

Mikrosize®

# iMetal-850 R/TR

## Upright Metallographic Microscope



### Contact us

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## Feature and Application

The iMetal-850 is a research-grade brightfield/darkfield metallographic microscope equipped with an infinity-corrected optical system. It features a trinocular observation tube and 4 pieces of 60mm parfocal infinity-corrected long-working-distance plan semi-apochromatic objectives, with a nosepiece equipped with DIC slots. Both epi-illumination and trans-illumination adopt 12W 4500K broadband LED lighting with CRI  $\geq 95$  and intelligent intensity adjustment. It is equipped with coaxial coarse/fine focusing, a large-travel double-layer mechanical stage, supports brightfield and darkfield observation, reserves polarizing and differential interference contrast (DIC) functions, and is fitted with a standard C-mount CCD interface to meet research-grade metallurgical observation .

### Product Feature

- Equipped with an intelligent light intensity management system, which automatically adapts light intensity when switching objectives, eliminating the problem of dim images at high magnifications in conventional microscopes, ensuring stable and clear imaging.
- Fitted with a high-power 4500K LED light source with CRI  $\geq 95$ , 50,000-hour service life, low heat generation, and brightness equivalent to a 100W halogen lamp, suitable for multi-scenario lighting.
- Adopts a beam-splitting prism auxiliary focusing (FA) system and full-field Kohler illumination, with inner wall light-absorbing coating to reduce stray light, achieving high-contrast and uniformity metallographic imaging.
- Motorized encoded objective turret integrates hardware and software, recording parameters into captured images, saving operating time, reducing setup errors, and improving inspection efficiency.
- Standard 5X–50X long-working-distance plan semi-apochromatic objectives ( for brightfield/darkfield); optional 100X dry objective delivers 390nm resolution, supporting brightfield, darkfield, polarizing and other observation modes.
- Coaxial coarse/fine focusing paired with a large-travel double-layer mechanical stage enables convenient operation and adapts to various sample sizes, meeting high-precision requirements for scientific research and industrial metallographic analysis.



## Feature and Application



### Product Application

- Metallographic analysis of metallic materials, clearly presenting microstructures to support material property evaluation and quality inspection.
- Ore petrographic analysis via polarizing observation, accurately identifying mineral types and structures to provide data support for geological research.
- Electronic component inspection, observing internal structures and solder joint conditions to ensure production quality of electronic devices.
- Polymer material research, analyzing micro-morphology and structure to facilitate formula optimization and R&D.
- Industrial quality control, rapidly detecting surface defects and micro-flaws to enhance production management.
- Scientific research laboratories, performing multi-mode micro-observation to support various material science experiments and analyses.

## Product Details



**1. Eyepiece**

**2. Trinocular Observation Tube**

**3. Camera**

**4. Light Source Control Knobs and Buttons**

**5. Objective Switching Button**

**6. Workbench**

**7. Coarse and Fine Coaxial Adjustment Knob**

**8. Workbench Control Handle**

**9. Nosepiece**

**10. Objective Lens**

**11. Polarizer**

**12. Analyzer**

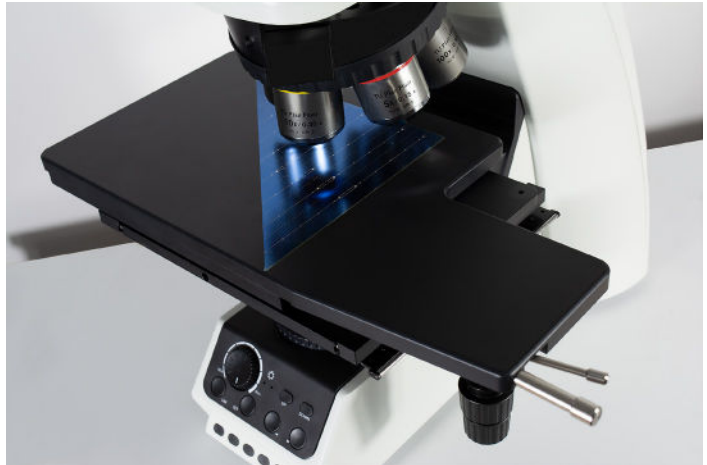
**13. Bright-Dark Field Switching Lever**

**14. Dic Slot**

**15. Beam-splitting Lever**

## Product Details

### Product Structure



- Double-layer mechanical moving stage with low-handle coaxial X/Y adjustment; stage surface: 135×125mm, glass stage: 101×101mm.
- Extra-large stage travel: 100×100mm.
- Compatible with reflective metal stage plate and trans-reflective glass stage plate.
- Right-hand 4-inch mechanical stage with 100×100mm travel, coaxial X/Y adjustment; equipped with trans-illumination light barrier and glass stage plate.

- Objective Options for Diverse Applications
- Magnification: 5X, 10X, 20X, 50X, 100X;
- Standard long-working-distance plan semi-apochromatic objectives (shared for brightfield/darkfield).
- Ultimate resolution of 100X dry objective: 390nm.
- Working distance of LM95PLAP0100 up to 13mm.
- Suitable for brightfield, darkfield, polarizing, mixed and DIC illumination.



## Product Details

### Product Structure



- Coaxial coarse/fine adjustment knob, adjustable tension, fine adjustment division: 1 $\mu$ m.
- Smooth and precise knob adjustment.



- Epi-illumination: 12W 4500K broadband LED, CRI  $\geq$ 95, pre-centered, continuously adjustable brightness, reserved polarizing slot, adjustable iris, built-in brightfield and darkfield modules.
- Trans-illumination: 12W 4500K broadband LED, CRI  $\geq$ 95, pre-centered, continuously adjustable brightness, high-resolution multi-function condenser with adjustable iris and filters.
- Achieves full true-color imaging at both high and low brightness.
- Almost no heat generation, light intensity equivalent to 100W halogen lamp.
- Stepless brightness adjustment; customizable brightness for each objective, with automatic adjustment during objective switching.

## Product Details

### Product Structure

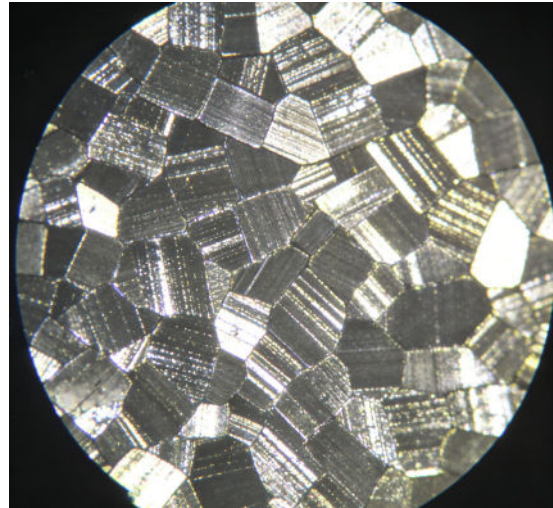
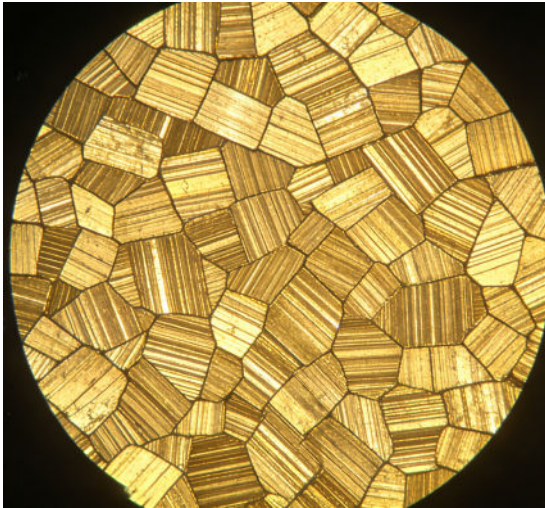


- Motorized Encoded Nosepiece: The iMetal-850 features a built-in control panel that integrates microscope hardware settings with image analysis software. Illumination intensity and objective position are recorded in software or manual controller.
- The encoding function logs microscope settings into captured images, saving operator time and reducing setup errors.

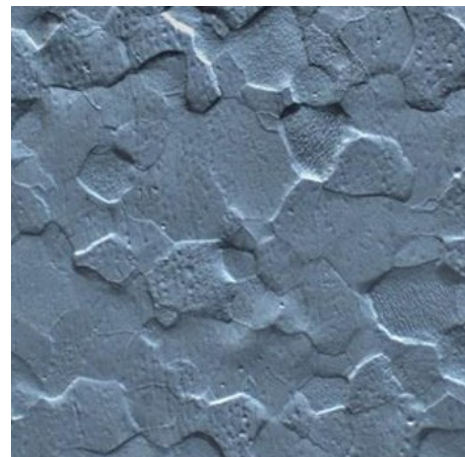
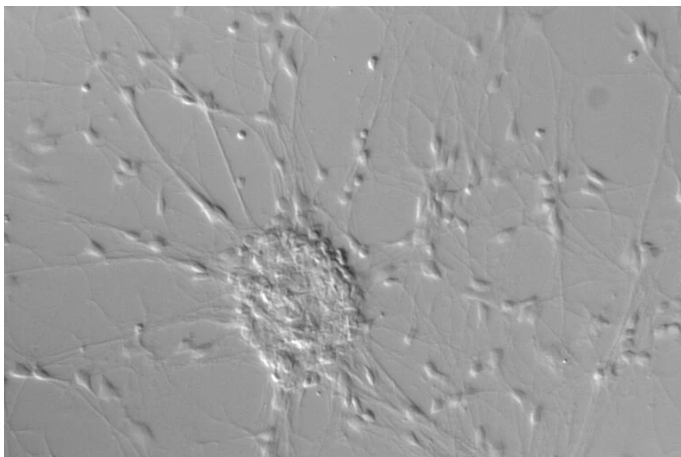
## Product Details

### Optical Path Switching

- The iMetal-850 supports optional bright-dark field, polarizing observation and differential interference contrast (DIC), which can be selected by customers according to their needs.



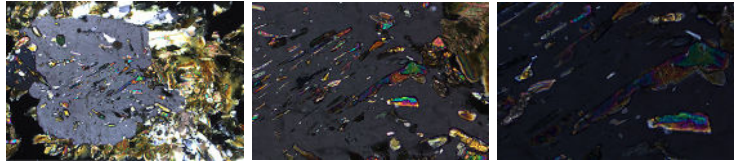
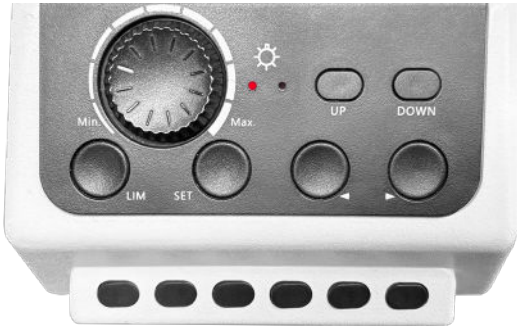
- Simultaneous bright-dark field comparison of samples: the bright field displays the overall morphology, while the dark field highlights defects, particles and transparent edges with stronger contrast for easier flaw detection.



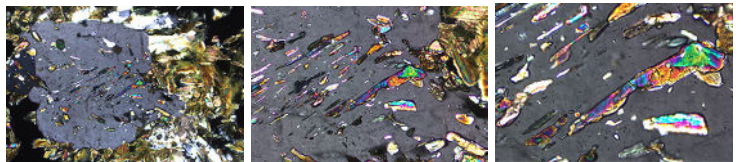
- DIC observation delivers a 3D embossed effect with a strong sense of depth, clear edges and no halation, ensuring more accurate details. It enables sample observation without staining, which is sample-friendly.

## Product Details

### Intelligent Light Intensity Management System

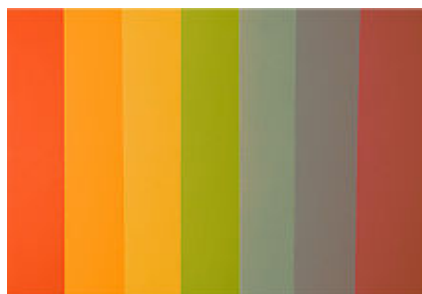
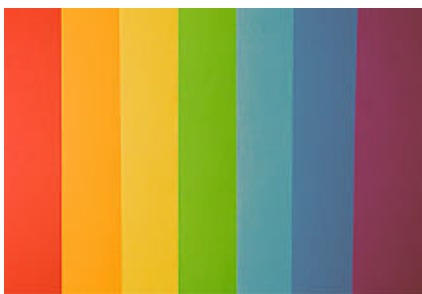


- For traditional microscopes, the image becomes darker when increasing the objective magnification.



- The intelligent light intensity management system automatically adjusts the light intensity to the optimal level when changing the objective magnification.

### LED Light Source



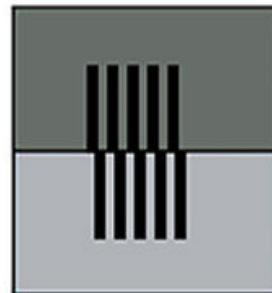
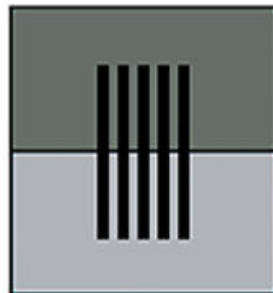
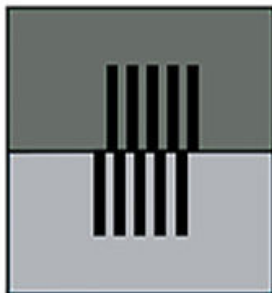
- Halogen lamps: color rendering changes at different light intensity levels.

- LED light source: constant and consistent color rendering at different light intensity levels, with more vivid colors than halogen lamps.



## Product Details

### Auxiliary Focusing



- Beam-splitting prism auxiliary focusing (FA) system.
- Inner wall light-absorbing coating to reduce stray light interference.
- Full-field bright and uniform Kohler illumination system.

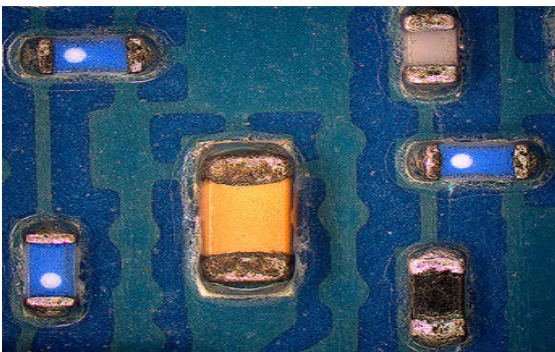
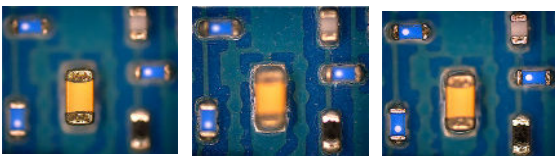
## Software (Standard Delivery)

### Software Function: Image Stitching



- The real-time image stitching function adopts image recognition technology; a panoramic image can be obtained simply by moving the stage knobs, providing a wider field of view for users.

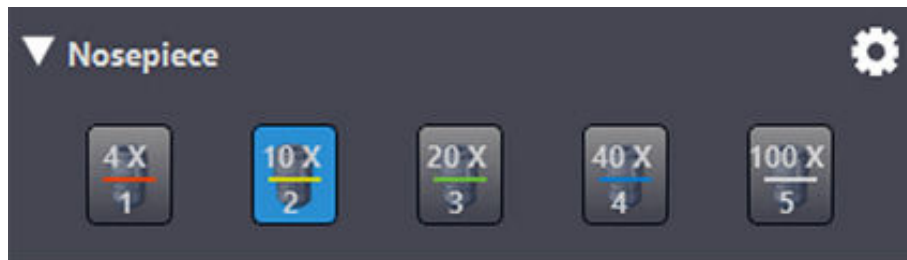
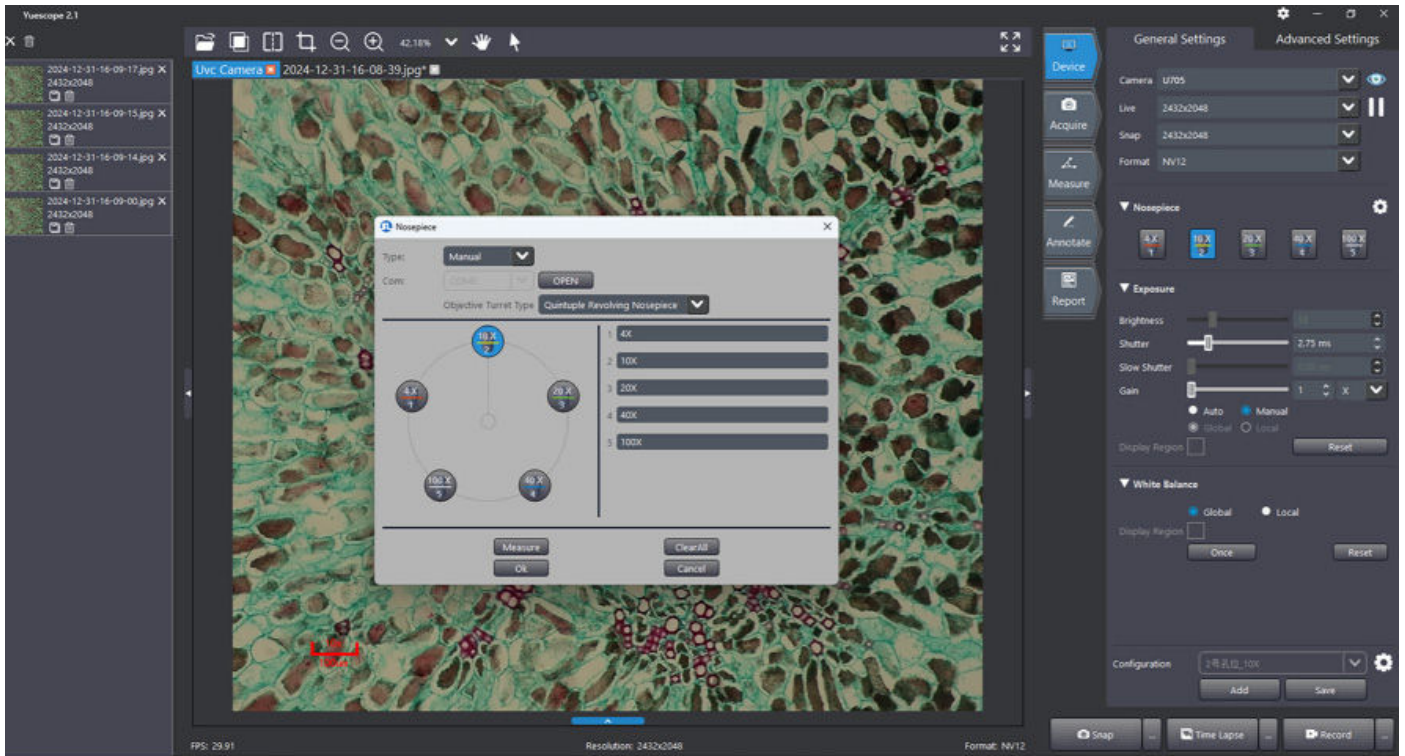
### Software Function: Depth of Field Fusion



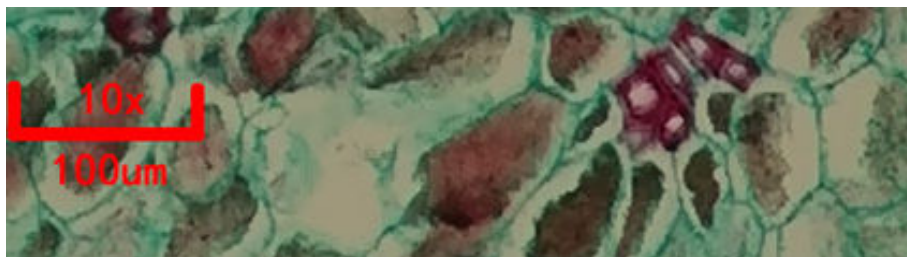
- The real-time depth of field fusion function can capture sample images with a height exceeding the objective depth of field and stack them to create an ultra-depth of field image.

## Software Operation Interface

### Software Functions



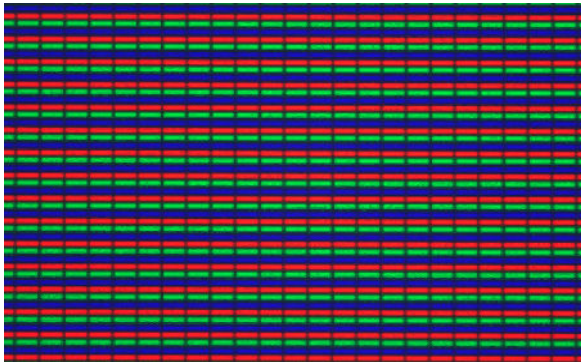
- Active objective lens recognition by software



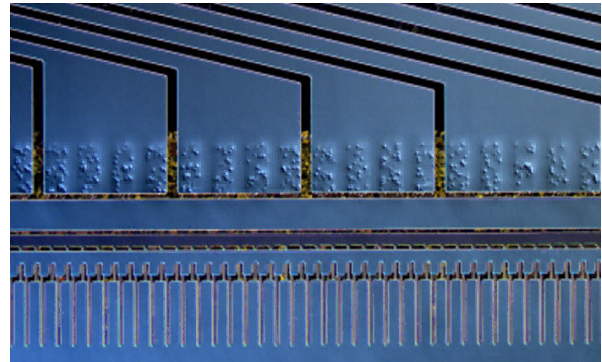
- Automatic scale bar switching by software when changing objectives

## Software Operation Interface

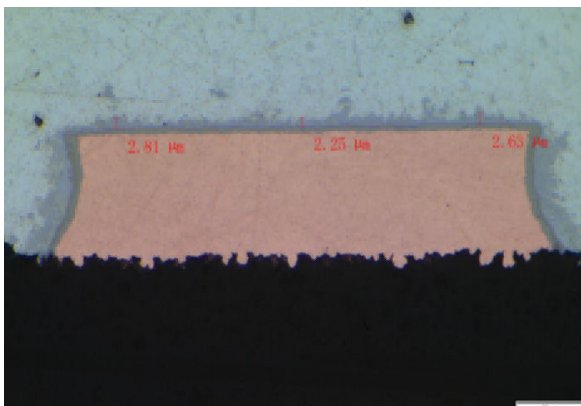
### Measurement Imaging



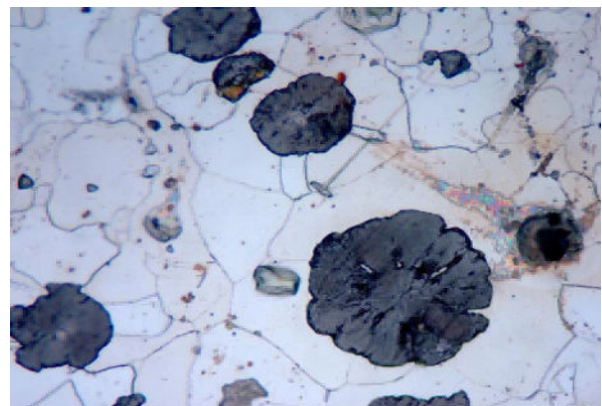
LCD color filter 1500X



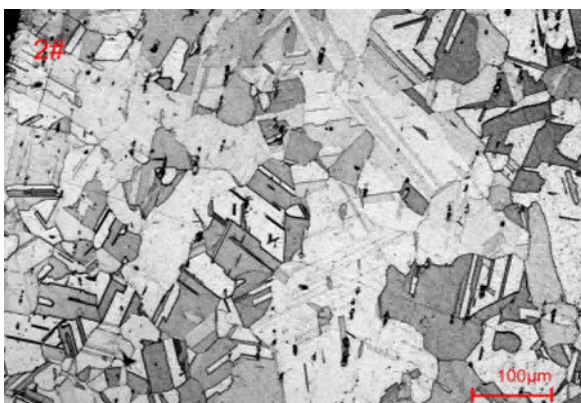
Conductive particles DIC observation in the display module at 300X magnification



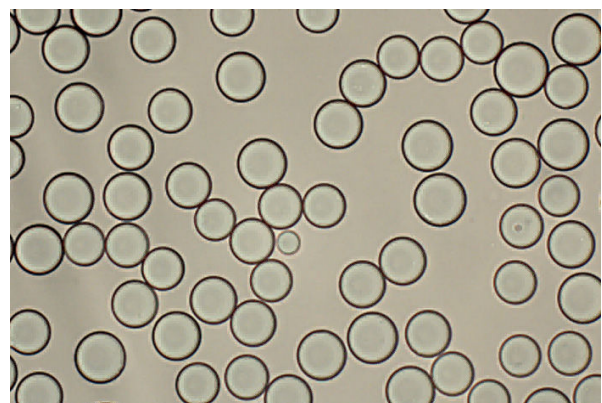
IMC circuit board IMC thickness measurement 3000X



Microscopic analysis: After grinding, polishing and corrosion of the alloy, magnification 1500X



Austenitic latticework, in reflected bright-field mode, 600X



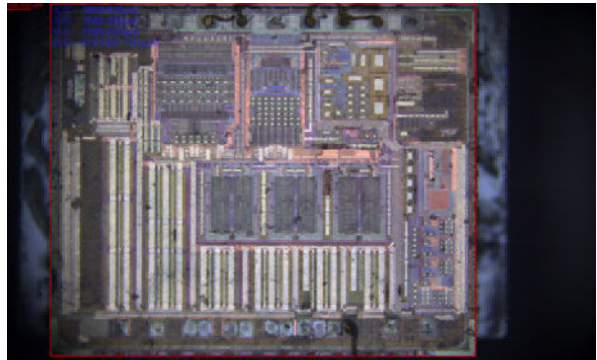
Particle size analysis - Statistical and analytical assessment of microemulsion particles 1200X

## Software Operation Interface

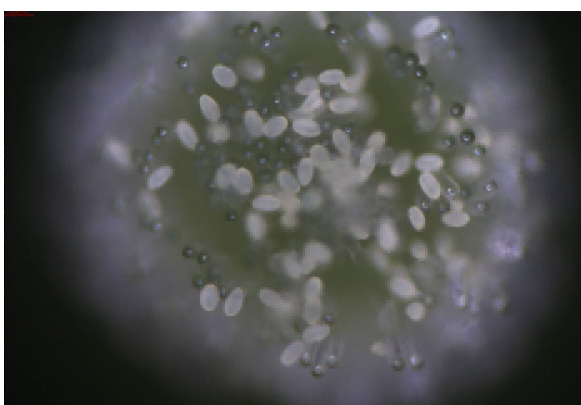
### Measurement Imaging



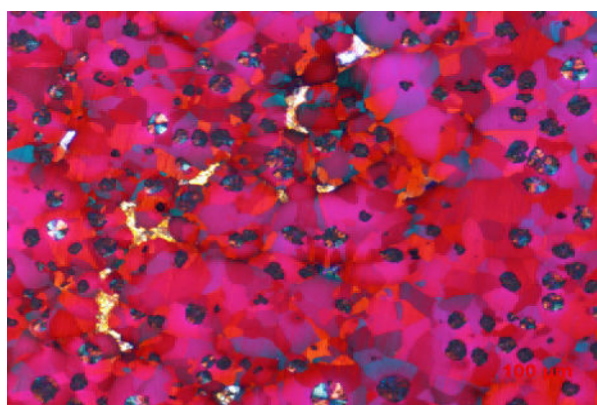
Nanomaterials, 500nm diameter microsphere particles,3000X



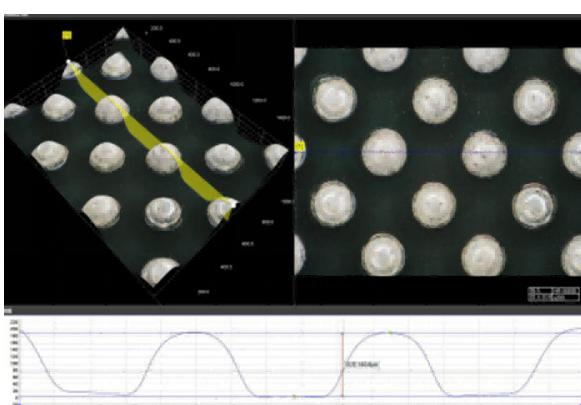
Chip defects,semiconductor defect inspection,150X



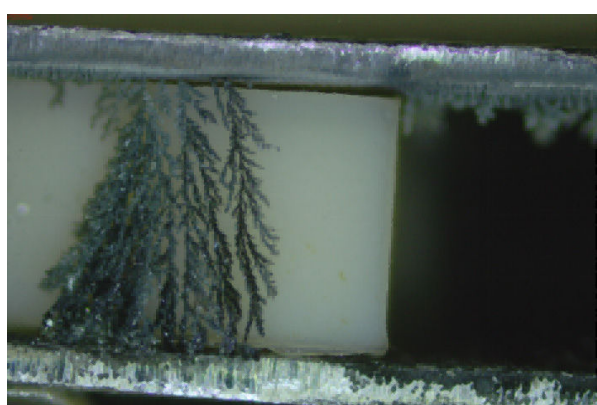
The stigma papillae cells of Arabidopsis thaliana and pollen grains,600X magnification



Rock phase analysis - Polarized light mode - 1500X



Solar panel,tin ball 3D measurement,100X



In-situ dendrite,dendrite observation mode,300X

# Technical Specification

<b>Model</b>	iMetal-850 R	iMetal-850 TR
<b>Optical Path</b>	Reflection	Transmission/ Reflection
<b>Optical System</b>	Infinite optical system, intelligent light intensity management LED system	
<b>Observation Tube</b>	Trinocular observation head, 30° inclination; Splitting ratio: Eyepiece/Camera=100/0,50/50,0/100	
<b>Eyepiece</b>	Ultra-wide field eyepiece 10X (field number $\Phi$ 25mm), high eyepoint, diopter adjustable	
<b>Objective Lens</b>	M60PLFL5XBD, NA=0.15, WD=15mm	
	M60PLFL10XBD, NA=0.3, WD=14.5mm	
	M60PLFL20XBD, NA=0.5, WD=4mm	
	M60PLFL50XBD, NA=0.75, WD=4mm	
<b>Polarization Observation</b>	Reflection polarizer 360° rotatable polarizer	Transmission/ reflection polarizer 360° rotatable analyzer
<b>Nosepiece</b>	Detachable 5-hole encoded nosepiece (M32) with DIC slot	

# Technical Specification

<b>DIC</b>	High-resolution DIC, adjustable focal length (optional) High-resolution DIC, fixed focal length (optional)	
<b>Lighting System</b>	LED illumination, color temperature 4500K, CRI≥95	
<b>Reflective Observation</b>	Bright/Dark field Kohler lighting system, 50,000-hour LED light source	
<b>Transmission Observation</b>	Kohler lighting system, Abbe condenser, NA = 1.1, suitable for objectives with magnification of 4X or higher	
<b>Focus Adjustment System</b>	Coarse and fine coaxial, adjustable tightness, 1μm fine adjustment scale value, optical prism-assisted focusing (FA) system	
<b>Workbench</b>	Right-hand position 4-inch mechanical platform, travel range: 100*100mm mechanical platform, X and Y directions are coaxially adjustable; it can be equipped with a transmission system light-blocking plate and a glass sample platform plate.	Double-layer mechanical moving platform, 135*125mm double-layer mechanical loading platform, travel range 100*100mm
<b>Glass Stage Size</b>	101*101mm	
<b>Intelligent Management</b>	The control circuit automatically adjusts the light intensity to the optimal level when changing the objective magnification	
<b>Camera</b>	pixel micro industrial camera	
<b>Camera Interface</b>	Standard C-type interface 1X, adjustable focus, suitable for CCD within 4/3 inches	
<b>Software</b>	Basic measurement software; Microscopic analysis software (Optional)	

## Standard Delivery

Name	Qty	Photo	
<b>Mainframe</b>	1pc		
<b>Objective lens:10X/25mm</b>	2pcs		
<b>60mm Parfocal Brightfield/ Darkfield Semi-Apochromatic Objectives</b>	M60PLFL5XBD,NA=0.15,WD=15mm	1pc	/
	M60PLFL10XBD,NA=0.3,WD=14.5mm	1pc	
	M60PLFL20XBD,NA=0.5,WD=4mm	1pc	
	M60PLFL50XBD,NA=0.75,WD=4mm	1pc	
<b>Nosepiece</b>	1pc		
<b>Workbench</b>	1pc		
<b>Polarizer</b>	1pc		

## Standard Delivery

Name	Qty	Photo
<b>Analyzer</b>	1pc	
<b>2000W Pixel Micro Industrial Camera</b>	1pc	
<b>1X C-type Camera Interface</b>	1pc	
<b>Basic Measurement Software</b>	1pc	
<b>Instruction Manual</b>	1pc	

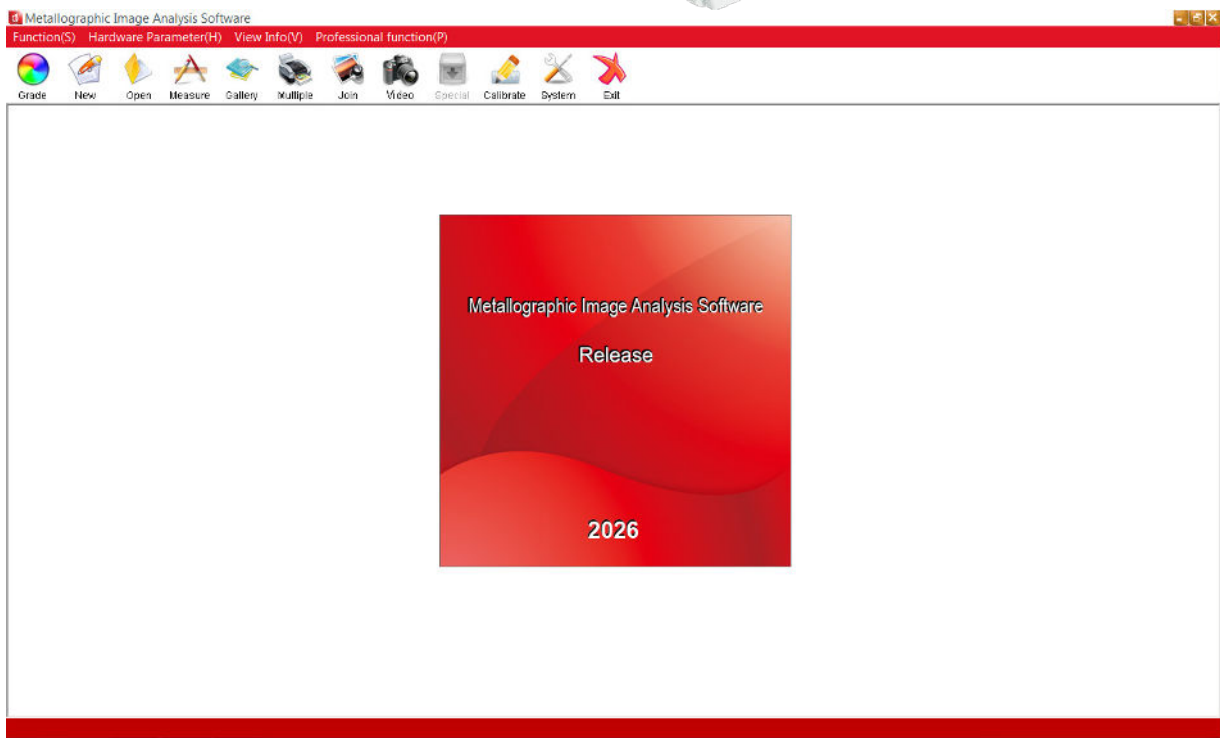
## Standard Delivery

Name	Qty	Photo
High-precision Micrometer (0.01mm scale value)	1pc	 A high-precision micrometer with a white plastic protective case, shown open to reveal the metal measuring tool inside.
Dust Cover	1pc	 A black, rectangular dust cover made of a textured material, likely for protecting the micrometer.
Power Cord	1pc	 A black power cord with a rectangular power adapter block and a standard two-prong electrical plug.
Camera Cable	1pc	 A black camera cable with a USB connector on one end and a specialized connector on the other, used for connecting the camera to a computer.

# Optional Delivery

<b>Observation Tube</b>	Ergonomic Trinocular Inclining Head with Erect Image Splitting ratio: Eyepiece/Camera = 100/0,0/100
<b>Eyepiece</b>	M60PLFL100XBD, NA=0.8, WD=3mm
	LM60PLFL20XBD, NA=0.4, WD=19mm
	LM60PLFL50XBD, NA=0.6, WD=11mm
<b>Camera Interface</b>	Standard C-type interface 0.5X, adjustable focus, suitable for CCD within 2/3 inches
	Standard C-type interface 0.65X, adjustable focus, suitable for CCD within 1 inch
<b>DIC</b>	High-resolution DIC, adjustable focal length High-resolution DIC, fixed focal length
<b>Stage</b>	Right-hand detachable quick-slide stage, 150×100mm travel
<b>Nosepiece</b>	Detachable 6-hole encoded nosepiece (M25) with DIC slot
<b>Software</b>	Metallographic analysis software

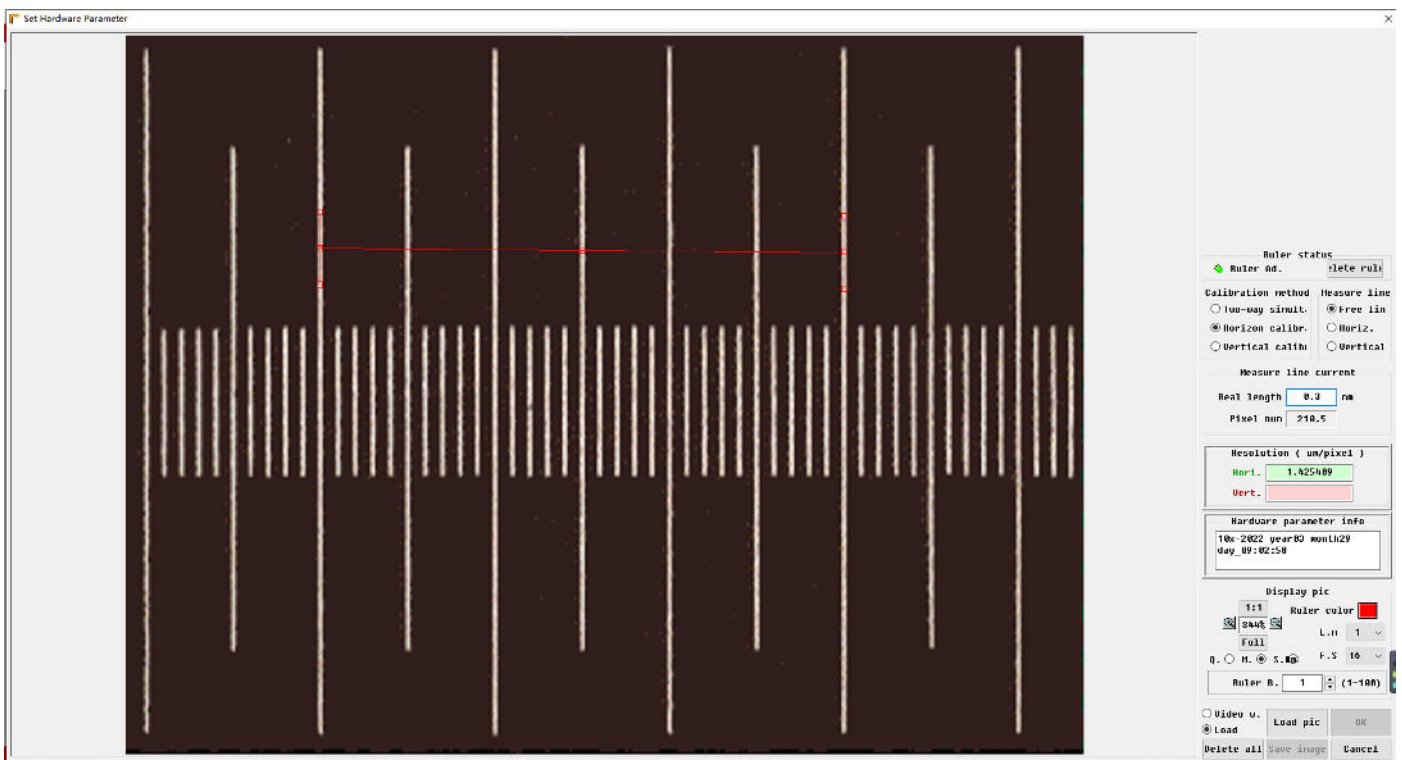
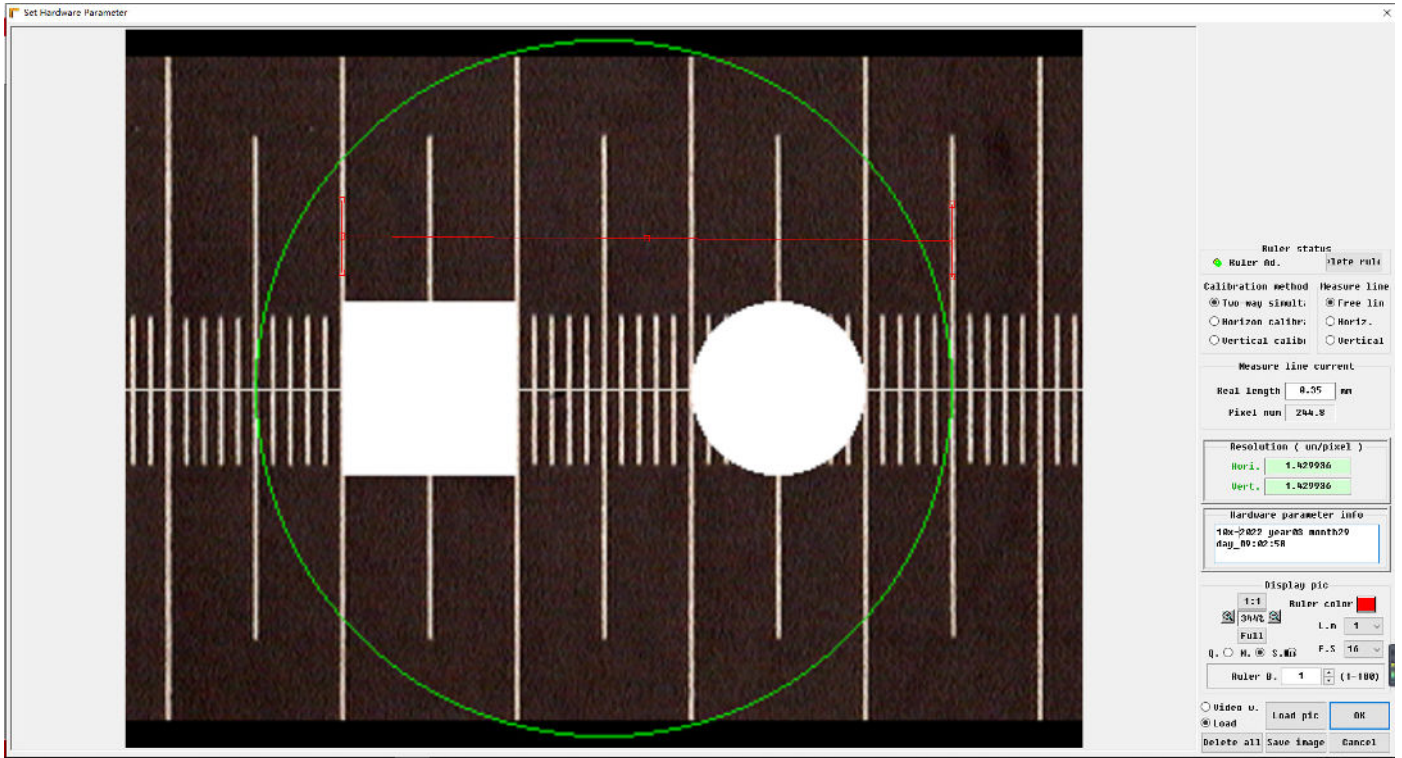
## iMetal-MA Metallographic Analysis Software



- The software supports hardware calibration and metallographic grade evaluation, covering international testing modules for grain size, inclusions etc. It has basic functions such as image preprocessing, accurate geometric measurement, multi-format report export and fixed-magnification printing, as well as image stitching, video acquisition, confocal imaging and 3D optical imaging etc. It supports atlas comparison and data statistics, It meets the standardized requirements of the entire metallographic testing process and is compatible with the Windows 7, 10 and 11 operating systems.

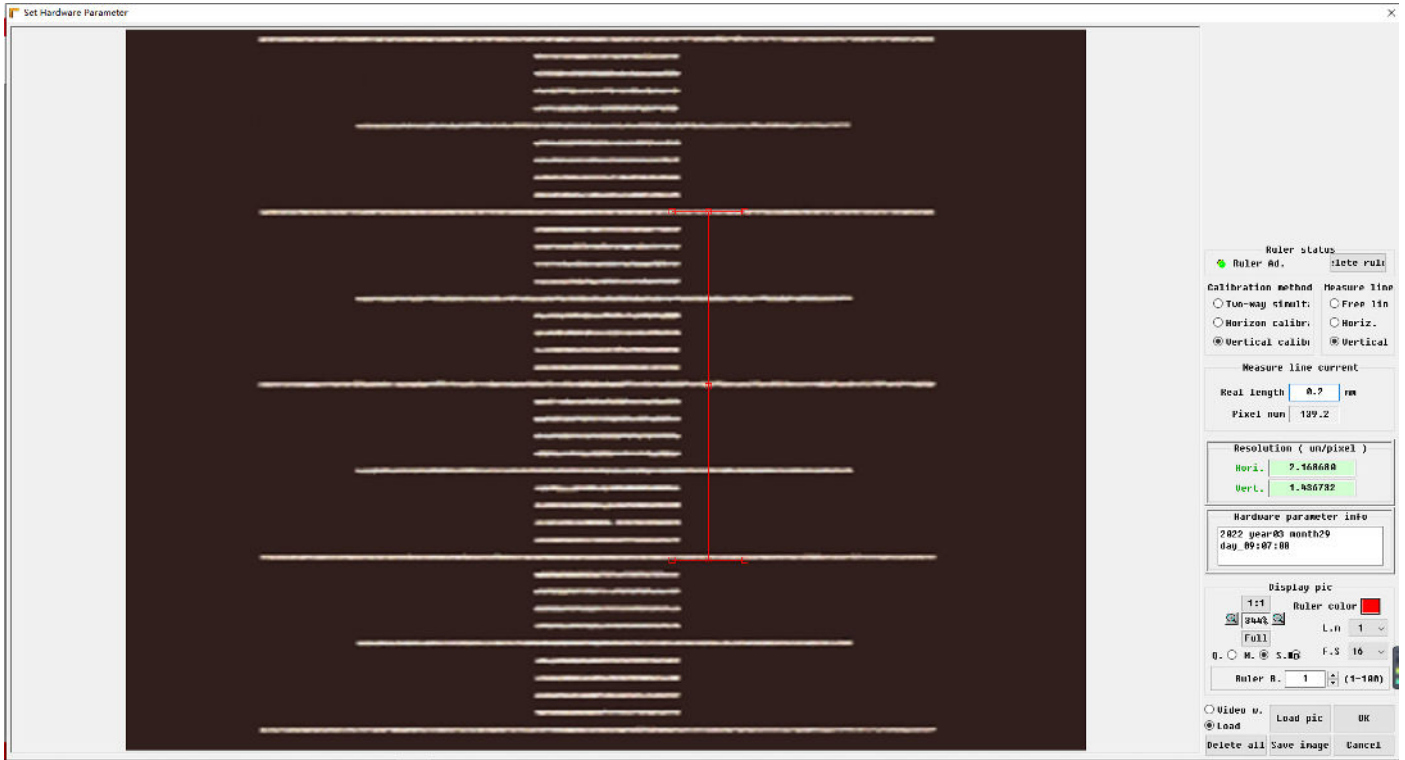
## Operation Interface

### Image Calibration



## Operation Interface

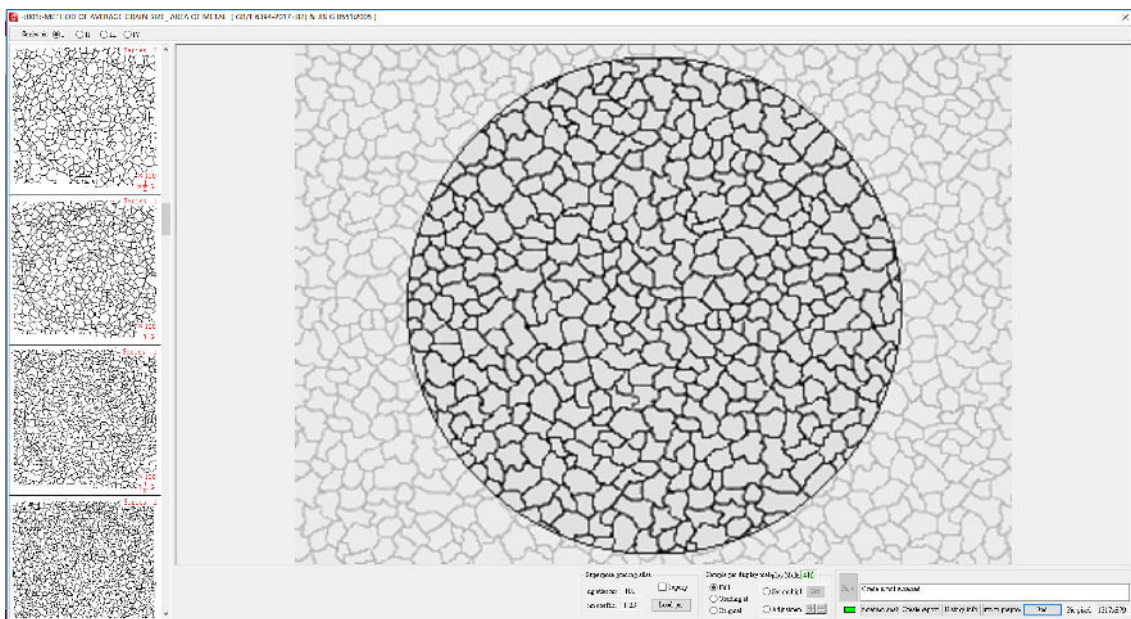
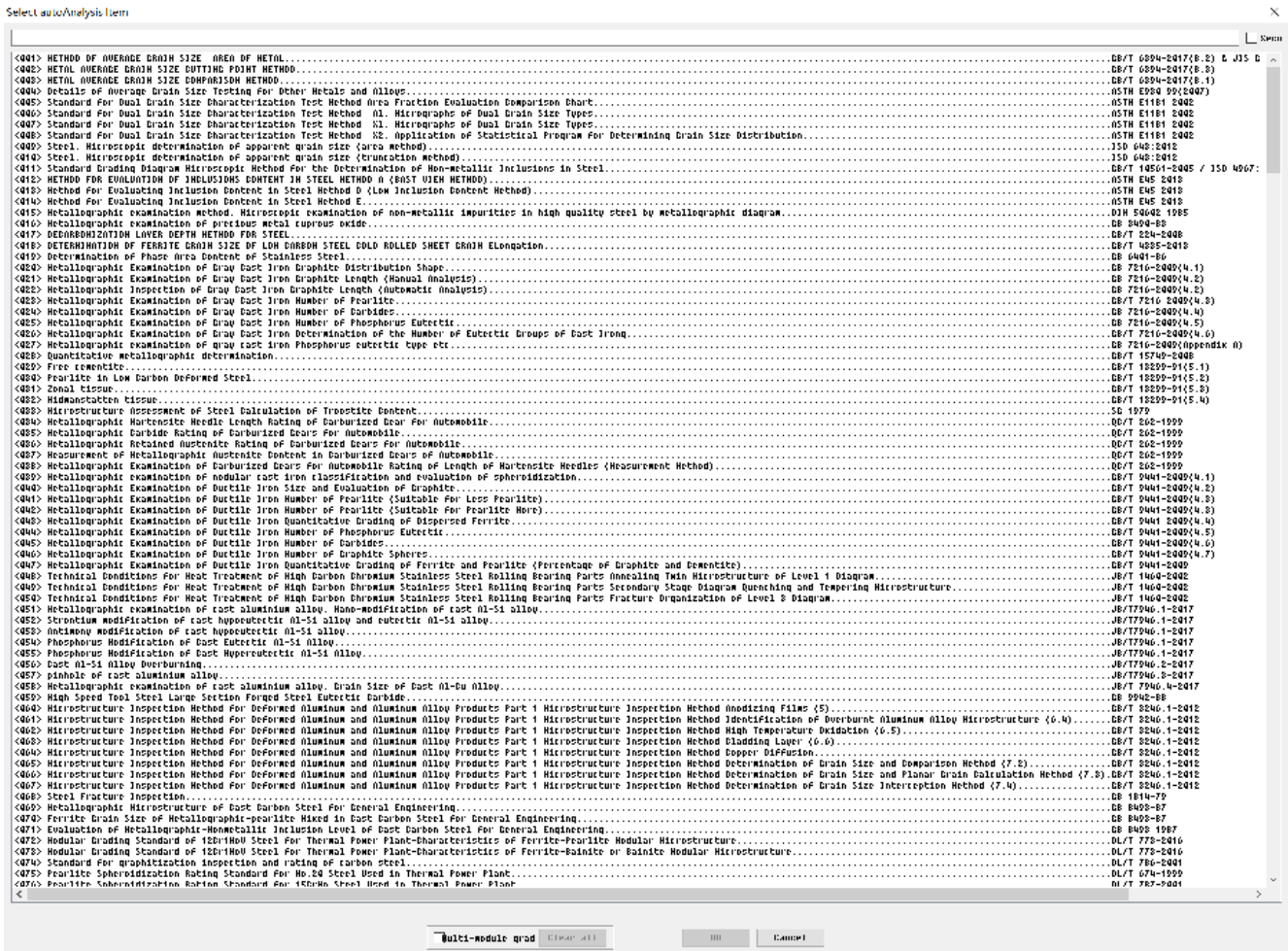
### Image Calibration



- The software supports three calibration methods (bidirectional simultaneous, horizontal and vertical) to adapt to different testing scenarios.
- The resolution can be automatically calculated only by loading the micrometer image, dragging the scale and entering the actual length, featuring simple and easy operation.
- The calibration results can be verified through geometric measurement with the error controlled within a minimal range, laying an accurate hardware foundation for subsequent measurement and grading. Meanwhile, it supports the export and import of resolution parameters to realize rapid reuse across multiple devices and scenarios.

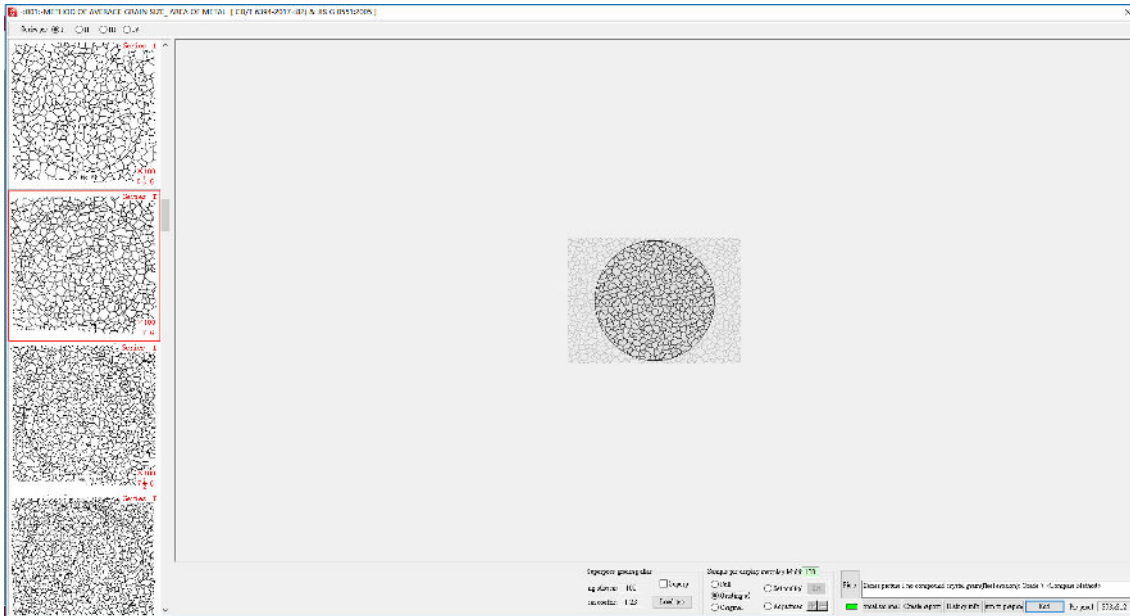
## Operation Interface

### Metallographic Grade Evaluation Function



## Operation Interface

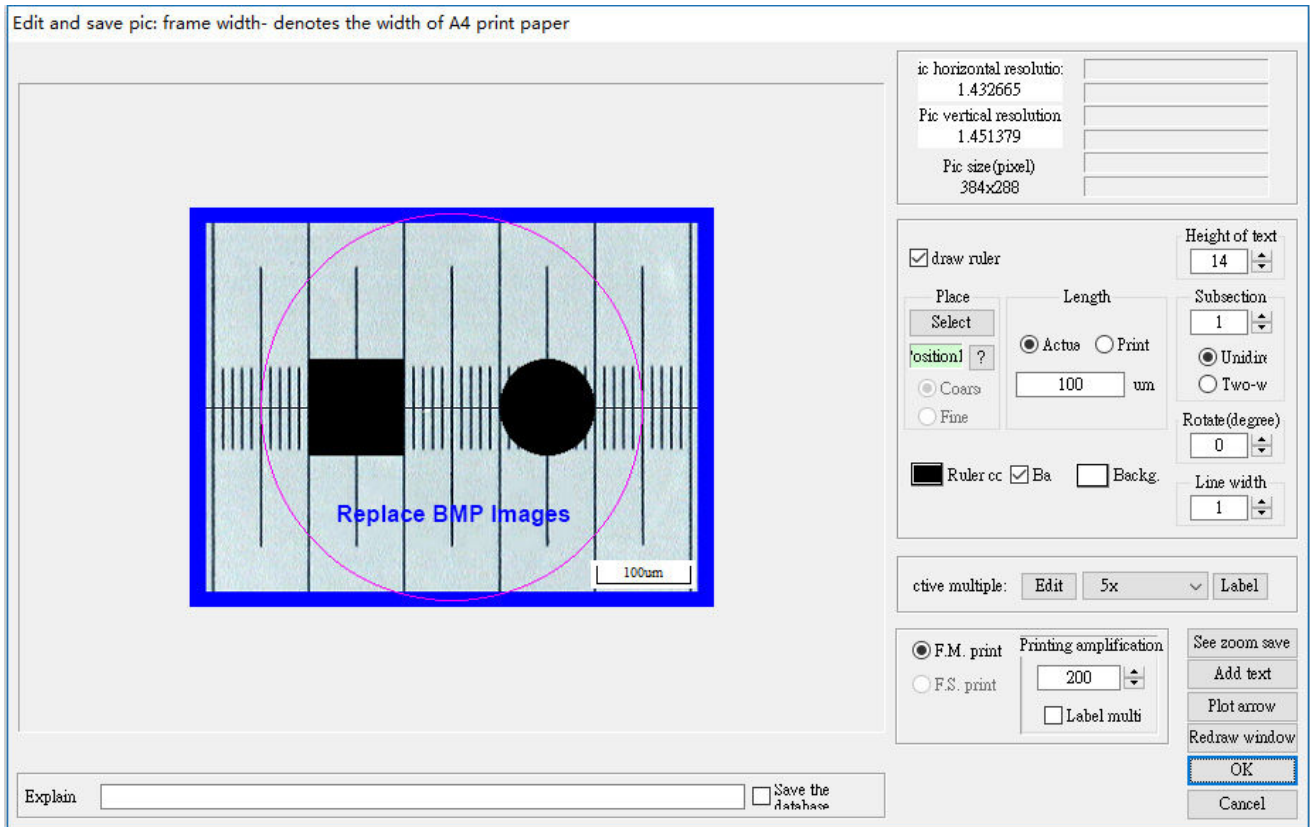
### Metallographic Grade Evaluation Function



- Comprehensive testing coverage: It covers mainstream testing items such as grain size, non-metallic inclusions, ductile iron and ferrite in stainless steel welds, and is adapted to national and international standard modules to meet the metallographic testing needs of various products.
- Adaptation of dual grading modes: It supports manual comparison grading and automatic quantitative grading. The former enables intuitive atlas comparison, while the latter accurately identifies microstructures and automatically calculates parameters, taking into account different testing scenarios and precision requirements.
- Convenient module retrieval: Testing modules can be sorted by number/standard number or quickly retrieved by keywords, which greatly improves the efficiency of module searching and makes the operation more efficient.
- Manual correction of results: It supports manual adjustment of metallographic microstructure attributes, addition/deletion of feature points and correction of automatic identification deviations. It also supports multi-field statistics for averaging to ensure the accuracy of grading results.
- Seamless connection of results to reports: Grading results can be directly linked to the report generation function, and standardized reports in PDF/WORD/EXCEL formats can be exported with one click, realizing a closed loop of the entire process from testing and grading to report generation.

## Operation Interface

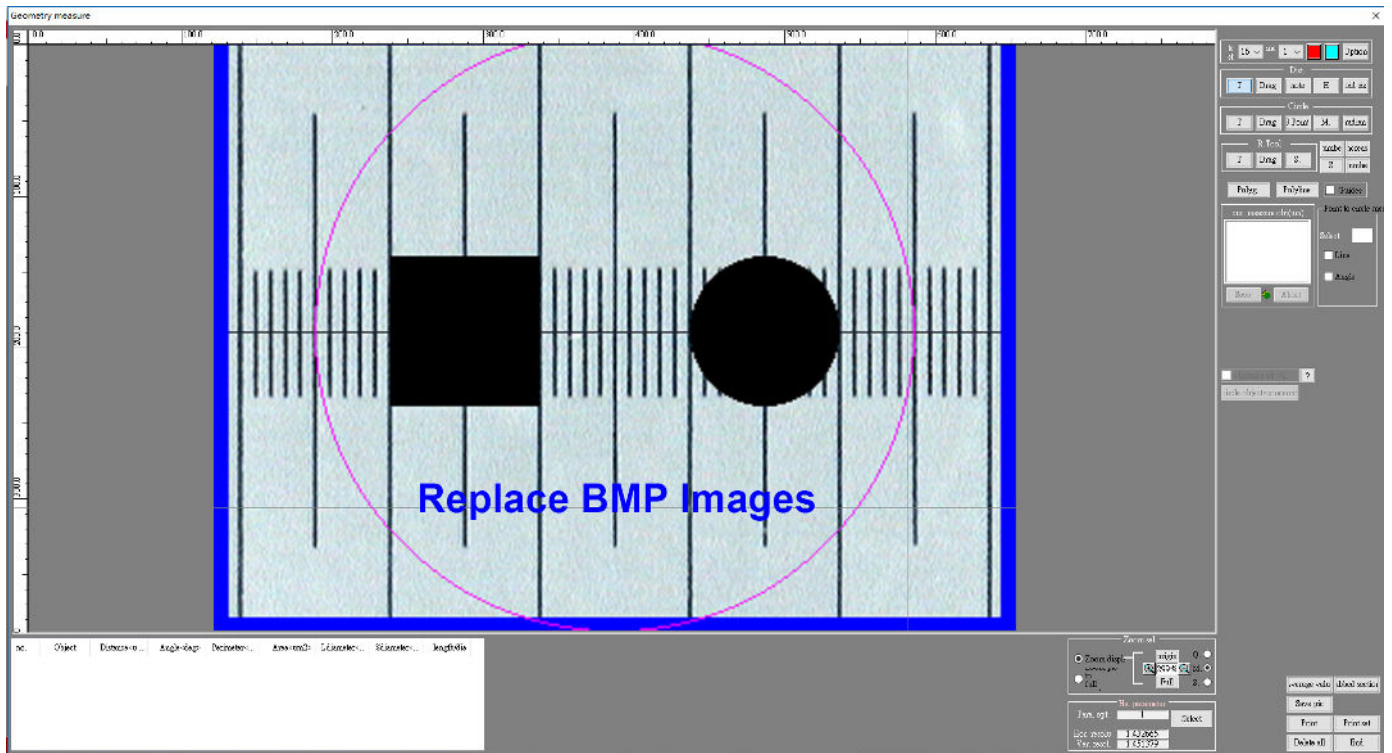
### Image Preprocessing



- Rich processing tools: It is equipped with dozens of professional tools such as brightness/contrast adjustment, binarization, sharpening and softening, filtering and denoising, and morphological operations to meet the optimization needs of various metallographic images.
- Flexible selection operation: It supports multiple selection methods including rectangle, ellipse and polygon. Selections can be moved and rotated, and precise pixel-based selection is also available, adapting to local and overall image processing scenarios.
- Customized output: Scales, text and arrows can be added when saving images, the printing magnification can be customized, and fixed-scale printing settings are supported to meet the requirements of standardized output.
- Efficient and convenient operation: Commonly used processing functions are integrated into exclusive panels, which can be called with one click without searching through multiple layers of menus, greatly improving the efficiency of image preprocessing.
- Complete data retention: It supports saving selected areas/entire images in BMP/JPG formats, the processing process is traceable, and the processed images can be directly connected to grading, measurement and report functions for smooth process connection.

## Operation Interface

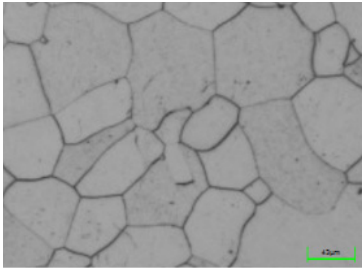
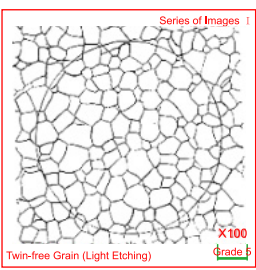
### Geometric Measurement



- Complete measurement tools: It supports various types of measurement including distance, rectangle, circle, polygon, angle, radian and point-to-center distance, covering the full-dimensional geometric measurement needs of metallographic testing.
- Units such as nm/um/mm can be freely selected, and the directions of measuring lines, arrows and text can be customized.
- Measurement results can generate image-text reports in real time and can also be directly imported into Excel for secondary analysis.

## Operation Interface

### Report Export

(Report name)		Sample Submission Date: 2018-01-01
(Submission unit)	(Submission unit)	
(Sample Varieties)	(Sample Varieties)	
(Test number)	(Test number)	
Inspection Item & Assessed Grade:	Item: Average Grain Size of Metals - Test Method for Average Grain Size of Metals (Area Method) [GB/T 6394-2017(8.2) & JIS G 0551:2005] Grade Type: Series of Images   Twin-free Grain (Light Etching): Grade 5 <Comparison Method>	
Image for Sample No.1: (Print Magnification: 280×)		Image for Sample No.2: (Print Magnification: 171×)
		
(Remarks)	(Remarks)	
(Surveyor)	(Check)	Sample Submission Date: 2018-01-01

- It supports universal report formats for single/multiple images, which can be selected on demand to adapt to the report presentation needs of different testing scenarios. Grading and measurement results can be exported in three mainstream formats (PDF/WORD/EXCEL) with one click, meeting different usage needs such as filing, editing and data statistics.
- Grading and measurement results can be directly linked to report generation without manual data entry, realizing the seamless connection of testing, results and reports and improving the efficiency of report generation.