HOLMARC
OPTO-MECHATRONICS LTD

Holmarc Opto-Mechatronics Ltd has been organized as a provider of engineering tools for scientific research. Our company is equipped to meet most challenging and demanding requirements of scientific community with our manufacturing and development capabilities in optics, mechanics, electronics and software. At Holmarc, experienced engineers, designers and technicians work hand in hand to deliver state of the art engineering solutions to our clients.

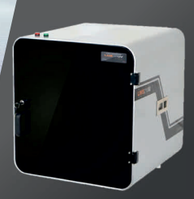
All of us at Holmarc stay tuned to absorb changes in technology as fast as possible. We deliberately keep our technical skills as well as manufacturing infrastructure flexible and maintain a dynamic work culture throughout our operations. We have distributors and collaborators in all parts of the world and are well equipped to serve world scientific community. We welcome queries irrespective of geographical and political boundaries.

SPECTROSCOPIC INSTRUMENTS

HOLMARC manufactures innovative spectroscopy products leveraging on our capabilities in optics. There are custom as well as standard spectroscopic products which find frequent applications in industry as well as research laboratories. Our product range include simple lab grade spectrometer to fully featured, fully automated imaging spectrometer with multiple gratings. A comprehensive range of accessories including spectroscopic sources, gratings, fiber optic guides, filters and software are also available.

UV LASER WRITING SYSTEM

PHOTOLITHOGRAPHY-2

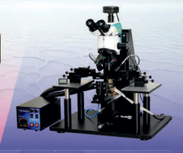


PHOTOLITHOGRAPHY-1

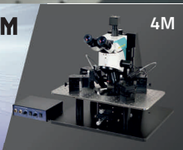
Holmarc designed a versatile 4" substrate UV Laser Writer with high precision components, specifically designed to give the user the highest degree of freedom to create micro structures in photo sensitive layers.

PROBE STATION SYSTEM

T01L



RF



4M

8M

Applications include failure analysis, LED, MEMS, opto-electronics, device characterization, wafer level reliability etc. We offer a complete set of accessories to allow you to position, navigate, and contact the wafer or device under test.

Get in touch with our technical experts and discuss your application needs and unique requirements. You can be sure that you will receive rapid response and service.

For more products and informations, log on to **www.holmarc.com** or contact us at sales@holmarc.com

visit us @
www.holmarc.com
E-mail: sales@holmarc.com

OFFICE & FACTORY ADDRESS
B.7, H.M.T. INDUSTRIAL ESTATE,
H.M.T. P.O, KALAMASSERY,
KOCHI - 683 503, KERALA,INDIA

ISO 9001 2015 CERTIFIED

HOLMARC ANALYTIC DIGITAL ANALYTIC INSTRUMENTS

H-LabZ RESEARCH LAB EQUIPMENTS

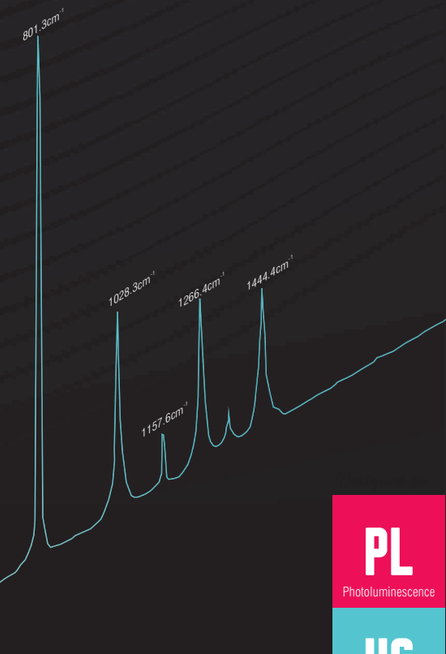
Connect with us on

RESEARCH GRADE-Confocal Microscope Systems

HARS
HOLMARC ADVANCED RESEARCH SYSTEMS

CONFOCAL MICRO RAMAN
SPECTROMETERS

from India's No.1 scientific / research equipments manufacturing company



PL Photoluminescence

UC Upconversion

FL Fluorescence

EL Electroluminescence

offer up to **0.1cm⁻¹** per pixel resolution

Upright/ Inverted Microscope Configuration

Galvo⁺ **High Speed** Scanning

Trigger Mode for External Laser Integration

8 **Laser Integration Option**

Raman **ELECTROCHEMICAL FLOW CELL**

Stokes and Anti-stokes Shift Measurement Mode

Temp. Dependent Raman Measurement

POLARISED RAMAN Spectroscopy

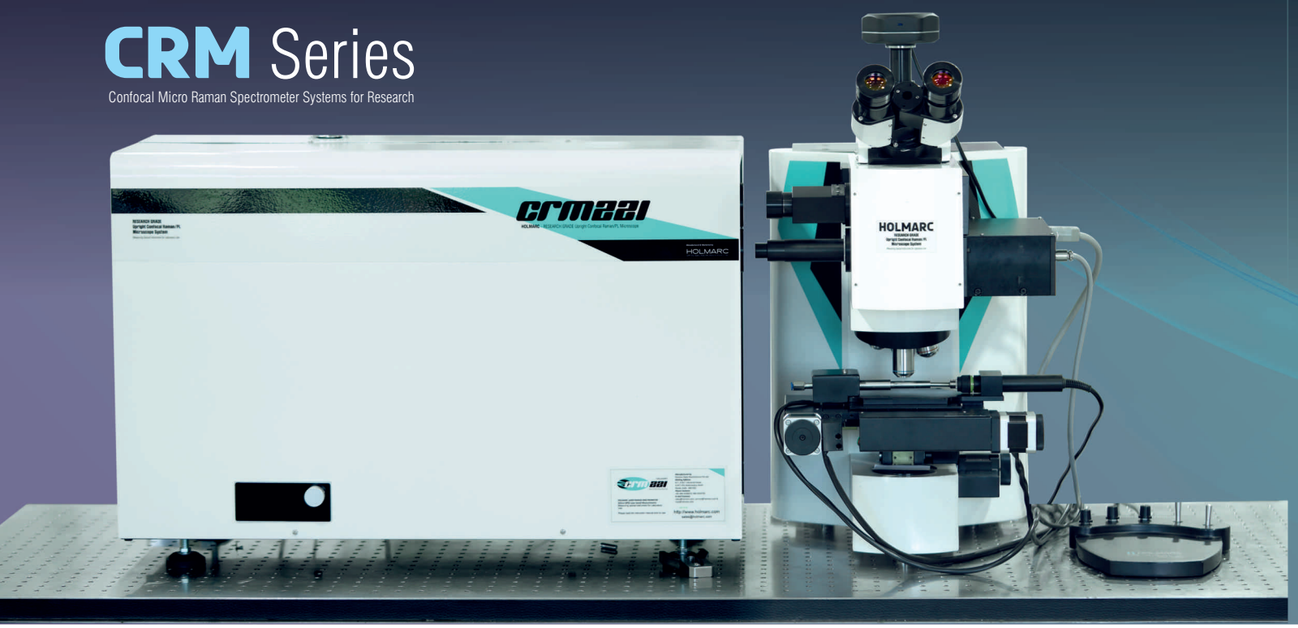
PRESSURE DEPENDENT RAMAN

RAMAN HYPERSPECTRAL IMAGING

AUTO LIVE FOCUS-TRACK

CRM Series

Confocal Micro Raman Spectrometer Systems for Research



CONFOCAL MICRO RAMAN SPECTROMETER

Applications areas

- Nanotechnology
- Battery & solar cell research
- Material science
- Petroleum industry
- Forensics
- Life science
- Pharmaceutical Industry
- Bio-medical
- Chemical analysis
- Environment science
- Gemology

We have the opportunity to accelerate research by producing cost-effective Raman spectrometers right here in India—the birthplace of the Raman spectrometer. Let's harness our expertise and contribute to scientific advancements!

Team Holmarc

Standard Lasers

488nm | 532nm | 638nm | 785nm

Product features

- **Fully Automatic Upright Infinity Confocal Microscope and Spectrometer Design:**
This system combines the capabilities of an upright infinity confocal microscope and a spectrometer. It operates automatically, simplifying sample focusing & enabling Raman and photoluminescence (PL) analysis.

- **Motorized Turret for Microscope Objective:**
The microscope features a motorized turret with six slots for inserting different microscope objectives.

- **Automatic Filter Wheel:**
An eight-slot automatic filter wheel accommodates standard 35x25 mm and 25 mm diameter dielectric and edge/notch filters.

- **High-Resolution Czerny-Turner Spectrograph:**
The system includes a 400 mm focal length (FL) Czerny-Turner spectrograph with a remarkable resolution of 0.95 cm^{-1}.

- **Optional Double/Triple Turret Grating System:**
Users have the flexibility to choose between single, double, or triple grating configurations.

- **Wide Wavelength Range:**
The system covers a broad wavelength range from 190 nm to 2400 nm, depending on the grating and detector used.

- **Cooled CCD Detector:**
Equipped with a 3648-pixel cooled CCD detector, ensuring reliable data acquisition.

- **Multiple Laser Options:**
The provision for three different lasers allows users to select the most suitable laser for their specific applications.

- **Motorized Sample Stage:**
The sample stage can be adjusted in the X, Y, and Z directions using motorized controls.

- **Raman Mapping:**
Enables detailed mapping of Raman signals across samples.

- **Versatile Applications:**
Suitable for analyzing solid, liquid, and thin film samples.

8 Slot Motorized Filter Wheel

It can be used to hold up to 8 filter systems for Raman, PL, upconversion, fluorescence, electroluminescence, etc.

Motorized Focusing

Joy Stick Hand Held Controller

Confocal Raman spectroscopy is an advanced analytical method that merges Raman spectroscopy with confocal microscopy. By offering high-resolution Raman spectra from precise locations within a sample, it enables spatially resolved spectral analysis. The Holmarc CRM Series Raman Spectrometers utilize a fully automated infinity confocal microscope integrated with a high-resolution spectrometer and laser excitation system. This powerful combination facilitates detailed chemical investigations at the microscale.

The fully automatic microscope features a motorized objective turret, sample stage, and focusing capabilities. The turret accommodates six slots for inserting microscope objectives. Additionally, it is equipped with an eight-slot automatic filter wheel that includes dielectric beamsplitters and notch/edge filters. These filters are essential for applications such as Raman spectroscopy, photoluminescence, fluorescence and upconversion measurements.

The viewing head is of the stereo binocular type, providing sharp and high-resolution images of the sample. It incorporates a 5.0 MP CMOS camera. Coaxial illumination and bottom illumination can be conveniently controlled via software. For ease of use, a hand-held controller allows adjustments to the sample stage and focusing using a joystick key, along with LED intensity control.

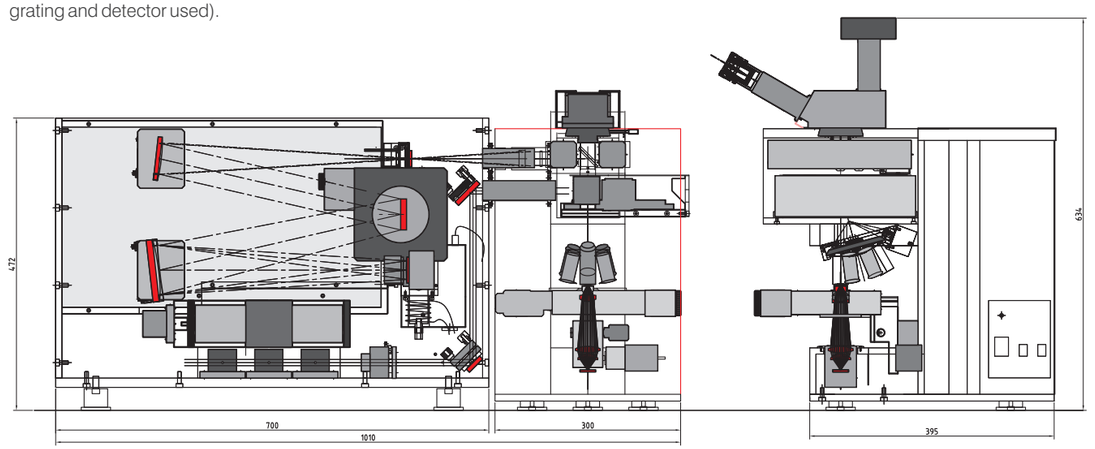
The spectrometer employs a Czerny-Turner configuration with a grating turret. To ensure precise focusing and collimation, aberration-corrected 400 mm FL parabolic mirrors are utilized. These mirrors are coated with high-reflective protected aluminum for optimal performance within the spectrometer and microscope.

At the entrance port, a variable slit is provided, allowing fine adjustments using a micrometer control. The spectrometer employs a cooled linear CCD array detector as its primary sensor. (We can supply a range of detectors including EMCCD to suit specific requirements.) Exposure time can be adjusted via software, ranging from milliseconds to minutes. For enhanced resolution and repeatability across the entire wavelength range, the spectrometer utilizes an encoder-based grating rotation mechanism.

The system features a standard 532 nm low-noise laser with a spectral resolution of 0.06 nm and high stability. This laser is equipped with a Raman filter set for optimal performance. Additionally, the spectrometer has the capability to accommodate two more lasers, which can be selected using the motorized stage. The spectrometer offers various grating turret configurations, including single, double, and triple gratings. A single shot can capture a Raman spectrum range spanning from 100 cm^{-1} to 3500 cm^{-1}. If needed, the spectrometer's wavelength can be adjusted to cover a spectrum beyond 3500 cm^{-1}. The measurements can be performed using the stitched scanning option as well, which spans the entire wavelength range from 200nm to 1050nm (subject to variations based on the grating and detector used).

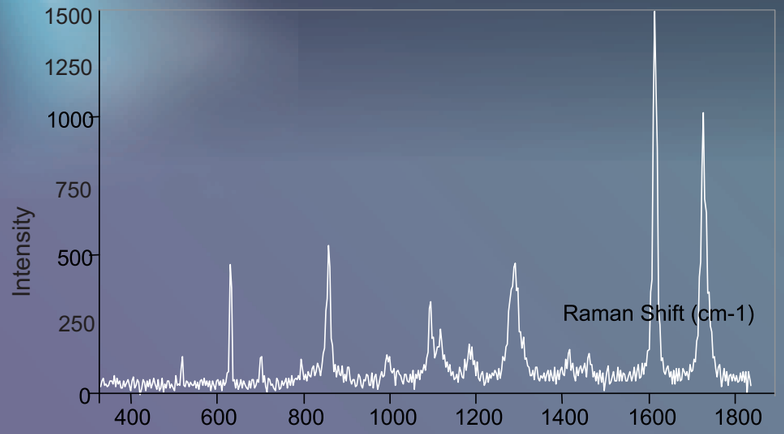
UC Upconversion | **PL** Photoluminescence

"While primarily designed as a micro Raman system, this versatile instrument can also serve other research purposes. It excels in high-resolution microphotoluminescence spectral measurements and upconversion spectral measurements. Additionally, it seamlessly integrates with other lasers, making it a valuable tool for scientific investigations. The CRM series micro Raman spectrometers are purpose-built to combine these capabilities effectively."



Spectra **RAMAN**

Windows based software for Raman spectroscopy



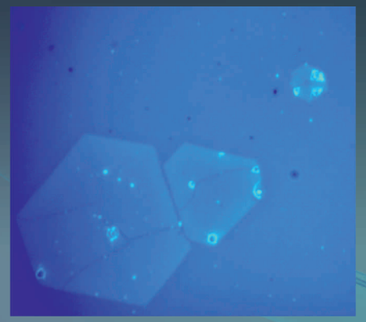


Fig. WS2 Sample Image

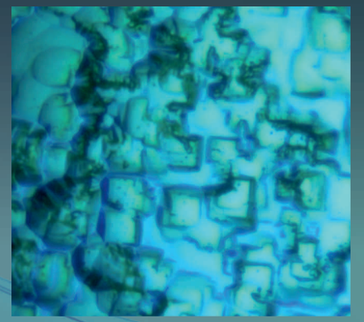


Fig. Silicon

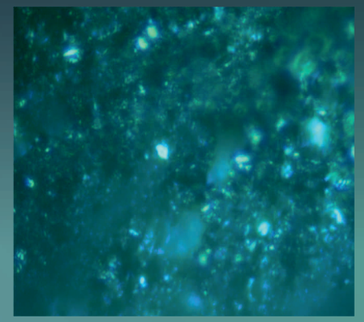


Fig. Graphene Sample

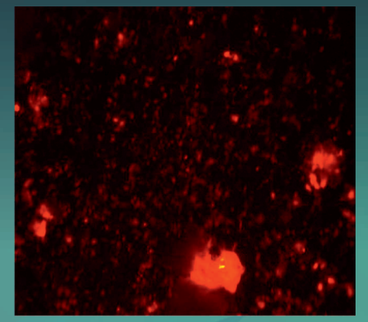
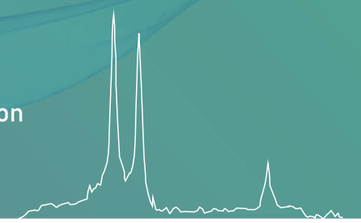


Fig. Ruby Pellet PL Mapping

CRM configured to suit the study of materials such as
Graphene, Exfoliated graphene, graphite, MoS2, WS2, TiO2, TeO2, etc.

HOLMARC, with its expertise, can create an integrated device that combines galvano-based high-resolution photoluminescence (PL), Raman spectroscopy, and upconversion mapping. This multifunctional instrument promises exciting possibilities for scientific research and analysis.



HOLMARC SPECTRA RAMAN SPECTROMETER SOFTWARE FEATURES:-

This Windows based software is used for Raman spectroscopy and powers HOLMARC Confocal Raman spectrometers.

- Options for single and continuous acquisition.
- Batch collection of data, either continuous, multiple focus or stitched.
- Save live to file.
- User built libraries management and automatic material identification.
- Easily remove fluorescent backgrounds.
- Allows user to set a XYZ zero point.
- Store coordinates for all 3 axes (X, Y, and Z).
- High-quality image tiling & Fast and accurate relocation.
- Selection of excitation wavelength.
- User defined exposure time control.
- Averaging of spectra.
- Dark subtraction.
- Easily to switch microscope ⇄ spectrometer.
- Control laser shutter via software for Raman: on/off.
- Grid & Playback mode.
- Graphical View of captured spectrum simulating visual appearance through spectroscope.
- Flexible & intuitive display adjustments, plus cursor, and peak-finding.
- Peak analysis options.
- Advanced smoothing algorithms.
- Automated spectra scaling and peak labeling.
- Fast scaling, zooming, scrolling, and panning, re scaling with mouse.
- Lock axis range to custom values.
- Easy to Switch x axis Pixels ⇄ Wavelengths ⇄ Raman Shift.
- Status bar at graph window displays current mouse position => fast reading of data points.
- Options for user wavelength calibration.
- Exports single and multi spectral files to Excel/CSV and .HRD.
- Plot export as: Bitmap Image (.bmp) | JPG Image (.jpg) | Gif Image (.gif) | JPEG Image (.jpeg) | Png Image (.png) | Tiff Image (.tiff) | Wmf Image (.wmf).
- Saves Report as pdf.
- Copy Function to Clipboard.
- Saves previous settings.

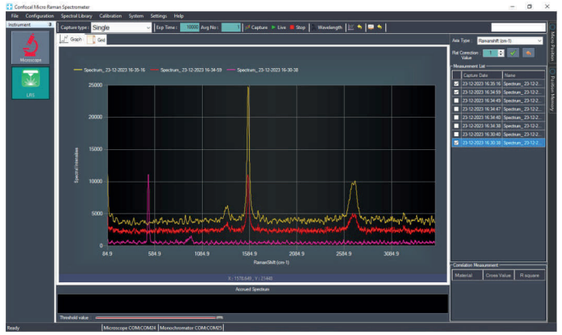


Fig. Spectra Overlay Feature

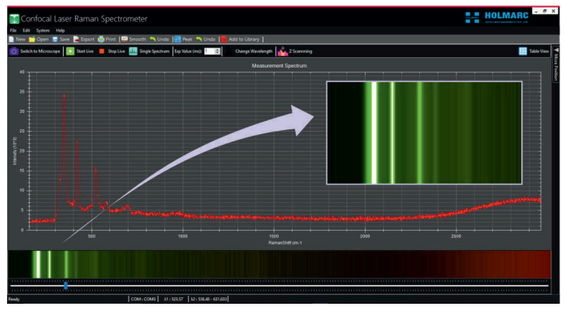
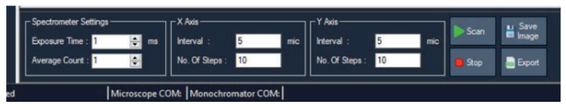


Fig. Visual representation of Raman spectrum from graphical style.



The CRM series Raman spectrometer can capture the spectrum by continuously changing the focus.
This makes Raman measurements with film samples easier, especially if the imaging of the samples is not clear.

Your research requirements are distinct. Holmarc Offers,

HYPER SPECTRAL RAMAN IMAGING

The system employed a High-Sensitive 2D detector with a Galvano-Based scanning method.

POLARIZED RAMAN SPECTROSCOPY

The system utilized a motorized Glan-Thompson polarizer rotator for polarization-dependent Raman spectrum measurements.

TEMPERATURE DEPENDANT RAMAN

Temperature control chambers specifically designed for Raman spectrometers offer precise temperature regulation across a wide range, spanning from -195°C to 600°C.

PRESSURE DEPENDANT RAMAN / ENVIRONMENTAL CHAMBER

Environmental control chambers equipped with gas purge capabilities are available. These chambers allow for Raman measurements in the presence of inert gases. Additionally, they enable the study of pressure-dependent differences in Raman spectra for various samples.

RAMAN SHIFT MEASUREMENTS

The software continuously records changes in the Raman stock and anti-stock lines.

ELECTRO CHEMICAL FLOW CELL

Used to obtain in-situ chemical information about the reactions taking place during an electrochemical experiment.

AUTO FOCUS - LIVE TRACKING

Live autofocus tracking is a feature that can help keep the image of a Raman microscope in focus when the stage is moved.

Raman customization

With a rich 30-year history, HOLMARC specializes in product customization. Our unique strength lies in our ability to handle the entire process from design and prototyping to manufacturing from our facilities. We have well-developed facilities for optics, electronics, software, mechanical and fabrication. Be it modifying a standard product or engineering a customized solution, we are equipped to meet specific application requirements. Feel free to contact us for any construction needs or assistance. We are committed to excellence!

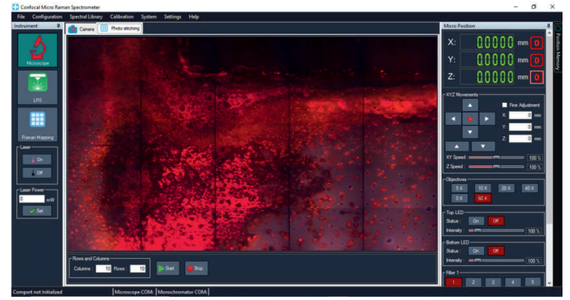
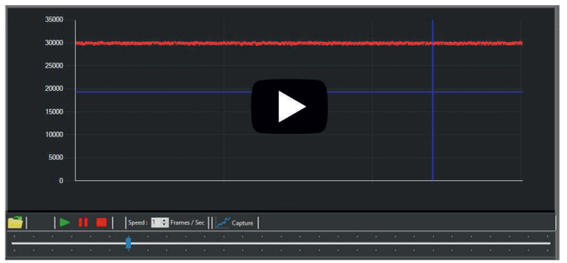


Fig. Raman/PL mapping

CRM Series Raman spectrometers can stitch individual microscope images to create an entire sample image.
A desired area of the sample can be mapped for hyperspectral Raman imaging.



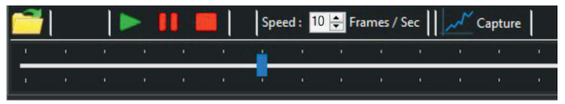


Fig. Playback mode.

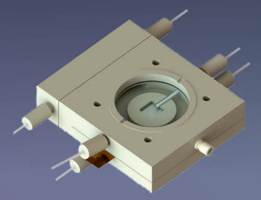
CRM series Raman spectrometer can take continuous spectra like a video.
It can be played after holding the desired time.
Each spectrum in the video can be exported for further processing.
This feature is really helpful for timed measurements.

CRM Series

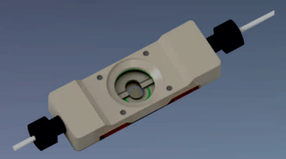
Confocal Micro Raman Spectrometer Research Accessories

SERVICE AND SUPPORT

We have full fledged service department for ensuring prompt and timely service for all our products. As a policy, we make sure that all service queries and requests are answered within 24 hours or next working day. Whether the product is standard or custom, whether it is in warranty or out of warranty, holmarc customers can remain assured of service at any point of time.

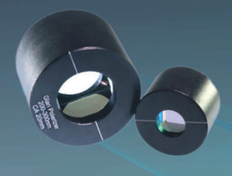


Raman Electrochemical Flow Cell



Environmental control/
Gas purging Pressure Chamber

Temperature control Chamber
from < -195°C to 600°C



Glan Thompson Polarizers
for polarization dependant
Raman spectrum measurements

offer up to **0.1cm^{-1}** per pixel resolution

Upright/ Inverted Microscope Configuration

Galvo^{+} High Speed Scanning

Trigger Mode for External Laser Integration

RAMAN HYPERSPECTRAL IMAGING

AUTO LIVE FOCUS-TRACK

Raman **ELECTROCHEMICAL FLOW CELL**

Stokes and Anti-stokes Shift Measurement Mode

Temp. Dependent Raman Measurement

PRESSURE DEPENDENT RAMAN

POLARISED RAMAN *Spectroscopy*

HOLMARC CRM SPECIFICATIONS:-

Model CRM226HX2

MICROSCOPE

Equipment Type: Upright research-grade microscope
Optical System: Colour-corrected infinity optical system
Tube Length: 200 mm
Objectives:
10×, 20×, 40×, 60×, 80×, 100×
Plan objectives, 45 mm parfocal, confocal compatible
Objective Turret: Motorized, 6-position
Filter Selection Unit:
8-slot dichroic motorized filter cube assembly
Optics, filters, and gratings provided for both 532 nm and 785 nm lasers
Focus: Motorized stepper motor–controlled precision focusing
Illumination for Imaging: Co-axial high-brightness LED
Illumination Control: Continuously variable, PC-controlled

Microscope Enclosure:
Class-3B enclosed microscope housing, suitable for open-lab operation
Laser blocked from viewing optics via safety optics

LASER

Laser Configuration:
Dual-laser system (532 nm & 785 nm) with automatic selection
Supports up to 8 lasers internally and externally
Coupling: Direct free-space coupling
Fiber-coupled option also supported

Laser Power Control: Motorized ND attenuation wheel (0–100%)
Fine power control from 0.02% to 100% via software
Laser Power Meter: Included, measurement at sample plane
Laser ON/OFF: Fully software controlled
Alignment: Auto/manual laser alignment with steering optics
Software alignment of laser–Raman–camera path

532 nm CW Laser
Type: Low-noise variable-power DPSS laser
Output Power: 0–100 mW
Linewidth: Narrow
Mode: CW, TEM_{00}
Cooling: TEC, air-cooled
Stability: < 2% over 4 hours
MTTF: > 10,000 hours

785 nm CW Laser
Output Power: 0–300 mW
Spatial Mode: Multi-mode
Stability: < 3% over 4 hours
Cooling: TEC
Warm-up Time: < 1 minute
MTTF: 10,000 hours

MAPPING STAGE - Sample Stage

XY Stage: XYMR50 motorized stage
Travel: 50 × 50 mm
Resolution: 50 nm
Z Focus Travel: 25 mm
Resolution: 10 nm
Sample Holding Capacity: Up to 120 mm
Scanning: Programmable, joystick-controlled
Chemical imaging, particle counting, size mapping: Included
Controller: HOLMARC XYZ Stepper controller Unit
Scanning: Programmable
Joystick : 3 Axis Joystick controller

RAMAN SPECTROMETER

Spectrometer Type: Czerny–Turner
Optical Design: Abberation Corrected high-throughput spectrograph
Focal Length: 400 mm
Focal Ratio: f/4
Grating Turret:
Triple-grating motorized turret
Encoder feedback resolution: 0.001125°

Gratings Supplied: 300 l/mm, 600 l/mm, 1200 l/mm
Optional: 900 / 1800 / 2400 / 3000 / 3200 l/mm
Grating Exchange: Motorized, software-controlled, no realignment required

Raman Spectral Range: 100 cm^{-1} to 6000 cm^{-1}
Rayleigh Filter: Motorized Rayleigh filter switching
Thermal Stability: Thermally isolated spectrometer housing
Photoluminescence & Upconversion Spectral Range: 350–1050 nm
PL Measurement Capability: Included with required accessories
Fluorescence Background Correction: Automated
Calibration:
Neon lamp (wavelength calibration)
Silicon standard (Raman shift validation & intensity correction)

CONFOCAL PERFORMANCE & RESOLUTION

True / Adjustable Confocal Facility:
Motorized confocal pinhole and slit
Automated signal optimization
Spatial Resolution: ≤ 750 nm lateral
≤ 900 nm axial @ 532 nm laser
Spectral Resolution (FWHM): ≤ 0.5 cm^{-1}
Scan-to-Scan Repeatability / Reproducibility: ≤ 0.05 cm^{-1}

FILTERS & ATTENUATION

Edge Filter:
532 nm edge filter with ≤100 cm^{-1} cut-off
Neutral Density Filters:
Motorized filter wheel
Range: 0.01% to 100% transmission Fully software controlled operation
Photoluminescence (PL) Filters:
Coverage from 532 nm to 1050 nm
Filter Wheel:
Motorized 8-slot turret for Raman, PL, fluorescence, imaging
Spectrometer Coupling:
Direct free-space coupling (Fiber coupling - Optional)
Fully integrated optical path within a single enclosure

SPECTROMETER DETECTOR

Low readout noise, high-resolution Spectroscopic line CCD camera
-Low readout noise: 4e-rms typ.
-High resolution: pixel size 12 × 12 um
-Quantum efficiency: 90% or higher at peak
-Wide spectral response range
-High UV sensitivity and stable characteristics under UV light irradiation
Make: Hamamatsu
Type : Binning type
Image size : 24.576 x 1.464 mm
Number of effective pixels: 2048 x 122 pixels
Pixel size : 12 x 12 um
Spectral response range: 200 to 1100 nm
Line rate (Typ.) : 107 lines/s
Line rate (max.) : 203 lines/s
Dark current (Typ.) : 30 e-/pixel/s
Readout noise (Typ.) : 4 e- rms
Type: TE-cooled CCD detector
Cooling: Two-stage, −60 °C
Window material: AR-coated sapphire

IMAGING CAMERA

Sensor Type: CMOS, Global Shutter
Pixel Size : 4.0μm×4.0μm
Optical Size : 1/2.7"
Resolution : 1280x1024
Max Frame Rate 213.9FPS
Effective Sensor Area : 5.12mmx4.1mm
SNR : 40db
Sensitivity : 8V/Lux.S
Bit Depth : 10bit
Trigger Mode Hardware Trigger / Software Trigger
HDR : 60dB
Exposure Time :4us-145ms305us
Pixel Formats : RAW8、RAW16、BGR24、MONO8、MONO16
Data Interface : USB3.0

SOFTWARE

Holmarc Micro Spectra Raman Software (Windows-based)
Functions include:
Raman imaging (1D, 2D, 3D hyperspectral)
Auto-calibration (Si, Cyclohexane, Ne/Hg/Ar)
Dark-current correction
PCA / multivariate analysis
Chemical segmentation
Scheduled auto-calibration without user input
User spectral libraries & material identification
• System Control and Data Collection software including
Software for Sample Viewing
• Capable of managing user-built libraries and material identification

UPGRADEABILITY

The system is designed to be future-ready and supports extensive Confocal Raman–specific upgradations, including:
• Field upgradation to UV lasers (≤ 325 nm)
• Support for additional visible and NIR lasers (e.g., 405 nm, 633 nm, 785 nm, 830 nm, 1064 nm)
• Provision for multiple internal and external laser integration with motorized selection
• Upgrade to NIR detectors for extended spectral coverage
• Compatibility with heating and cooling stages for temperature-dependent Raman studies
• Support for polarization-resolved Raman measurements (horizontal, vertical, and custom angles)
• Expandable software for advanced Raman imaging and analysis