



- Elemental Analysis
- Raman Spectroscopic Analysis
- Water Quality Analysis
- Fluorescence/Cathodoluminescence Analysis
- Particle Characterization
- Surface Characterization
- Optical Components

# HORIBA

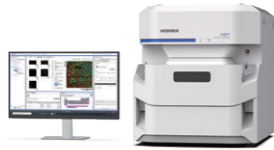
Your Partner in Science

## Analytical and Optical Solutions

.Research .Manufacturing .Recycling

### Elemental Analysis

X-ray Analytical Microscope  
**XGT-9000 Series**



Next evolution of micro-X-ray fluorescence spectroscopy with ultimate performance in speed and flexibility for elemental imaging.



[Detectable elements] B(5) - Am(95) (XGT-9000 Expert)  
[Maximum sample size] 300 x 250 x 80 mm [WxDxH]  
[Maximum mapping area] 100 x 100 mm  
[Sample chamber] Full vacuum, Partial vacuum

X-ray Fluorescence Analyzer  
**MESA-50/MESA-50K**



The large chamber MESA-50K compared with MESA-50

Benchtop models for speedy elemental analysis of materials, with a sophisticated LN<sub>2</sub>-free detector.



[Detectable elements] Al (13) - U (92)  
[Spot size] 1.2 mm, 3 mm and 7 mm  
[Dimensions] 208 x 294 x 205 mm (MESA-50),  
590 x 584 x 366 mm (MESA-50K) [W x D x H]  
[Instrument weight] 12 kg (MESA-50)

X-ray Fluorescence Sulfur/Chlorine-in-Oil Analyzer  
**MESA-7220V2**



Measure ultra low sulfur and chlorine in petroleum products. Choose single position type or the 8-position turntable type.



[Range] 0.00 - 100,000 ppm  
[Detection limit] S: 0.7 ppm / Cl: 0.6 ppm  
[Conformity Standards] ASTM D7220 / D4294 / D4929C  
ISO 8754 / 13032 / 20847

X-ray Fluorescence Sulfur-in-Oil Analyzer  
**SLFA-6100/6800**



Compact and lightweight XRF sulfur-in-oil analyzer with excellent sensitivity and stability.



[Range] 0 - 9.9999%  
[Detection limit] 5 ppm or less  
[Conformity standards] ASTM D4294 / ISO 8754 / JIS K2541 / B7995

X-ray Fluorescence Sulfur-in-Oil Analyzer  
**SLFA-60**



Compact and lightweight XRF sulfur-in-oil analyzer that provides easy and simple operation for petroleum products measurement.



[Range] 0 - 9.9999%  
[Detection limit] 15 ppm or less  
[Conformity standards] ASTM D4294 / ISO 8754 / JIS K2541 / B7995

Sequential ICP Optical Emission Spectrometer  
**Ultima Expert**



Ultima Expert offers excellent resolution, low detection limits and full wavelength coverage optics for the most challenging applications.



[Focal length] 100 cm  
[Spectral range] 120 - 800 nm  
[Resolution] 6 pm (2,400 gr/mm) / 10 pm (4,320 gr/mm)  
[Grating] 2,400 gr/mm 4,320 gr/mm + 2,400 gr/mm (option)

Oxygen/Nitrogen/Hydrogen Analyzer  
**EMGA-Pro/Expert**



High-speed measurements on oxygen, nitrogen and hydrogen content down to ppm level in inorganic materials, such as steel products, non-ferrous alloys, electrical materials, etc.



[Method] Impulse furnace in inert gas, Non Dispersive Infrared absorption method (O), Thermal Conductivity Detector (H/N)  
[Measurement range] Oxygen: 0.04 ppm - 5%  
Nitrogen: 0.04 ppm - 3% Hydrogen: 0.08 ppm - 2500 ppm  
[Automation] Integrated auto cleaner and crucible loader

Carbon/Sulfur Analyzer  
**EMIA-Pro/Expert**



Measures carbon and sulfur content down to ppm level in steel products, non-ferrous alloys, minerals, electronic materials and others, such as catalyst, rubber, etc.



[Method] High-frequency heating in oxygen stream Non-Dispersive Infrared absorption method  
[Measurement range] Carbon: 0.6 ppm - 10%  
Sulfur: 0.6 ppm - 1% (m/m)  
[Automation] Integrated auto cleaner

Carbon/Sulfur Analyzer (for Temperature Rise Analysis)  
**EMIA-Step**



Measures carbon and sulfur content down to ppm level in steel products, non-ferrous alloys, minerals, electronic materials and the others, such as catalyst, rubber, etc.



[Method] Tubular electric resistance heating furnace type Non-Dispersive Infrared absorption method  
[Measurement range] Carbon: 3 ppm - 6%, Sulfur: 4 ppm - 1% (m/m)

### Particle Characterization

Laser Scattering Particle Size Distribution Analyzer  
**Partica LA-960V2**



The system is known for its dynamic wide measurement range, excellent performance assurance and worldwide user-accepted quality.



[Size range] 0.01 µm - 5,000 µm  
[Measurement duration] 1 minute from dispersion liquid filling and measurement to rinsing.  
[Optional accessories] Dry unit, Miniflow unit, Fraction cell, Paste cell, etc. Please see the list below right.

Laser Scattering Particle Size Distribution Analyzer  
**Partica mini LA-350**



The compact Partica mini LA-350 can achieve high performance with easy operation and maintenance.



[Size range] 0.1 µm - 1,000 µm  
[Dimensions] 297 x 420 x 376 mm [WxDxH]  
[mass] Approx. 23 kg

Nano Particle Analyzer  
**nanoPartica SZ-100V2 Series**



This instrument analyzes three parameters that characterize nanoparticles: particle size, zeta potential and molecular weight.



[Size range] 0.3 nm - 10 µm  
[Zeta potential] -500 - +500 mV  
[Molecular weight] 1 x 10<sup>3</sup> to 2 x 10<sup>7</sup> (Debye plot)

### Optional Accessories for Partica LA-960V2



#### Imaging Analysis Unit (Built-in option)



Sample imaging can be observed with particle size distribution. Observation of aggregation, forging material in sample.

#### High Concentration Cell

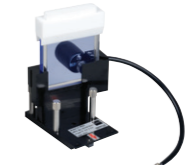


This accessory enables highly concentrated sampling. Some slurries and suspensions are already dispersed in certain conditioned liquids, therefore less dilution is required for particle size and distribution measurements.

#### MiniFlow (Circulation system)



Flow type measurement with 35 mL volume of dispersion medium is possible. It is recommended when using an organic solvent as a dispersion medium.



#### Fraction Cell

For minimal solvent requirements, such as ultra-trace amounts of sample, and when you want to recover the whole sample after measurement. It can measure from a minimum volume of 5 mL.

#### Dry Cell



Dry cell can measure samples in a powder state. It supports both non-dispersion measurement with free fall and forced dispersion measurement using compressed air.



#### Automated Sampler (Wet measurement in powder)

The Auto Sampler is a rotary table-type automatic sampling system equipped with 24 detachable sample cups.

## Raman Spectroscopic Analysis

### Confocal Raman Imaging System LabRAM Soleil



Including state-of-art technologies and functions, perform even the most advanced research and ultrafast confocal Raman imaging has never been so easy.



[Spectral range] UV-VIS-NIR (300 - 1,600 nm)  
[Excitation source] Up to 4 internal lasers  
[Measurement function] Ultrafast (up to 100 times faster\*) confocal imaging with patented Smartsampling function  
(Scan area : 500 μm x 500 μm with 10x objective lens)  
[Standard wavenumber cut-off] 30 cm<sup>-1</sup>  
[Dimensions] 898 x 797 x 806 mm [WxDxH]  
\* Comparison with our conventional model

### Ultimate Raman Microscope LabRAM Odyssey



2-in-1 PL and Raman measurement with high spectral resolution. Perfect for advanced materials and semiconductor studies, with an extended spectral range from Deep UV to Infrared.



[Cut-off] <50 cm<sup>-1</sup> (Standard), <10 cm<sup>-1</sup> (Optional)  
[Spectral range] 200 to 2,200 nm  
[Flexibility] Up to 3 detectors and an unlimited number of lasers (6 motorized)  
[Optional accessories] Laser trapping, Transmission Raman accessory, Particle analysis software

### Raman Microscope XploRA™ PLUS



Fully automated and fully confocal Raman microscope for fast, non-destructive chemical micro-analysis and Raman chemical imaging.



[Spectral range] Visible light - Near-infrared (532 to 1,100 nm)  
[Excitation source] Upt to 3 internal lasers  
• Fast Raman imaging with SWIFT function  
• One click operation

### Affordable Benchtop Raman Spectrometer

#### MacroRAM™



#### XploRA Nano



Brings simplicity to Raman measurements without compromising the ability to handle even complex samples, from extremely small liquid volumes to large solids. Its compact and robust design, including Class 1 laser safety, means it's safe for use in most environments, from undergraduate teaching labs to industrial QC applications.



LabRAM Odyssey and XploRA PLUS integrated with Scanning Probe Microscopes (SPM) can provide Raman & Photoluminescence nano-images correlated with various SPM modes. Compact, fully automated and easy-to-use NanoRaman systems for measurements from micro to nanoscale for correlated and TERS/TEPL analysis (Tip-Enhanced Raman Spectroscopy/Photoluminescence).

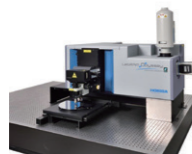
[Optical access] Top and side AFM/Raman optical coupling with high NA objectives (0.7 NA);  
[AFM] Infrared AFM diode at 1.3 μm, all SPM modes, fully automated operation, optional liquid cell,  
[Environment] Environmental chamber, heating-cooling sample holders, liquid and electrochemical cells.

### AFM-Raman

#### LabRAM Odyssey Nano



### Micro-Photoluminescence Spectrometer LabRAM Odyssey Semiconductor



Ideal for non-destructive, non-contact evaluation of compound semiconductors. It is the ideal tool for photoluminescence and Raman imaging on wafers up to 300 mm diameter.



[Measuring wavelength range] Ultraviolet - Near-infrared (200 - 2100 nm)  
[Sample temperature cells] from 4 to 300 K

### Standard Microscope Spectroscopy Solutions Standard Microscope Spectroscopy



Lets you add spectroscopy to any standard microscope for applications like: Photoluminescence (PL), Raman, Electroluminescence (EL), Time-resolved PL (TRPL), and Dark Field Scattering Spectroscopy.



### Optional Accessories for Raman Particle Disperser XD-100



Uniform particles dispersion in a simple and intuitive operation. Ideal sample preparation for challenging particle analysis with micro Raman, micro XRF, SEM or other microscopic techniques



## Surface Characterization

### Pulsed RF Glow Discharge Optical Emission Spectrometer (GD-OES) GD-Profiler 2



Fast, simultaneous depth profile analysis of elements. Ideal for multilayers and treated materials.



[Measurement range] H (1) - U (92)  
[Sputtering rate] 1 μm/min (Depending on sample)  
[Detector] Standard; 15 ch, Maximum; 46 ch

### Fully Automated Ellipsometer UVISEL Plus



Automated spectroscopic ellipsometer delivering excellent performance for nano and micro layer characterization.



[Spectral range] 190 - 885 nm (NIR extension: up to 2,100 nm)  
[Spot size (pinhole)] 0.05 - 0.1 - 1 mm manual, 0.08, 0.12, 0.25, 1.2 mm automatic [Angle range] 55° - 90° by steps of 5° manual, 45° - 90° by steps of 0.01° automatic

## Water Quality Analysis

### pH / Water quality meters LAQUA Series



Handheld Model

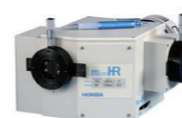


Benchtop Model

Compact Spoon-type Electrode Model



### High Performance Compact Spectrometer MicroHR Series

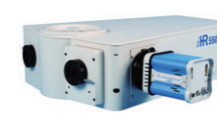


A short focal length Czerny-Turner spectrometer that can be used as an imaging spectrograph or a scanning monochromator.



[Focal length] 140 mm [Aperture] f/3.88  
[Scanning range] 0 - 1,500 nm mechanical range (motorized version)  
[Spectral dispersion] 5.25 nm/mm at 400 nm

### Imaging Spectrometer iHR320/550

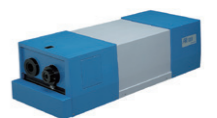


Provides the most reliable optical platform with optimal solution for essential parameters in imaging spectrometers.



[Focal length (mm)] 320 (iHR320), 550 (iHR550)  
[Aperture] f/4.1 (iHR320), f/6.4 (iHR550)  
[Spectral range] 150 - 1,500 nm (at 1,200 gr/mm grating)  
[Spectral dispersion] 2.35 nm/mm at 435 nm, 1,200 gr/mm (iHR320), 1.34 nm/mm at 435 nm, 1,200 gr/mm (iHR550)

### High Resolution Spectrometer FHR Series/M Series



These large focal length spectrometers are ideal for applications when extremely low stray light and high resolution levels are required, and offer a unique combination of drive speed, precision and high spectral resolution.



[Focal length (mm)] 640/1,000 (FHR series), 1,000/1,250 (M series)  
[Aperture] f/5.4 (FHR640), f/9.0 (FHR1000) f/8.0 (1000M), f/9.0 or f/11.0 (1250M)  
[Spectral dispersion (nm/mm)] 1.2 (FHR640), 0.8 (FHR1000) 0.8 (1000M), 0.65 (1250M)

## Fluorescence/Cathodoluminescence Analysis

### Fluorescence and Absorbance Spectrometer

#### Duetta



Ultra fast, compact and two-in-one fluorescence and absorbance spectrometer for analytical molecular fingerprinting.



[Fluorescence detection range] 250 - 1,100 nm  
[Excitation/absorbance wavelength range] 250 - 1,000 nm  
[Dimensions] 432 x 519 x 366 mm [WxDxH]  
[Weight] 20.4 kg

### Benchtop Spectrofluorometer

#### FuoroMax Plus



A compact benchtop instrument offering the ultimate in sensitivity and flexibility. Dual detectors (UV-Vis and NIR) for wide range measurement.



[Light source] 150 W CW ozone-free Xe arc lamp  
[Optional measurement modes] Lifetime options (TCSPC, Phosphorescence)

### Spectrofluorometer

#### Nanolog



Supports fluorescence and phosphorescence measurements from UV to NIR regions and offers flexible system configuration for selecting specifications.



[Wavelength range] 290 - 850 nm (option: up to 2100 nm)  
[SN Ratio] 15,000:1 (Raman scan in water, FSD)  
[Wavelength resolution] 0.2 nm  
[Expandability] Emission lifetime, quantum yield, polarization, temperature control, etc.

### Modular Research Fluorometer for Lifetime and Steady State Measurements

#### Fluorolog-QM

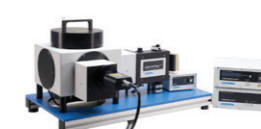


Offers all reflective optics, combined with a multitude of light source and detector options, and sample handling accessories, for the highest sensitivity and versatility of any spectrofluorometer.



### Fluorescence Lifetime Spectrometer

#### DeltaPro/DeltaFlex



DeltaPro/DeltaFlex are the next generation of time-correlated single photon counting (TCSPC) fluorescence lifetime instrumentation.



[Wavelength] 785 nm [Laser Power] 7 mW - 450 mW  
[Dispersion] 10.3 nm / mm [Focal length] 115 mm  
[Spectral range] 100 - 3400 cm<sup>-1</sup> (Stokes), 1700 - 1700 cm<sup>-1</sup> (Stokes/anti-Stokes)  
[Spectral resolution] 6 cm<sup>-1</sup> at 912 nm (Stokes), 7 cm<sup>-1</sup> at 852 nm (Stokes/anti-Stokes)

### SEM-Cathodoluminescence (CL) Spectral System

#### CLUE Series



Provides high performance CL analysis for a wide range of applications for semiconductor, photonics, and geology.



[Focal length] 140, 320, or 550 mm  
[Spectral range] UV-Vis-NIR; 200 - 1,700 nm depending on configuration

## Optical Components

### High Performance Compact Spectrometer MicroHR Series

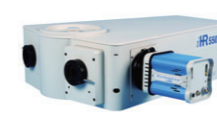


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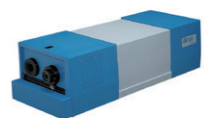


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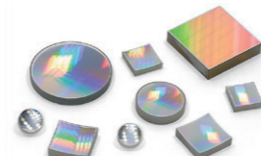


Benchtop Model

Compact Spoon-type Electrode Model



### Diffraction Gratings

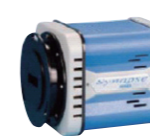


- VUV Synchrotron gratings  
- Gold coated master gratings  
- Custom gratings for astronomy and space flight



Types of gratings:  
Plane, concave, convex, toroidal shape / Holographic or ruled gratings / Flat-field with aberrations correction / OEM spectrometer or monochromator gratings / EUV to Mid-IR / Standard or custom capabilities

### Synapse/Symphony Series CCD/Near-Infrared InGaAs Detector



This is an optical spectrum detector used for a spectrometer



● For weak optical spectrum

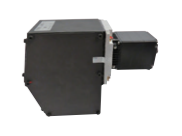
### CP/VS Series Small-size Spectrographs



Ideal compact spectrographs for small, portable equipment. Perfect for limited space and available for OEM supply.



### Hyperspectral Imaging and Multichannel Spectrometers Hyperspectral Cameras



Miniature spectrometers optimized for CCD, CMOS and InGaAs linear array sensors to operate from UV through NIR range.



Bulletin: HRE-0067C