sections performed with ZEN Intellesis. Light microscope images on the left and segmented images on the right, respectively. Each color on the segmented images represents a different coating layer. Galvanized steel imaged with brightfield (top). High temperature corrosion scale on 9% chromium steel, imaged with brightfield (center). Thermal spray coating, imaged with C-DIC contrast (bottom). TWI Ltd., Cambridge, UK.

Expand Your Possibilities

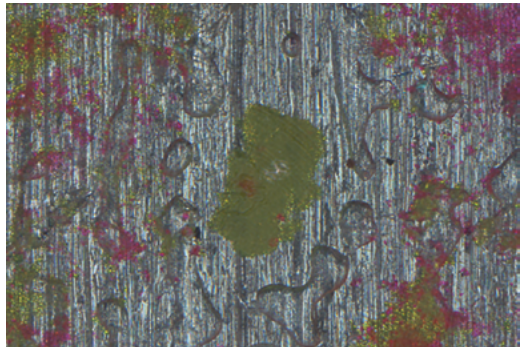
Choose the Right Camera

You know how important detailed documentation of results is in your daily work. High contrast images provide information on the quality of your components while quick acquisition times keep processes efficient. ZEISS Axiocam microscope cameras bring you solutions tailored to your applications. Enjoy brilliant images with the finest color differentiation of even minute details with the Axiocam 503 color.

OAD: Your Interface to ZEN Imaging Software

Do you have a special application that demands functionality beyond the basic ZEN software? Then opt for ZEN's integrated OAD (Open Application Development) environment. With OAD you create your own macro solution. Enjoy the benefits of easy access to a vital set of ZEN functions and the ability to include libraries such as the .NET Framework.

- Customize and automate your workflows
- Exchange data with external programs such as MATLAB



Extend the Application Range with a Laser tailored for Your Applications

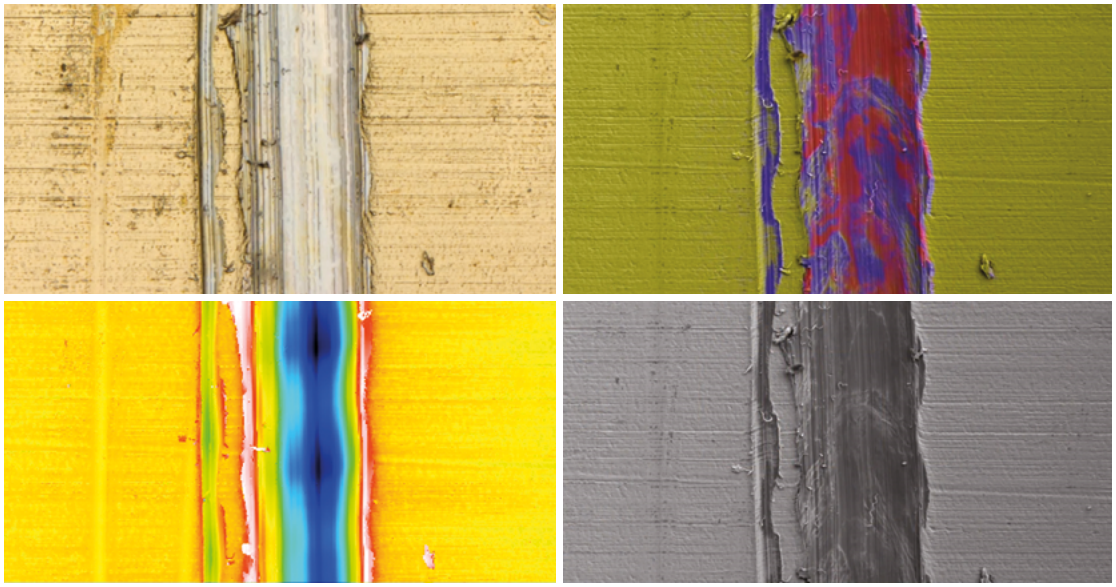
You have a choice of two options:

- The single-channel system with an ultraviolet laser module (module U, 405 nm wavelength) corresponds to a laser class 2 product. Its short wavelength allows imaging with high lateral resolution up to 120 nm.
- Or, when performing applications like imaging cell growth on biomaterials, you can configure the LSM 900 with four laser wavelengths – laser module URGB with 405, 488, 561, 640 nm. This multi-excitation wavelength lets you discover the distribution of fluorescent components.

Expand Your Possibilities

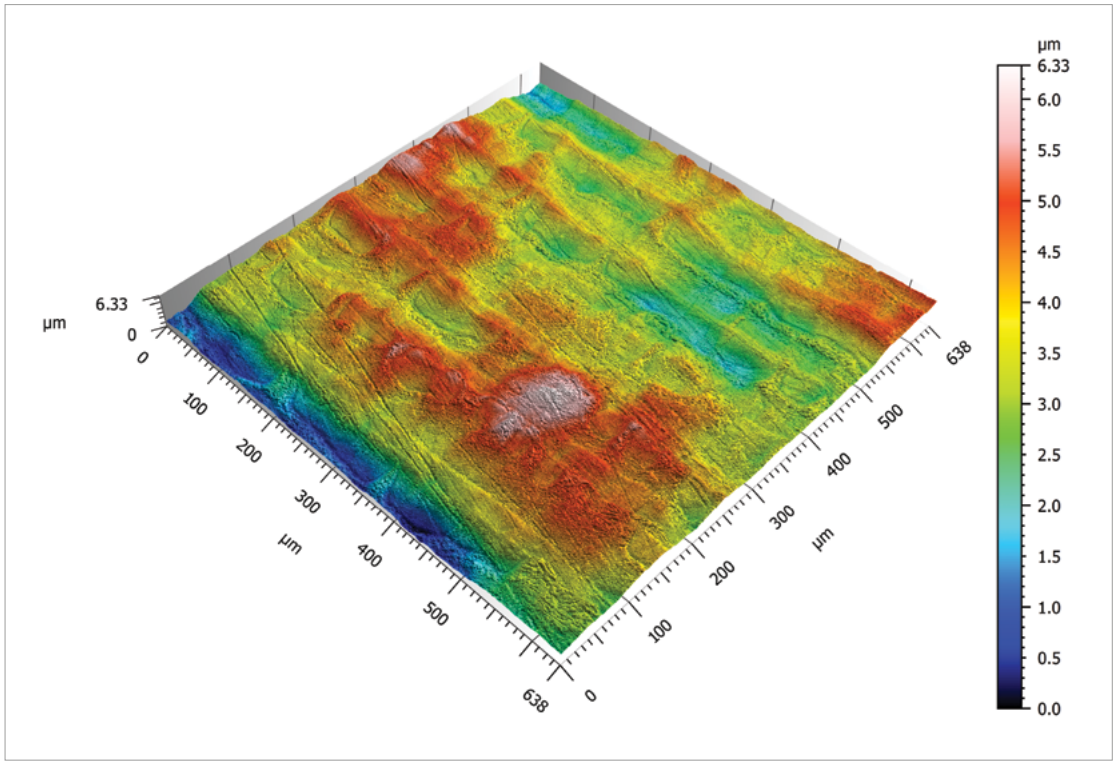
Correlative Microscopy with ZEISS Axio Imager 2: Bridging the Micro and Nano World

Are you looking for a way to effectively combine imaging and analytical methods? Shuttle & Find offers precisely this: An easy-to-use, highly productive workflow from a light to an electron microscope – and vice versa. The workflow between the two systems has never been so easy. The split-second, precise recall of regions of interest enhances productivity. Instead of wasting valuable time searching, you can now gain totally new insights into your samples with a few mouse clicks. You relocate regions of interest, marked in one system, within seconds in the other system. Open up new dimensions of information in numerous material analysis applications. Absolutely reproducible.



Investigation of a wear mark on an electronic contact: light microscope (LM) extended depth of field (EDF) image in widefield contrast (top left), scanning electron microscope (SEM) with energy dispersive X-ray spectroscopy (EDS) mapping (top right), color-coded height map (bottom left), backscattered secondary electron (BSE) signal in SEM (bottom right).

LSM 900 at Work: Materials Science



Laser polished surface of additive manufactured alloy. 3D view of color-coded height map, C Epiplan-APOCHROMAT 20x/0.7.

Understanding the properties of materials is key to creating innovative products. Most of these products will be based on newly-developed materials whose distinctive properties will enable you to devise and shape new solutions. One focus is on the microstructure of a material as this is strongly linked to its properties, although surface structure also influences the function of many components and manufactured parts. In addition, with novel production processes, the design options are expanding all the time.

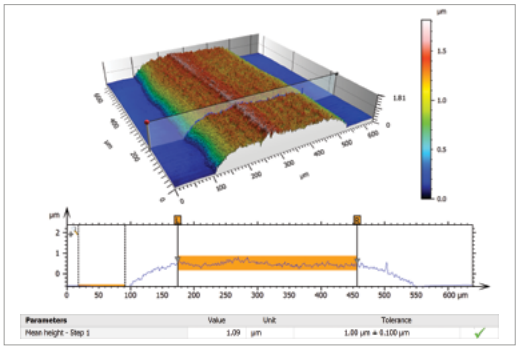
Typical Tasks and Applications

- Characterization of material properties
- Surface roughness analysis
- Metallography
- Coating thickness measurement
- Step height measurement
- Fluorescence microscopy

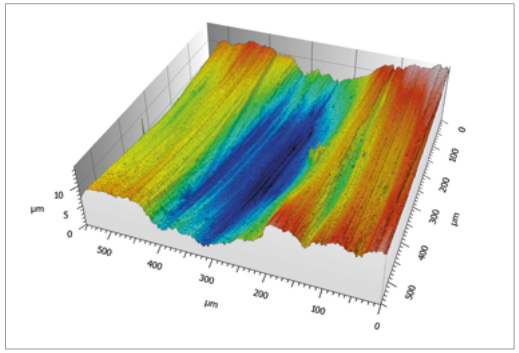
How You Benefit from ZEISS LSM 900

- Image metallographic samples with a broad range of contrast techniques.
- Locate regions of interest with suitable contrasts and perform topographic analyses.
- Use the fluorescence contrast to identify small cracks on you surface after impregnating with fluorescence dyes.
- Use the full set of characterization methods to find information about unknown materials.

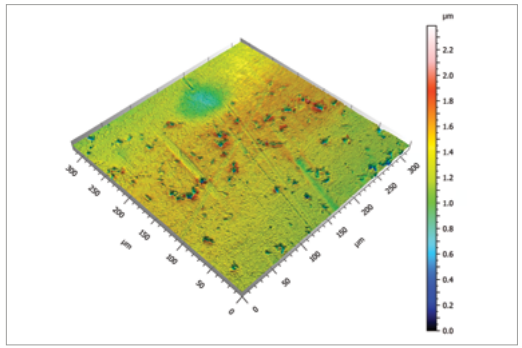
LSM 900 at Work: Materials Science



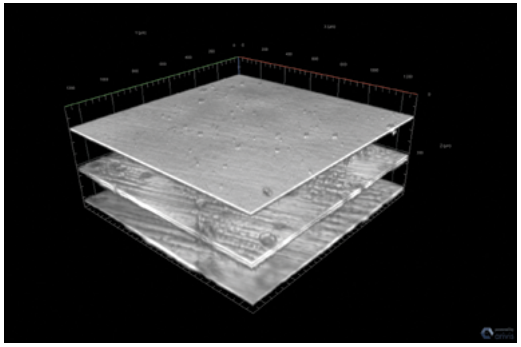
Printed graphite circuit on substrate. 3D-view of color-coded height map with step height measurement in profile. Objective: C Epiplan-APOCHROMAT 20×/0.7.



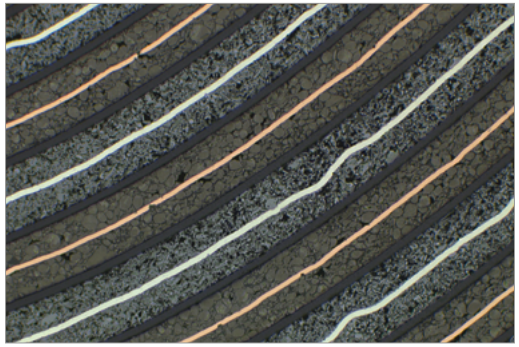
Wear mark on polymer surface. 3D-view of color-coded height map. Objective: C Epiplan-APOCHROMAT 50x/0.95.



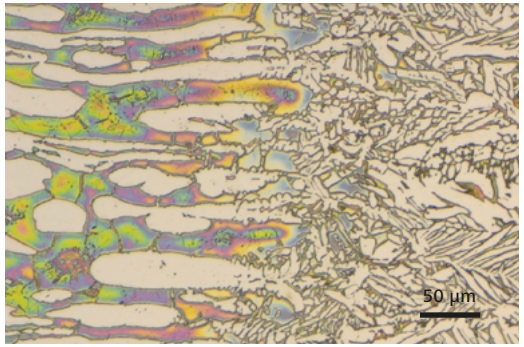
Pitting corrosion on polished surface. 3D-view of color-coded-height map. Objective: C Epiplan-APOCHROMAT 50×/0.95.



Two-layer system of a compound polymer, layer thickness measurement.

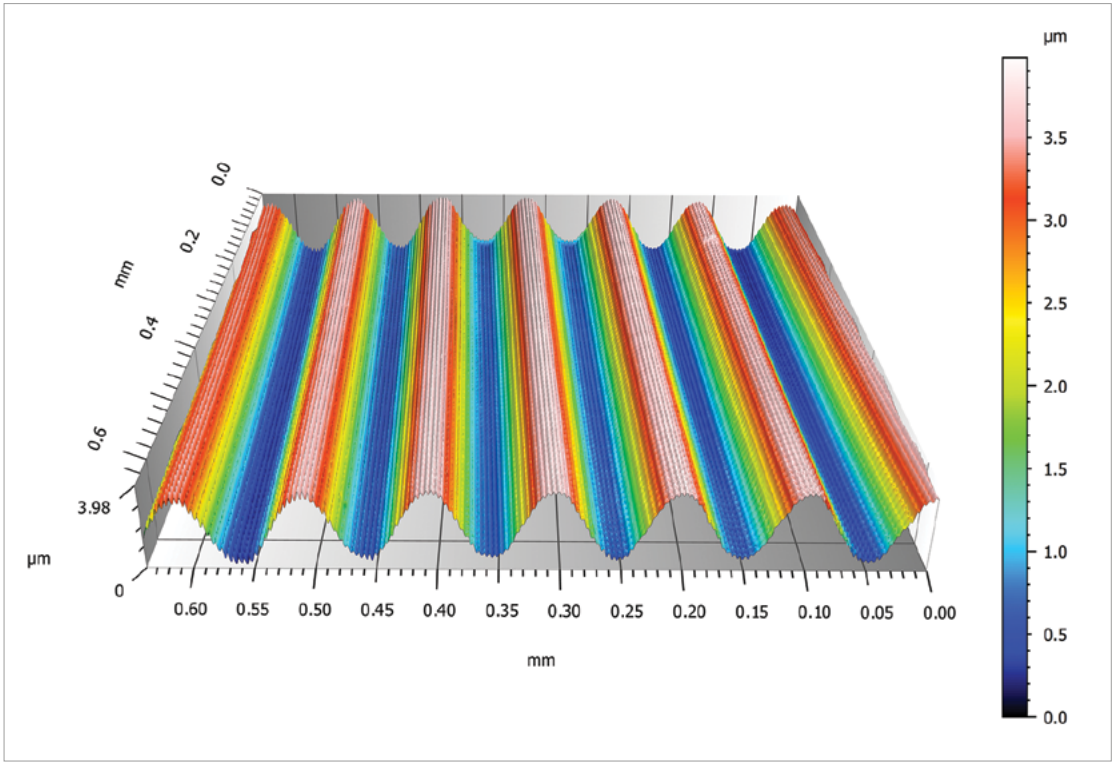


Micrograph of lithium ion battery in brightfield contrast.



Varying sizes of austenite and ferrite grains in the vicinity of a weld in duplex stainless steel. Sample courtesy of TWI Ltd, Cambridge, UK.

LSM 900 at Work: Manufacturing & Assembly Industries



Surface texture of geometric standard (ISO 5436-1, type C), 3D-view of color coded height map with ISO 25178 roughness parameter. Objective: C Epiplan-APOCHROMAT 20×/0.7.

Surface structure influences the functionality of a manufactured part. Low friction surfaces help create more efficient mechanical systems and reduce, for example, carbon dioxide emissions in the transportation & goods industries. Quantifying the aesthetic feel of visible surfaces such as brushed metal in luxury goods is supported by texture analysis. Monitoring during the manufacturing process is crucial for getting the functionality right.

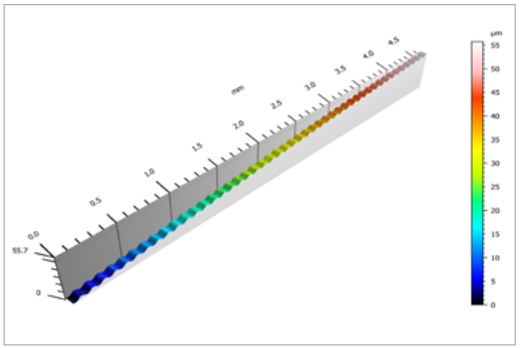
Typical Tasks and Applications

- Surface roughness analysis
- Metallography
- Coating thickness measurement
- Step height measurement
- Fluorescence microscopy for identifying fluorescent areas/dyes

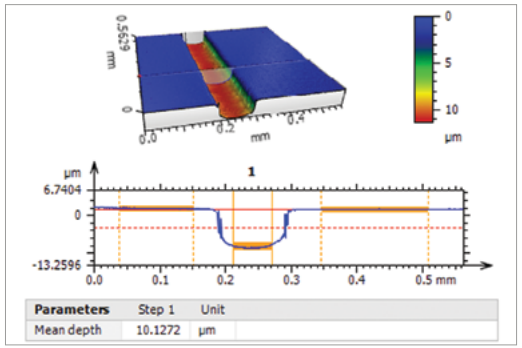
How You Benefit from ZEISS LSM 900

- Become more efficient with automated data acquisition.
- ConfoMap makes it easy to create reports for documentation.
- Characterize a surface´s texture in accordance with international standards e.g. ISO 25178.
- To understand material properties, you have the support of a broad range of studies such as 3D Fourier Analysis, volume studies and segmentation by watershed algorithms.

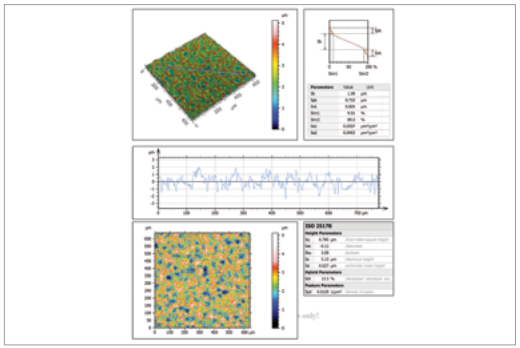
LSM 900 at Work: Manufacturing & Assembly Industries



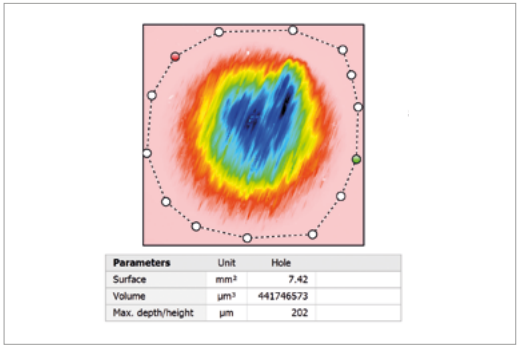
Surface texture of geometric standard (ISO 5436-1, type C), 3D-view of color-coded height map with profile view. 7×1 tiles image to get the evaluation length of 4 mm. Objective: C Epiplan-APOCHROMAT 20×/0.7.

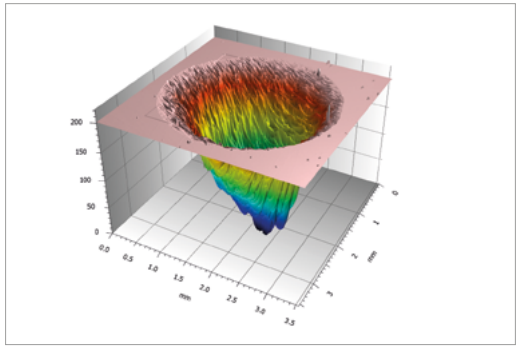


Evaluation of step height on a glass surface. Objective: C Epiplan-APOCHROMAT 10×/0.4

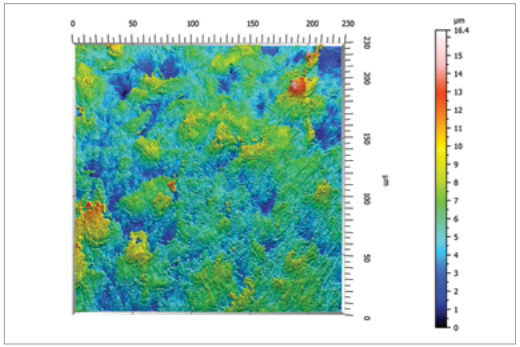


Report of machined surface with color-coded height map, visualization of bearing ratio parameter calculated from Abott curve and profile curve. Objective: C Epiplan-APOCHROMAT 20×/0.7.



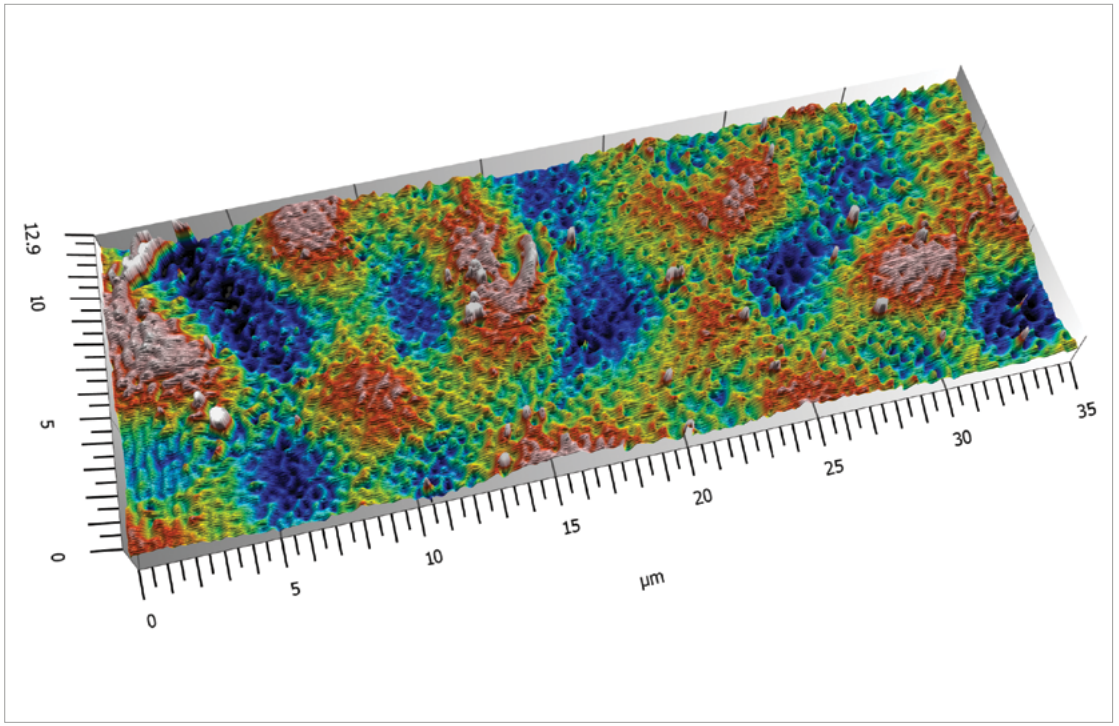


Metal testing for material wear. Volumetric measurement of a hole. Parameters such as volume, surface, depth, perimeter and complexity can be derived in a report. Color coded height map and results (left). 3D-view of color coded height map (right).



Ceramic surface – Color-coded height map. Objective: C Epiplan-APOCHROMAT 50x/0.95

LSM 900 at Work: Forensics



Color-coded 3D-view of diffractive element on a document.

The daily routine of a forensic scientist is anything but routine. It might require analyzing a potentially-manipulated signature or examining the paper it's written on. Looking at the individual topography of the firing pin of a gun or searching for traces of evidence on cloth. Analyzing documents for authenticity or identifying documents that have security marks to prevent misuse – that means recognizing diffractive elements that are common principles in protecting documents or products.

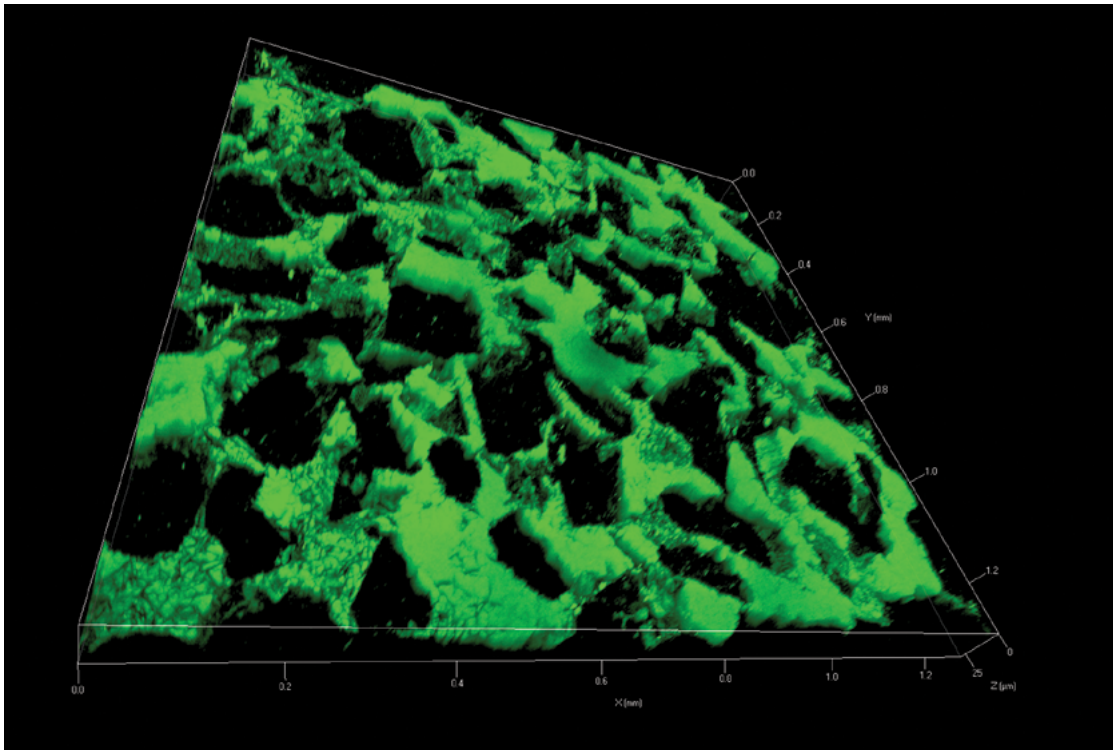
Typical Tasks and Applications

- Analysis of surface structure of diffractive elements
- Topography analysis
- Detection of fluorescent particles
- Discovery of differences in ink

How You Benefit from ZEISS LSM 900

Reveal the smallest details of your surface by using high lateral resolution and sampling with up to 6144 x 6144 pixels combined with a 405 nm laser wavelength. Manifold contrasting techniques such as darkfield and fluorescence provide additional information to assist your investigation. A non-contact imaging method protects your sensitive samples.

LSM 900 at Work: Raw Materials



Sandstone. 3D representation of fluorescent dye to visualize porosity, 4×4 tiles image. Objective: EC Epliplan-APOCHROMAT 20×/0.6.

The fluorescence capability of LSM 900 can help identify potential reservoirs and rock porosity. Find out where oil is migrating with fluorescent 2D and 3D images of petroleum fluid inclusions. In a core this will reveal a wealth of information about the reservoir quality.

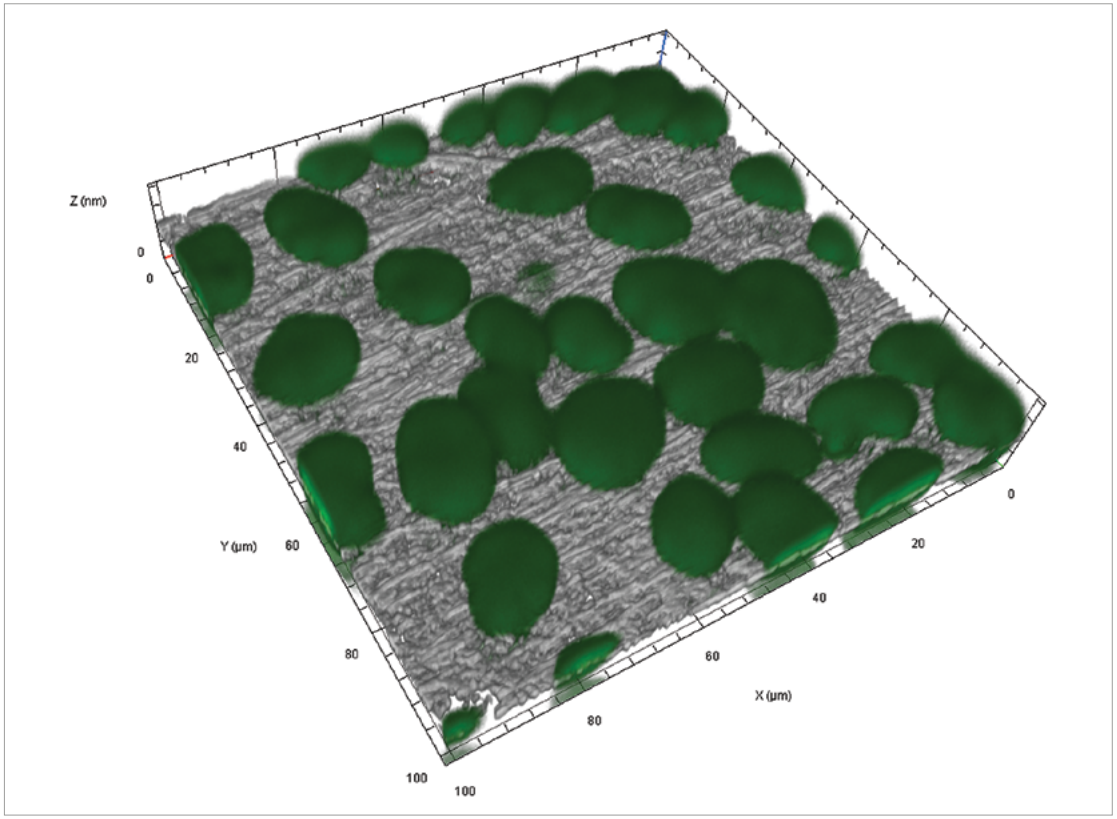
Typical Tasks and Applications

- Organic petrology
- Petrography
- Optical mineralogy
- Surface roughness analysis

How You Benefit from ZEISS LSM 900

- Examine rock texture with transmitted light.
- Use cross polarized light microscopy in reflected and transmitted light for thin section samples.
- Acquire large areas by tiling images together to get sufficient data for evaluation.
- Use fluorescence contrast to identify areas with fluorescent dyes.

LSM 900 at Work: Biomaterials and Medical Applications



Cell distribution on metal surface, grey: titanium surface; green: cells multi-channel analysis, surface structure characterization, fluorescence imaging of cells.

In the investigation of biomaterials for medical applications, understanding the interaction between the inorganic material of an implant and the organic bone tissue plays a crucial role in successful patient recovery.

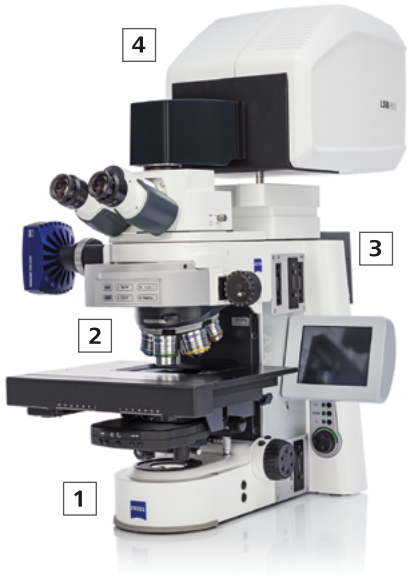
Typical Tasks and Applications

- Investigation of cell growth on metal surfaces
- Characterization of bacteria growth on implant surfaces
- Modeling corrosive biofilm on enamel
- Surface roughness analysis
- Topography analysis

How You Benefit from ZEISS LSM 900

The unique combination of a research grade light microscope with a confocal laser scanning microscope allows you to image the surface structure of an inorganic material while simultaneously imaging cells with fluorescence. Benefit from the configuration with the 4URGB laser for fluorescence to identify different fluorescent dyes.

Your Flexible Choice of Components



1 Microscope
- Axio Imager.Z2m or Axio Observer 7
- Camera port
- Manual or motorized stages

2 Objectives
- C Epiplan-APOCHROMAT
- LD C Epiplan-APOCHROMAT
- EC Epiplan-NEOFLOUAR

3 Illumination
- Laser module URGB (405, 488, 561, 640 nm)
- Laser module U (405 nm) Laser class 2 when in system

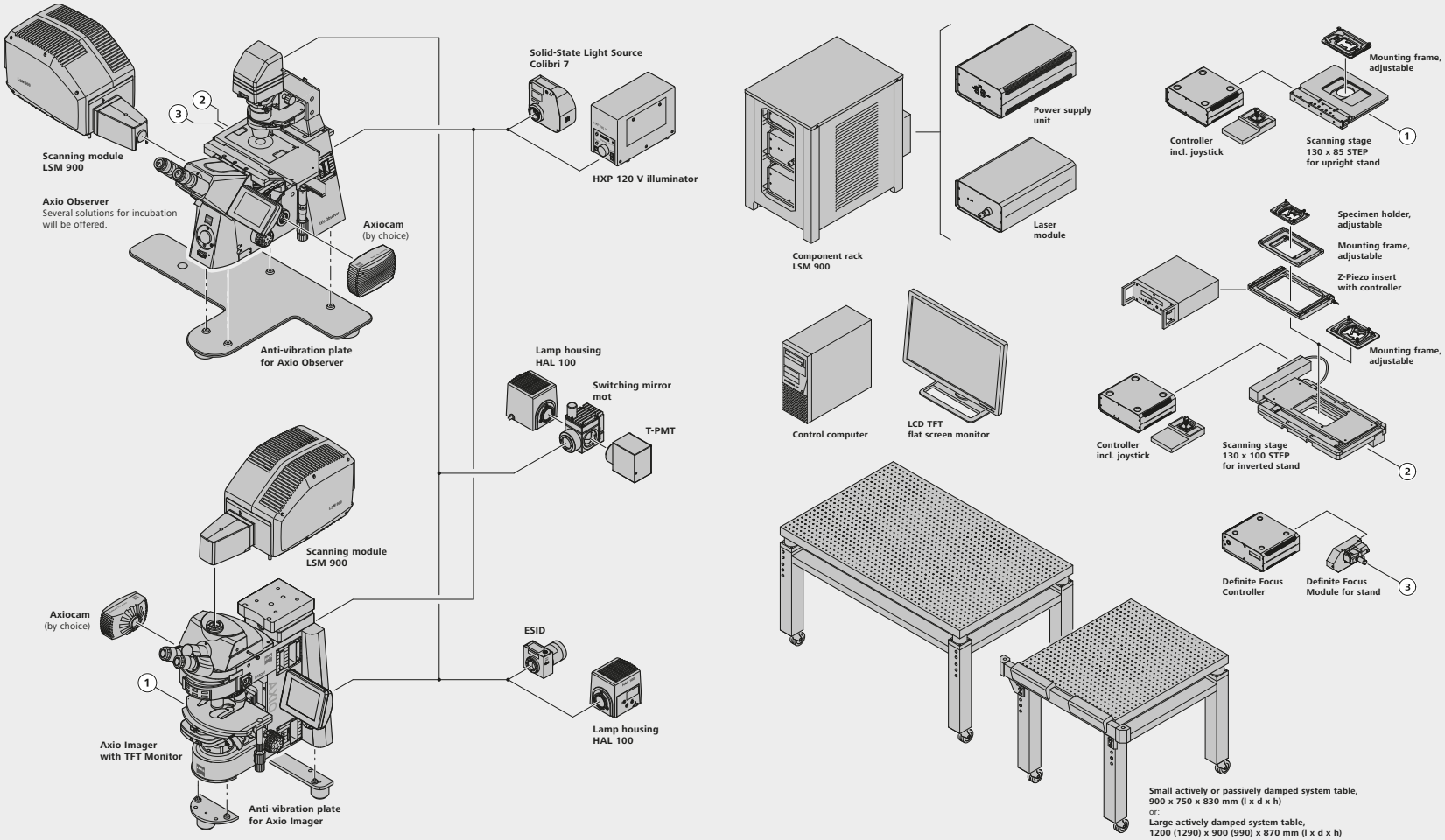
Reflected Light
- Halogen
- HXP
- Colibri 5/7
- microLED
- VIS-LED

Transmitted Light
- Halogen
- LED

4 Scanning Module
- 1 channel multi-alkali (MA) PMT or 2 channel multi-alkali (MA) PMTs
- 1 additional GaAsP PMT, MA PMT or Airyscan detector for 40× or 63× objectives

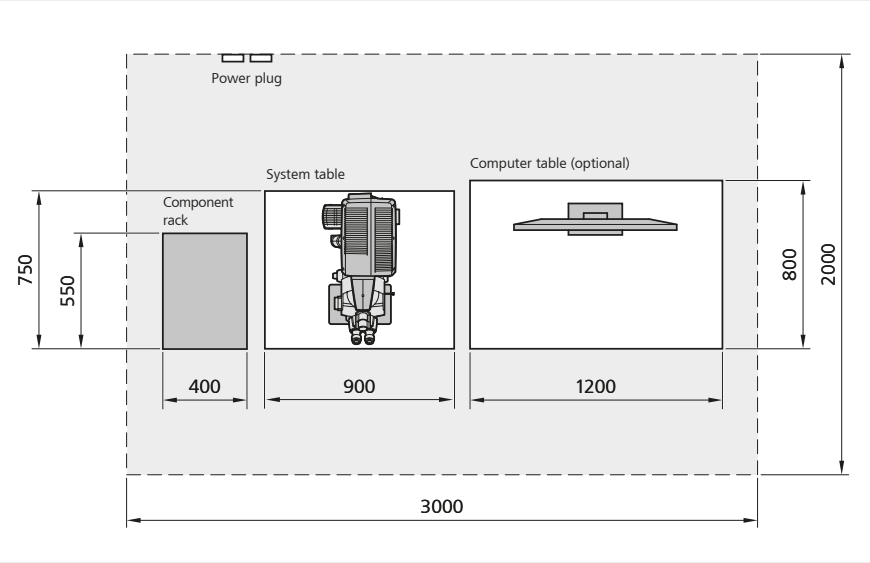
5 Software
- ZEN (blue edition), recommended modules: Topography module, Tiles & Positions
- ConfoMap, recommended modules: 2D Automotive, Contour Analysis

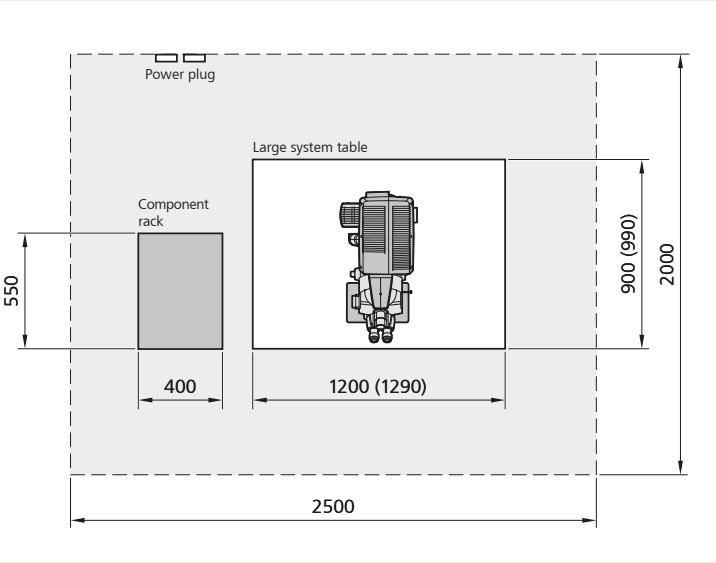
Technical Specifications



Technical Specifications

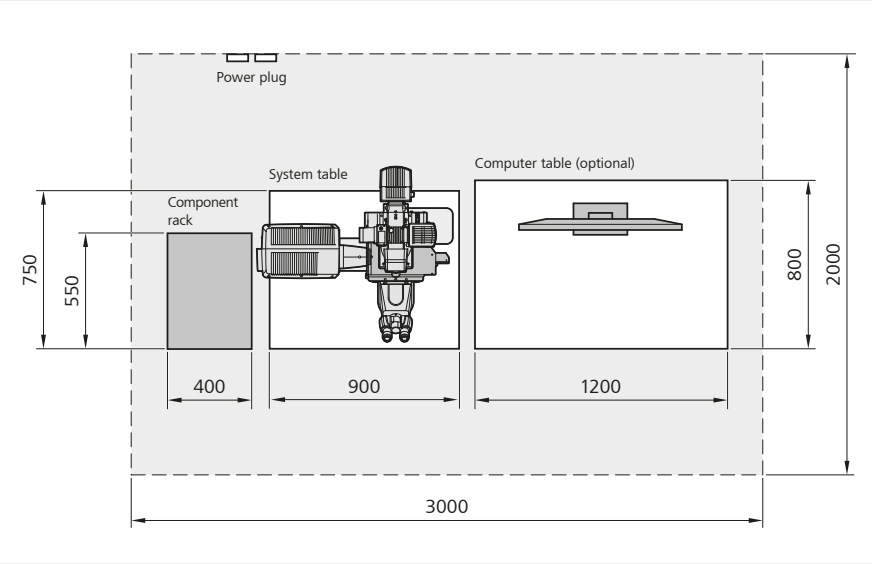
Space Requirements ZEISS Axio Imager.Z2m

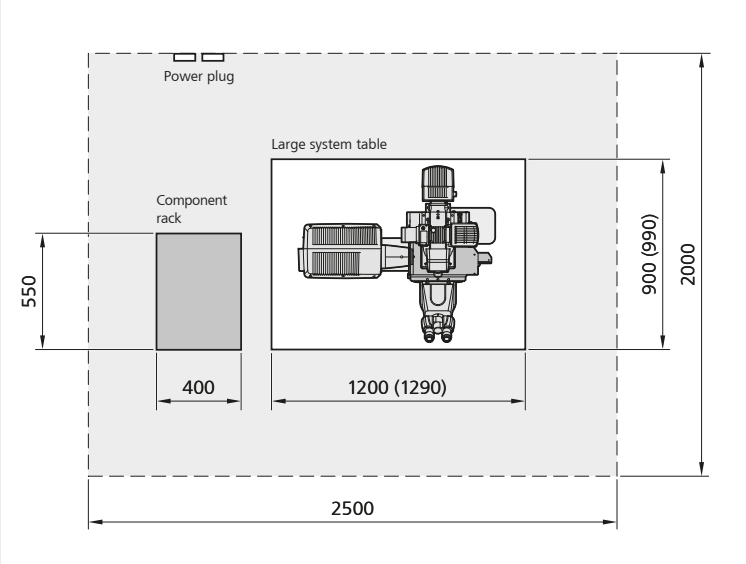




Technical Specifications

Space Requirements for ZEISS Axio Observer 7





Technical Specifications

Microscopes	
Stands	Upright: Axio Imager.Z2m; Inverted: Axio Observer 7
z drive	Smallest increment 10 nm
XY Stage (option)	Motorized XY scanning stage for Mark & Find function (xy) as well as Tile Scan (Mosaic Scan). Tiling not available for layer thickness measurements. Smallest increment 0.2 µm
Objectives	More than 40 reflected-light objectives. Recommended: C Epiplan-APOCHROMAT series (specially designed for 405 nm)

Scanning Module	
Scanner	Two independent, galvanometric scanning mirrors with ultra-short line and frame flyback
Scanning Resolution	32 × 1 to 6,144 × 6,144 pixels, continuously adjustable (for each axis)
Scanning Speed	Up to 8 images/sec with 1024 × 256 pixels; Up to 2 images/sec with 1024 × 1024 pixels
Scanning Zoom	0.5× to 40×; continuously adjustable
Scanning Rotation	Can be rotated freely (360°), adjustable in increments of 0.1°, freely adjustable xy offset
Scanning Field	12.7 mm × 12.7 mm in the intermediate image plane with full pupil illumination
Pinhole	Master pinhole with preset size and position; automatic alignment
Beam Path	One major beam splitter at 10 degrees provides an 80:20 split ratio in a single-channel system. In multi-channel-systems there is an 80:20 split ratio at 405 nm and excellent laser line suppression at 488, 561 and 640 nm. The patented Variable Secondary Dichroics (VSDs) can be used as a flexible means of diverting the respective spectral range of light to the chosen channels. Use emission filters to clean up the signal when imaging autofluorescent or highly scattering samples.

Detection Options	
Detectors	Depending on whether it is configured with 1 or 2 multi-alkali (MA) PMT (typical QE25%)
	2-CH scanhead can be further upgrated by 1 additional GaAsP PMT (typical QE 45%), MA PMT or Airyscan detector
	Transmitted light detector (ESID or T-PMT)
Data Depth	8-bit and 16-bit available
Real-Time Electronics	Microscope, laser, scanning module and additional accessory control; data acquisition and synchronization management through real-time electronics; oversampling read-out logic for best sensitivity; data transfer between real-time electronics and user PC via LVDS with the ability to evaluate the data online during image acquisition

Technical Specifications

Standard Software	
ZEN Imaging Software with topography module	A software package that sets up various experiments (topography, layer thickness measurements, fluorescence, light microscopy). Software can be upgraded with additional modules for special requirements. The user interface and wizard for topography and layer thickness measurements offer a convenient way to configure all motorized functions of the scanning module, laser and microscope. Includes computation and post-processing of height information. Transfer of topography data to the analysis software (ConfoMap).
ConfoMap	ConfoMap is the comprehensive software for analyzing and presenting topography data. The standard ConfoMap package comes with many analytical studies. It can be upgraded further for advanced surface texture analysis, dimensional analysis, grain and particle analysis, 3D Fourier analysis and the analysis of surface evolution and statistics. Based on the well-established Mountains Technology®, ConfoMap is subject to continuous evolution by metrologists and software engineers.

Optional Software	
Tiles & Positions	A powerful tool in your microscopy applications that makes it easier to image large areas on your samples at high resolutions.
Shuttle & Find	A correlative microscopy interface for ZEISS light microscopes, scanning electron microscopes (SEMs) and focused ion bean SEMs (FIB-SEMs). It lets you identify an area of interest in one instrument and find that specific area again for analysis in another instrument.
Open Application Development (OAD)	Python scripting interface for automation & customization. Experiment feedback for smart experiments. Open interface to third party software (e.g. MATLAB)
Experiment Designer	Defintion of advanced automated imaging
ZEN Intellesis	Perform advanced image processing with machine learning algorithm

Lasers	
Laser Module URGB (pigtailed; 405, 488, 561, 640 nm)	Single-mode polarization preserving fiber
	Typical total dynamic range of 10,000:1; direct modulation 500:1
	Diode laser (405 nm, 5 mW); laser class 3B
	Diode laser (488 nm, 10 mW); laser class 3B
	Diode (SHG) laser (561 nm, 10 mW); laser class 3B
	Diode laser (640 nm, 5 mW); laser class 3B
Laser Module U (pigtailed; 405 nm)	Single-mode polarization preserving fiber
	Typical total dynamic range 25:1
	Diode Laser (405 nm, 5 mW); laser class 3b; in system rating laser class 2, with simplified installation requirements

Technical Specifications

Power Requirements		
LSM 900 has a main power supply cable and country-specific plug or plug NEMA 5/15 (L/N/Ground 120V/15A). Plus the matching mains socket outlet.		
Line Voltage	100 V AC ... 125 V AC (+10%)	220 V AC ... 240 V AC (+10%)
Line Frequency	50 ... 60 Hz	50 ... 60 Hz
Max. Current	1 phase at 9 A	1 phase at 4.5 A
Power Plug	NEMA 5/15	Country specific connectors
Power Consumption	900 VA (continuous operation; maximum)	900 VA (continuous operation; maximum)
	260 VA (standby operation)	280 VA (standby operation)
	0.011 VA (off mode)	0.025 VA (off mode)
Heat Emission	700 W	700 W

EMC Test
According to DIN EN 61326-1
1. Noise emission according to CISPR 11 / DIN EN 55011
2. Noise immunity according to table 2 (industrial sector)

Environmental Requirements	
For operation, the system has to be placed in a closed room.	
1. Operation, specified performance	T = 22° C ±3° C without interruption (24 h per day independently whether the system is operated or switched off). The system must never be placed in the direct air flow from air conditioning.
2. Operation, reduced performance	T = 15° C to 35° C, any conditions different from item 1. and 4.
3. Storage, less than 16 h	T = -20° C to 55° C
4. Temperature gradient	±0.5° C/h
5. Warm-up time	1 h for standard imaging; ≥2h for high-precision and/or long-term measurements
6. Relative humidity	<65% at 30° C
7. Operation altitude	max. 2,000 m
8. Loss of heat	700 W

LSM 900 meets the requirements according to IEC 60825-1:2014

Count on Service in the True Sense of the Word

Because the ZEISS microscope system is one of your most important tools, we make sure it is always ready to perform. What's more, we'll see to it that you are employing all the options that get the best from your microscope. You can choose from a range of service products, each delivered by highly qualified ZEISS specialists who will support you long beyond the purchase of your system. Our aim is to enable you to experience those special moments that inspire your work.

Repair. Maintain. Optimize.
Attain maximum uptime with your microscope. A ZEISS Protect Service Agreement lets you budget for operating costs, all the while reducing costly downtime and achieving the best results through the improved performance of your system. Choose from service agreements designed to give you a range of options and control levels. We'll work with you to select the service program that addresses your system needs and usage requirements, in line with your organization's standard practices.

Our service on-demand also brings you distinct advantages. ZEISS service staff will analyze issues at hand and resolve them – whether using remote maintenance software or working on site.

Enhance Your Microscope System.
Your ZEISS microscope system is designed for a variety of updates: open interfaces allow you to maintain a high technological level at all times. As a result you'll work more efficiently now, while extending the productive lifetime of your microscope as new update possibilities come on stream.

Profit from the optimized performance of your microscope system with services from ZEISS – now and for years to come.

>> www.zeiss.com/microservice

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