Living up to Life

Leica
MICROSYSTEMS

Leica DFC550

Top-Quality Digital Camera Technology for Professional Documentation

INDUSTRY DIVISION

Top-Quality Digital Camera Technology for Professional Documentation

The new Leica DFC550 digital camera offers excellent color reproduction and the highest resolution for all light microscope related contrast methods. Superior image quality and high flexibility are the outstanding features of this camera. With its high precision Microscanning and Co-site Color Sampling, the hermetically sealed, thermoelectrically cooled 1.4 megapixel color sensor generates an image resolution of up to 12.5 megapixels in true colors. The Leica DFC550 offers a high dynamic range at an excellent signal-to-noise ratio. The camera delivers precisely detailed digitized images, 14-bit per color channel. The sensor's selectable read out, 24.6 MHz for fast live mode and fast image rates of 12.3 MHz for more image data, combine an optimum workflow and top image quality in a single camera. Robust and reliable interfaces such as FireWire-B and C-mount offer easy adaptation of the Leica DFC550 to all current microscopes and PC's.

GREATER DETAIL, MORE INFORMATION

Users requiring the greatest detail from their images benefit from the high-quality resolution offered by the Leica DFC550: Up to 12.5 megapixels at a color depth of 42-bit RGB is possible as a result of 36 partial exposures. Now, even the subtlest structures and color shades can be visually observed and digitally recorded. The Leica DFC550 ensures pin-sharp detail without moiré effect, color fringing or blooming.

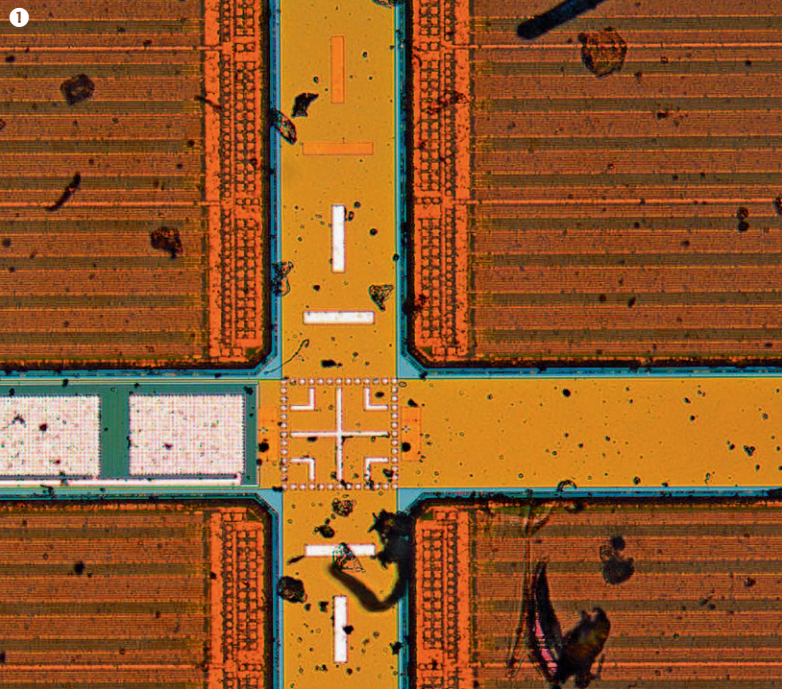
EXCELLENT RESULTS UNDER ALL MICROSCOPY CONDITIONS

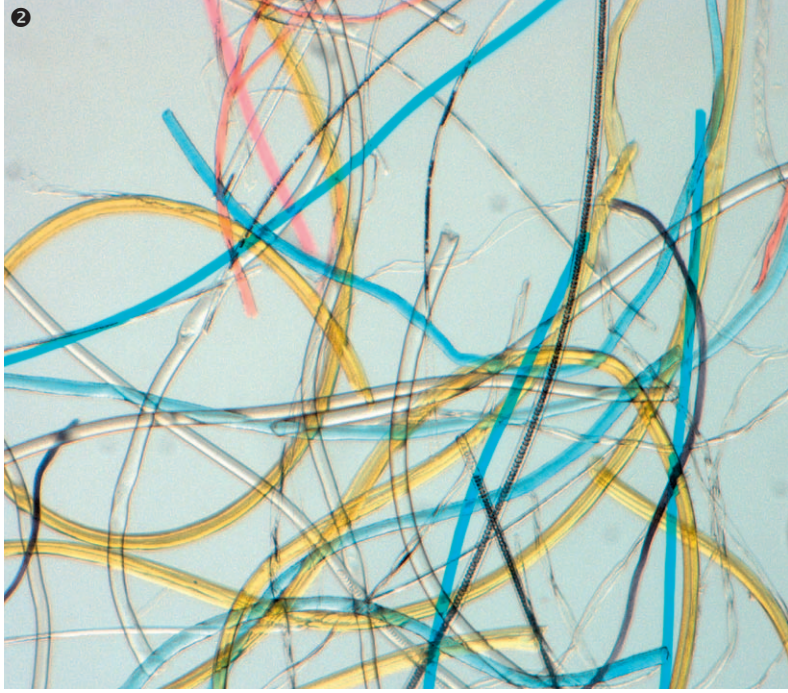
In addition to all common microscope modes, such as incidental and transmitted light, the Leica DFC550 digital camera is ideal for weak fluorescence and poorly illuminated samples. With combined cooling from a Peltier element and fan, the camera's CCD sensor provides perfect image and color quality even from long exposures. The 2/3" CCD Sensor is encapsulated in a sealed nitrogen chamber to avoid condensation on the optics, even with difficult-to-image samples.

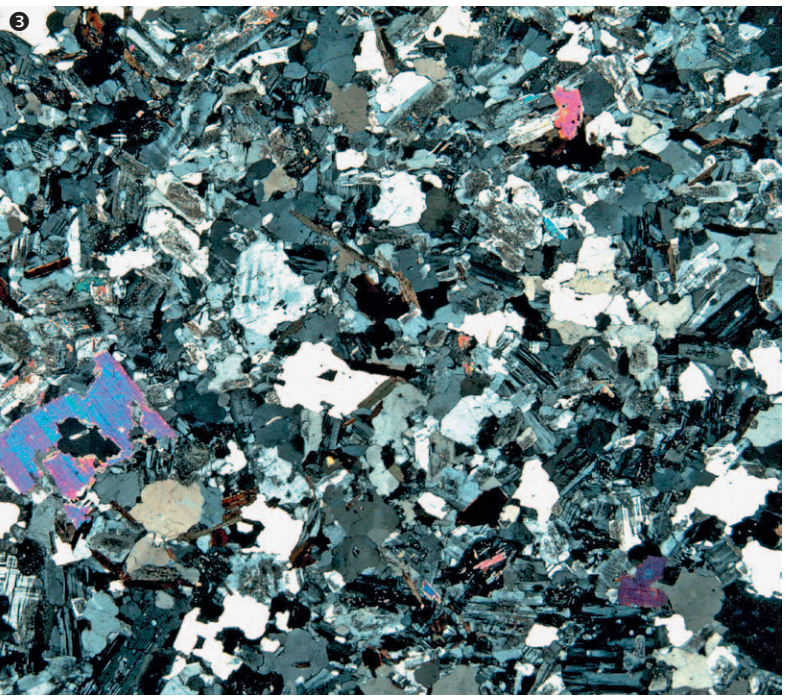
FLEXIBLE FOR ALL APPLICATIONS

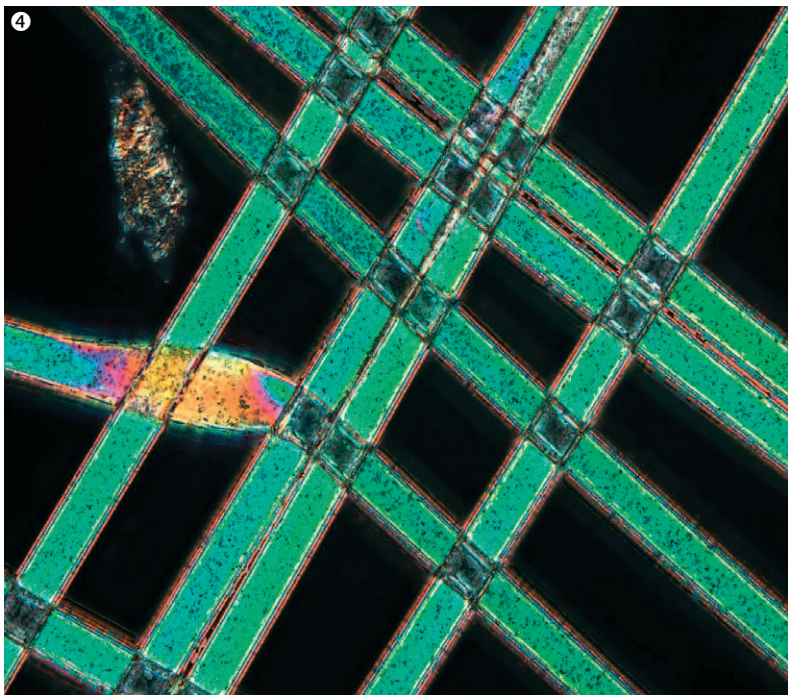
The Leica DFC550 is designed for all common contrast, light and dark procedures in microscopy, as well as for difficult fluorescence imaging. A choice of recording modes and resolutions provide excellent image quality in all applications.

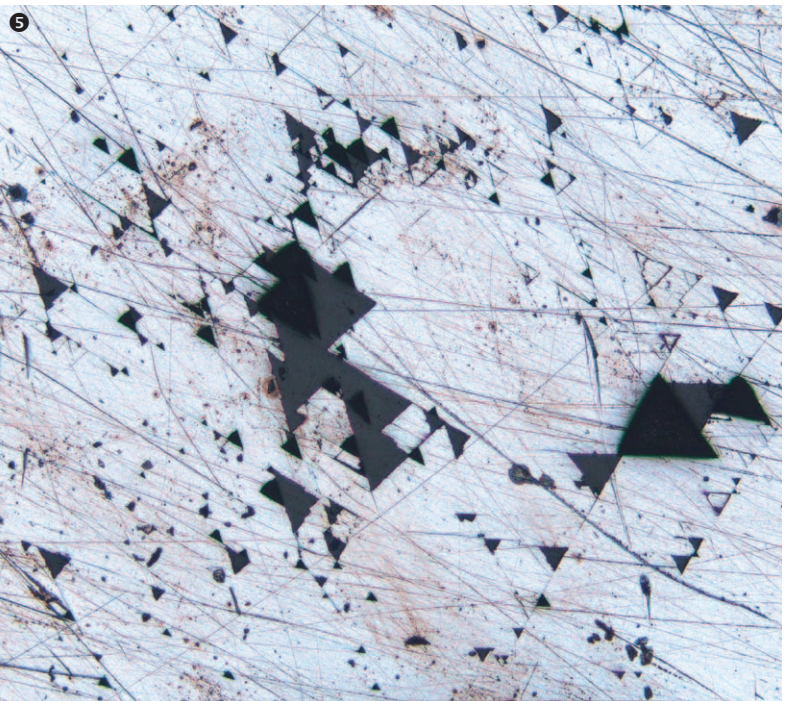
❶ Semiconductor inspection
❷ Fiber inspection
❸ Polarizing inspection
❹ Polarizing inspection
❺ Metallographic sample
❻ Metallographic sample

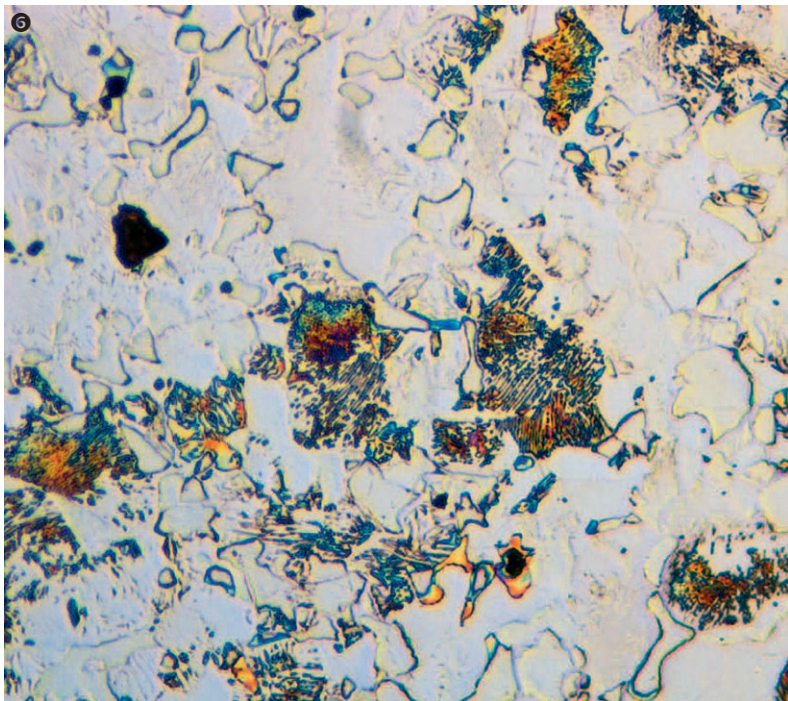






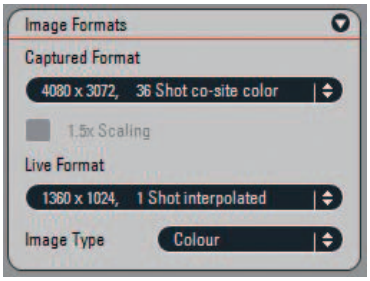


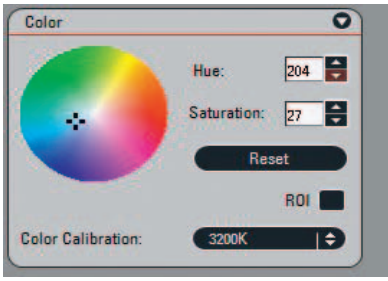


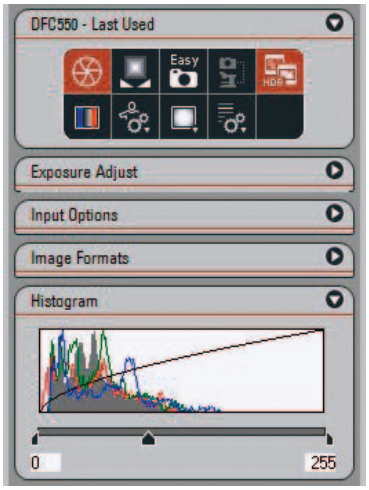


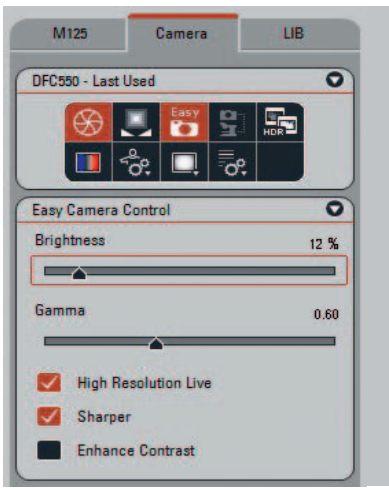
HIGH-PERFORMANCE LEICA LAS SOFTWARE

Leica Application Suite (LAS) integrates Leica microscopes, macroscopes, digital cameras, and software into one common environment to provide an easy-to-use and consistent imaging solution with unrivalled performance. The versatility of LAS makes it suitable for a diverse range of life science and industrial applications such as materials quality control, pathology, pharmaceutical testing, and many more. LAS accelerates the visualization, enhancement, measurement, documentation, and archiving of digital images. This powerful software solution can control all functions of Leica compound microscopes, stereomicroscopes, and macroscopes. By providing all the necessary tools for the installed applications to communicate with each other and with peripheral devices connected to the computer, LAS simplifies routine and research analysis.









LEICA DFC550:

- Fast, full color live images – for easy focusing and monitoring of the image composition.
- Many user selectable resolutions – from super fast 5×5 binning up to 12.5 Mpixel multishot mode to suit all imaging requirements. ❶
- Co-site Color Sampling and sub sample readout modes – no color interpolation required – for fast and absolutely clean true color images without moiré artifacts.
- Sensitive Sony CCD color sensor with high precision piezo micro scanner – to capture the subtlest structures and color shades
- Single FireWire-B connection for data and power – for ease of use and simple installation. ❺
- Complete camera kit with FireWire-B-B cable and FireWire-B board – no need for additional computer accessory (optional notebook kit available).
- Improved color calibration and color rendering – for the most demanding applications in industry and life science when the highest color quality is needed. ❷
- Active peltier cooling system with sealed sensor chamber and fan – to ensure the same image quality even with long exposure times.
- New low light image noise detection and reduction algorithm – to further reduce noise in the live image at low illumination levels.
- High Dynamic Range (HDR) Mode in LAS – to capture more details in delicate or challenging samples. ❸
- Easy and standard camera control panels – to concentrate on sample setup and for the best focus position. ❹

Technical Details

DIGITAL CAMERA	LEICA DFC550
Housing	Aluminum die cast
Size	(L × W × H) 157 mm × 93 mm × 123 mm
Weight	800 g
Exposure	0.25 milliseconds – 600 seconds
Live image	On computer screen
Cooling	Active (Peltier cooling), fan
External manual trigger	Present
Flash synchronization	Present
Shading correction	Present

SENSOR	
CCD sensor	2/3" – CCD ICX285AQ Progressive scan
Sensitive surface	8.8 mm × 6.6 mm
Pixel size	6.45 µm × 6.45 µm
Number of pixels	1360 pixels × 1024 pixels, 1.4 Mpixels
Total pixels (highest resolution)	4080 pixels × 3072 pixels, 12.5 Mpixels
Color filter	RGB Bayer
Signal-to-noise ratio	2050:1; 67 dB (at 24.6 MHz readout clock)
AD converter	14-bit
Protective filter	Hoya C-500S
Binning mode	3 × 3, 5 × 5
Analogue gain	1× – 8×

RESOLUTION	LIVE IMAGE SPEED	IMAGE & FILE SIZE
272 × 204 (5× binning)	40 fps	0.06 MP – 163 KB
340 × 256 (1 shot subsample)	56 fps	0.09 MP – 256 KB
452 × 340 (3× binning)	30 fps	0.15 MP – 450 KB
680 × 512 (2 shot subsample)	45 fps	0.35 MP – 1 MB
1360 × 1024 (1 shot)	13 fps	1.4 MP – 4 MB
1360 × 1024 (4 shot co-site color)	–	1.4 MP – 4 MB
2000 × 1500 (9 shot subsample)	–	3.0 MP – 9 MB
2720 × 2048 (16 shot co-site color)	–	5.5 MP – 16 MB
4080 × 3072 (36 shot)	–	12.5 MP – 36 MB

COMPUTER	
Supported operating systems	PC Win XP, Win 7
Software PC	DFC Twain, Leica LAS, Leica LAS-AF

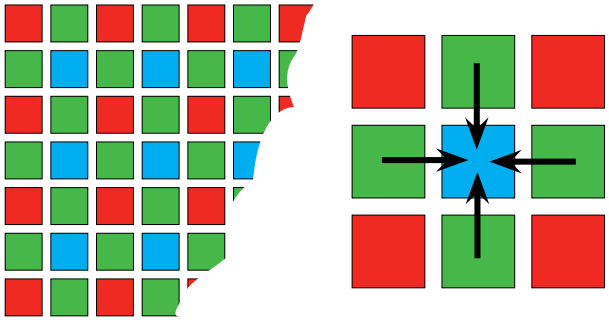
INTERFACES	
Optical	C-Mount
Recommended video adapter	0.63× / 0.7×
Data	FireWire-B 9-pin single cable (400 MB/s)
Power supply	12 – 33V via computer
Power consumption	8 W
Computer	FireWire-B interface

MISCELLANEOUS	
Minimum PC configuration	Intel Core Duo >2.5 GHz, or Intel Core-i series 2 GB RAM, Graphics card 256 MB RAM, shared memory not recommended, powered FireWire-B onboard or 1 free PCI express slot
Operating temperature range	+5 to +35°C
Air humidity	max. 80%, non condensing

PIEZO-SHIFT TECHNOLOGY

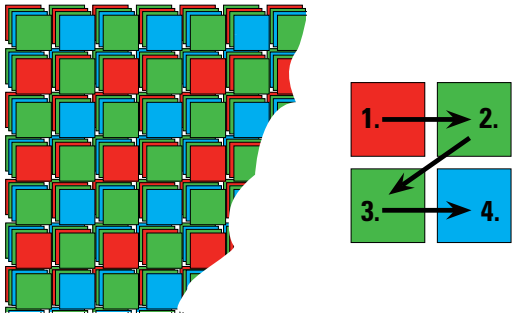
If the 4-shot capture mode is selected, the camera captures four images of the same object using pixel shifting technology. In between the single captures the complete CCD sensor is precisely shifted one pixel's width. Thereby each image point is captured once by a red, green, and blue pixel. The four images then combine to produce a true color image in the sensor's resolution, and complete color information is measured. As a result no color artifacts or aliasing will occur, and the color resolution is optimal.

Single-shot mode:



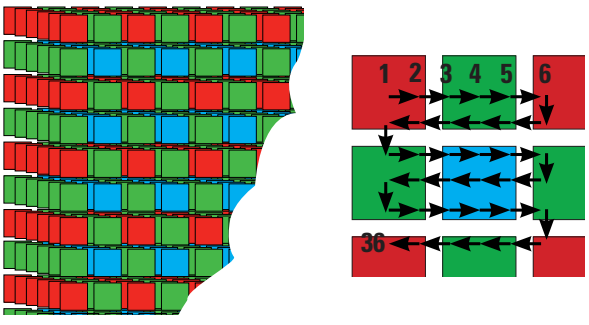
Left: part of the on-chip Bayer-type mosaic mask.
Right: single-shot interpolation of missing green color information for a "blue" pixel by inspecting the neighboring pixels.

4-shot mode:



True color by Co-site Color Sampling with 4-shot technique.
Left: the true color image is combined from 4 single images.
Right: shifting pattern for sampling color information.

36-shot mode:



Microscanning increases spatial and color resolution.
Left: the first 6 out of 36 total images that will combine to create a high-resolution image. Right: shifting pattern for the 36-shot.
The width of each single step is 1/3 pixel pitch.

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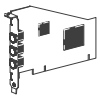
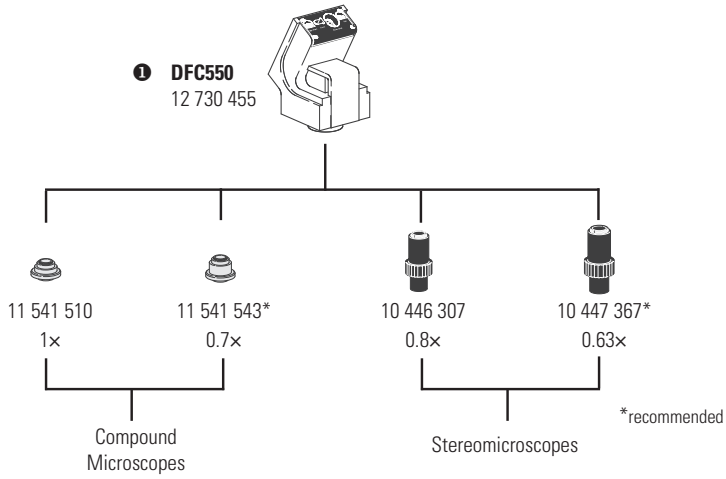
Assembly Diagram

❸ **Cables**
12 730 186 FW-B-B, 2.5 m

❹ **FireWire-Cards**
12 730 446 Notebook Kit FW-B
12 730 447 FW-B, PCI-Express Low Profile





ORDER NUMBERS

12 730 455	❶	Leica DFC550 Camera kit comprising: Leica DFC550 Camera, PCI-Express FireWire-B card, FireWire-B-B cable, 2.5 m, Leica software

ORDER NUMBERS (OPTIONS/EXTRAS)

12 730 447	❹	PCI-Express FireWire-B card for PCs without FireWire (2 ports) low profile
12 730 446	❹	FireWire-B notebook kit, comprising PCI-Express card (2 ports), power supply 100-240 V, FireWire-A-B adapter
12 730 186	❸	FireWire-B-B cable, 2.5 m, 9/9-Pin

The statement by Ernst Leitz in 1907, "With the User, For the User," describes the fruitful collaboration with end users and driving force of innovation at Leica Microsystems. We have developed five brand values to live up to this tradition: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement. For us, living up to these values means: Living up to Life.

INDUSTRY DIVISION

The Leica Microsystems Industry Division's focus is to support customers' pursuit of the highest quality end result. Leica Microsystems provide the best and most innovative imaging systems to see, measure, and analyze the microstructures in routine and research industrial applications, materials science, quality control, forensic science investigation, and educational applications.

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