



- HIGH SPECTRAL RESOLUTION
- LONG MAPPING RANGE
- UP-RIGHT AND INVERTED OPERATION
- MODULAR DESIGN
- WIDE RANGE OF LASERS

RG Raman microscope

Premium research-grade confocal Raman microscope for chemical and structural analysis



Photonic Solutions Ltd
Edinburgh
EH14 4AP
+44 131 664 8122
www.photonicsolutions.co.uk



TECHNOLOGY

RG Raman microscope perfectly suits for any kind of demanding Raman spectroscopy applications that require high spectral and spatial resolution, long mapping range, extremely stable laser power, high sensitivity and broad spectral range (from low frequency to high frequency Raman shift).

Technology is based on high throughput transmittance diffraction optics with up to 85% efficiency from sample to detector.

Four different lasers:

405 nm, 532 nm, 633 nm and 785 nm.

Extremely stable laser wavelength and laser power

[0.02% fluctuation during 8 hours of operation].



RG Raman microscope provides diffraction limited spatial resolution, extremely high throughput and additionally equipped with transmitted visible light microscopy on separate camera sensor. RG Raman microscope can be used in upright microscopy and inverted microscopy configurations. All what is need for switching between modes – flip 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.

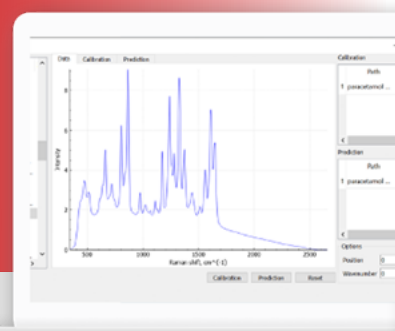
The visual observation reveals morphological details of a sample (e.g. color, size, shape), whereas the spectroscopic measurement reveals information about the molecular structure and chemical composition of a sample.

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

APPLICATIONS

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



SOFTWARE

Miraspec for PC (Windows 7, 10) 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 set 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 hyperspectral Raman map into the chemical maps using PCA, MCR and NNLS

SPECIFICATIONS (when equipped with RG Raman spectrometer)

| Feature versus model* | RG Raman 405 microscope | RG Raman 532 microscope | RG Raman 633 microscope | RG Raman 785 microscope |
|------------------------------------|---|-------------------------|-------------------------|--------------------------|
| Laser wavelength | 405 nm | 532 nm | 633 nm | 785 nm |
| Power range on a sample | from 0.1 to 30 mW | from 0.1 to 150 mW | from 0.1 to 50 mW | from 0.1 to 100 mW |
| Spectral Range | 50-3700 cm ⁻¹ | | | 50-2500 cm ⁻¹ |
| Spectral Resolution | 3-5 cm ⁻¹ | | | 2-4 cm ⁻¹ |
| Signal-to-noise ratio at**: | 1000:1 | 1200:1 | 900:1 | 900:1 |
| Lateral resolution*** | 280 nm | 320 nm | 500 nm | 600 nm |
| Axial resolution or confocality*** | 600 nm | 750 nm | 1000 nm | 1500 nm |
| White light microscopy | Reflected with simultaneous visualization of laser spot and Raman acquisition | | | |
| Microscopy configuration | up-right and inverted | | | |
| Mapping travel range in XYZ | 102 x 102 x 25 mm | | | |
| Lateral step size | 500 nm | | | |
| Axial step size | 500 nm | | | |
| Physical dimensions (LxWxH) | 400 mm x 320 mm x 475 mm | | | |
| Weight | 20 kg | | | |

SPECIFICATIONS (when equipped with miniRaman spectrometer)

| Feature versus model* | RG Raman Standard microscope | RG Raman Power microscope | RG Raman SERS microscope | RG Raman Power Dual microscope | RG Raman Standard Dual microscope |
|---------------------------------------|---|---------------------------------|--------------------------------|---|---|
| Laser wavelength | 785 nm | | | 660 nm and 785 nm | |
| Power range on a sample | 5-50 mW | 15-150 mW | 0,5-5 mW | 1-32 mW (660) 15-150mW(785) | 1-32 mW (660) 5-50 mW (785) |
| Spectral Range | 400-2700 cm ⁻¹ | | | 2700-4500 cm ⁻¹ (660) 400-2700 cm ⁻¹ (785) | |
| Spectral Resolution | 7-15 cm ⁻¹ (slit size dependent; slit size can be customized) | | | | |
| Signal-to-noise ratio at**: | 500:1 | 1000:1 | 100:1 | 1000:1 800:1 | 500:1 800:1 |
| 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 | 102 x 102 x25 mm | | | | |
| Lateral step size | 500nm | | | | |
| Axial step size | 500nm | | | | |
| Physical dimensions | 400 mm x 320 mm x 475 mm (LxWxH) | | | | |
| Weight | 20 kg | | | | |

* Each model is based on the same microscope body; only the RG Raman / miniRaman spectrometer is different.

RG Raman / miniRaman spectrometer can be replaced by the user if necessary.

** 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 ApS
Blokken 15, 1. tv.
3460 Birkerød
Denmark (DK)
CVR: 40979603



Photonic Solutions Ltd
Edinburgh
EH14 4AP
+44 131 664 8122
www.photonicsolutions.co.uk