



 Lightnovo

- EXTREMELY COMPACT
- HIGH MAPPING RESOLUTION
- UP-RIGHT AND INVERTED OPERATION
- MODULAR DESIGN

## miniRaman microscope

The world's smallest confocal Raman microscope for chemical and structural analysis

## TECHNOLOGY

Lightnovo is proud to present our world's smallest confocal Raman microscopes for laser wavelengths: 660nm and 785nm. MiniRaman microscope is based on our miniRaman spectrometer, which performs Raman shift and Raman intensity calibration during every spectrum acquisition. Due to unique, patented technology\* miniRaman microscope has very high throughput, perfect wavenumber accuracy and Raman intensity calibration via in-built reference channel.

"very high throughput, perfect wavenumber accuracy and Raman intensity calibration via in-built reference channel"

\*Patented technology



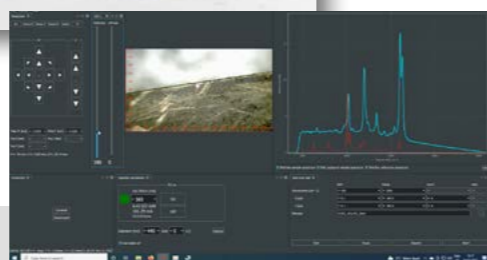
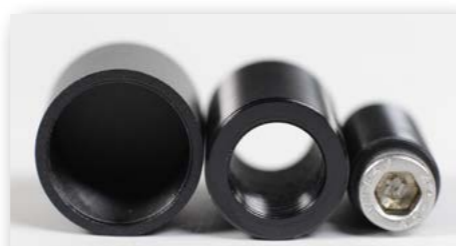
MiniRaman microscopes provide diffraction limited spatial resolution, extremely high throughput and additionally equipped with transmitted visible light microscopy on a separate camera sensor. MiniRaman microscope can be used in upright microscopy and inverted microscopy configurations. All what is need for switching between modes – flipping the device from top to bottom.

This instrumental setup allows for both sample viewing using the optical microscopy capabilities and performing measurements by Raman spectroscopy simultaneously.

The visual observation reveals morphological details of a sample (e.g. color, size, shape), whereas the spectroscopic measurement reveals information about the molecular structure and chemical composition of a sample.

## ACCESSORIES

- long working distance probe, f=30 mm
- middle working distance probe, f= 15 mm
- short working distance probe, f=6.25 mm
- objective covers
- adapters for standard microscopy objectives
- microscope objectives with magnification 10x, 20x, 50x, 100x
- custom microscope objectives available upon request



## SOFTWARE

**Miraspec for PC (Windows 7, 10, 11)** Software controlled by USB cable.

**Data acquisition allows:**

- to see white light microscopy image simultaneously with the laser spot on the sample
- to navigate over the microscopy image with XYZ sample manipulation
- to set up Raman mapping parameters (mapping area, step size, exposure time, laser power, etc.)
- to measure the Raman map with required dimensions in X, Y, Z
- to seat up kinetic mapping
- to avoid surface morphology impact on the Raman spectrum quality during mapping under high NA microscope objective – sample surface curvature compensation

**Data analysis allows:**

- to represent Raman map at peak intensity, peak area with and without background correction
- to create Raman spectral library from the Raman map
- to decompose Raman map into the chemical map using PCA, MCR and NNLS

Modular design



## APPLICATIONS

- Surface Enhanced Raman Scattering
- Materials science
- Pharmaceuticals
- Life science
- Polymers
- Nano-materials
- Semiconductors
- Cosmetics
- Forensics
- Art & museum
- Geology

MiniRaman microscope is also suitable for samples that tend to fluoresce when exposed to laser radiation. Due to the usage of a 785nm laser, the excitation energy is low enough for these samples not to fluoresce or only to a minor degree.

## SPECIFICATIONS

Feature versus model*	MiniRaman Standard M	MiniRaman Power M	MiniRaman SERS M	MiniRaman Power Dual M	MiniRaman Standard Dual M
Laser wavelength	785 nm			660/675 nm and 785 nm	
Power range on a sample**	5-50mW	10-90 mW	0,5-15 mW	5-40 mW (660) 5-75 mW (675) 10-90mW(785)	5-40 mW (660) 5-75 mW (675) 5-50 mW (785)
Spectral Range	400-2700 cm <sup>-1</sup>			2700-4000 cm <sup>-1</sup> (660) 2550-4000 cm <sup>-1</sup> (675) 400-2700 cm <sup>-1</sup> (785)	
Spectral Resolution	7-15 cm <sup>-1</sup> (slit size dependent; slit size can be customized)				
Signal-to-noise ratio at***:	500:1	1000:1	100:1	600:1 (660) 800:1 (675) 800:1 (785)	600:1 (660) 800:1 (675) 440:1 (785)
Lateral resolution****	900 nm			800 nm (660) 900 nm (785)	
Axial resolution or confocality****	3 μm			2.5 μm (660) 3 μm (785)	
White light microscopy	Reflected with simultaneous visualization of laser spot and Raman acquisition				
Microscopy configuration	up-right and inverted				
Mapping travel range in XYZ	25 x 25 x 25 mm				
Lateral step size	500nm				
Axial step size	500nm				
Physical dimensions	120 mm x 130 mm x 280 mm (LxWxH)				
Weight	7 kg				

\* Each model is based on the same microscope body; only the miniRaman spectrometer is different. miniRaman spectrometer can be replaced by the user if necessary.

\*\* Actual laser power range can differ  $\pm 2$  cm<sup>-1</sup> per device. Please contact us if you need specific laser power range values. Determined as peak signal-to-noise ratio of polystyrene spectrum at maximal laser power, integration time 0.3s, number of repetitions 10.

\*\*\*\* Determined at microscope objective NA=0.95 (magnification 100x).

*Harness the power of Raman spectroscopy and make it widely accessible for the benefit of mankind.*

*- Lightnovo's mission*



Lightnovo has been founded in 2019 by a team united by the belief in making a difference with innovative Raman spectroscopy solutions.

Our goal is to provide premium performance Raman spectrometers and microscopes with the world's smallest form factor at a price that democratizes access and opens new application areas.

It is our vision to become the recognized leader in providing the highest value Raman spectroscopy and Raman microscopy solutions for research, industry and healthcare.

 **Lightnovo**

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