



# SCIENTIFIC PRODUCT NAVI

- Particle Characterization
- pH/Water Quality Analysis

- Elemental Analysis
- Spectroscopy Analysis

- Surface Characterization
- Optical Components



Your Partner in Science

Supporting QC, R&D with our new ideas and technologies



## Elemental Analysis

### X-ray Fluorescence Analyzers



X-ray Analytical Microscope

XGT-9000

High sensitivity and new imaging technology of XGT-9000 realizes fast mapping foreign material analysis.



[Detectable elements] F (9) - Am (95)  
[Maximum sample size] 300 x 250 x 80 mm [WxDxH]  
[Maximum mapping area] 100 x 100 mm  
[Sample chamber] Full vacuum, Partial vacuum, Ambient condition



X-ray Fluorescence Analyzer

MESA-50

Portable benchtop model for speedy elemental analysis of materials.



[Detectable elements] Al (13) - U (92)  
[Spot size] 1.2 mm, 3 mm and 7 mm  
[Dimensions] 208 x 294 x 205 mm [WxDxH]  
[Mass] Approx. 12 kg  
[Power supply] AC adapter, Battery

NEW



X-ray Fluorescence Sulfur/Chlorine-in-oil Analyzer

MESA-7220V2

Measure ultra low sulfur and chlorine in petroleum products. Choose between a single or 8-tray carousel analyzer.

[Range] 0.00 - 100,000 ppm  
[Detection limit] S:0.7 ppm/ Cl:0.6 ppm  
[Sample volume] 7 - 10 ml for each sample cell  
[Sample chamber] Atmospheric conditions



Sulfur-in-oil Analyzer

SLFA-6000 Series

XRF Sulfur-in-oil analyzer equipped with a turntable, which allows sequential measuring up to 8 samples.



[Range] 0 - 9.9999%  
[Detection limit] 5 ppm or less  
[Accuracy] Less than 5 ppm (1% sulfur sample)  
Less than 1.6 ppm (0% sulfur sample)



Sulfur-in-oil Analyzer

SLFA-60 Series

Compact, lightweight and robust sulfur analyzer. SLFA-60 provides easy and simple operation for petroleum products measurement.



[Range] 0 - 9.9999%  
[Detection limit] 20 ppm or less  
[Accuracy] Less than 15 ppm (1% sulfur sample)



Sequential ICP Optical Emission Spectrometer

Ultima Expert

Ultima Expert offers the highest resolution, lowest 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)

### ICP-OES Spectrometer



Carbon/Sulfur Analyzer

EMIA-Expert/  
EMIA-Pro

EMIA/EMGA series are based on HORIBA's widely respected expertise in Non-Dispersive Infrared (NDIR) and Thermal Conductivity Detector (TCD) technologies to measure light elements.

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



Carbon/Sulfur Analyzer

EMIA-Step

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



Oxygen/Nitrogen/Hydrogen Analyzer

EMGA series

[Method] Impulse furnace in inert gas  
Non Dispersive Infrared absorption method (O)  
Thermal Conductivity Detector (H & N)  
[Measurement range]  
Oxygen: -5% Nitrogen: -3% (EMGA-920)  
Hydrogen: -0.02% (EMGA-921)  
[Automation] Integrated auto cleaner and crucible loader

### Oxygen/Nitrogen/Hydrogen Analyzer

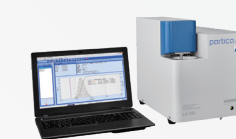


Laser Scattering Particle Size Distribution Analyzer

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  $\mu$ m - 5,000  $\mu$ m  
[Measurement duration] 1 minute from dispersion liquid filling to measurement and rinse.  
[Option] Dry unit, Miniflow unit, Small volume cell, Paste cell, etc.



Laser Scattering Particle Size Distribution Analyzer

Partica mini LA-350

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

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



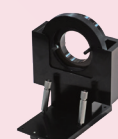
Nano Particle Analyzer

nanoPartica SZ-100V2

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

[Size range] 0.3 nm - 10  $\mu$ m  
[Zeta potential] -500 - +500 mV  
[Molecular weight] 1000 - 2 x 10<sup>7</sup> (Debye plot)

### Optional Accessories for Partica LA-960V2



High concentration cell

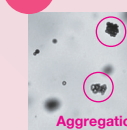
This accessory enables high concentrated sampling. Some slurries and suspensions are already dispersed in certain conditioned liquids, therefore less dilution is required for particle size and distribution measurements.



Mini flow with ultrasonic unit (0.01- 1000  $\mu$ m)

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

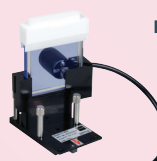
NEW



Imaging analysis unit (built-in option)

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

Sample image of glass beads



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 unit (0.1 - 5000  $\mu$ m)

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



Coated chute

The chute is coated with an electroplated nickel fluoride resin. Used for samples that adhere easily to a stainless steel chute, and when it is difficult to feed the sample by vibration.

## Surface Characterization

### GD-OES



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

GD-Profilier2

Fast, simultaneous depth profile analysis of elements. Ideal for multilayers and treated materials. New optional Sample Mapping Unit for unattended operation.

[Measurement range] H (1) - U (92)  
[Sputtering rate] 1  $\mu$ m/min  
[Detector] Standard; 15 ch, Maximum; 46 ch

### Ellipsometers



Fully Automated Ellipsometer

UVISEL Plus

HORIBA introduced his automated spectroscopic ellipsometer delivering the highest level of 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 type), 45° - 90° by steps of 0.01° (Auto type)



Nano Particle Tracking Analyzer

ViewSizer™ 3000

The ViewSizer™ 3000\* implements breakthrough improvements to particle tracking technology that include proprietary illumination and detection methods, allowing cutting-edge visualization, measurement and number concentration of nanoparticles over a wide range of sizes.

[Measurement Range] 10 nm - 15  $\mu$ m  
[Typical Sample Volume] 350  $\mu$ L - 1.25 mL  
[Dimensions] 550 x 660 x 350 mm [WxDxH]  
[Mass] 27 kg

The ViewSizer™ is manufactured by Manta Instruments and is distributed by HORIBA group companies\*. (\*Distribution depends on the country)



## Spectroscopy Analysis

### Fluorescence Spectroscopy



Fluorescence and Absorbance Spectrometer

Duetta



Duetta is an ultra fast, compact and two-in-one fluorescence and absorbance spectrometer for analytical molecular fingerprinting. It lets you acquire a full spectrum in less than 100 milliseconds. Duetta also uses new EzSpec Touch Screen Software with a selection of apps for routine analysis.

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

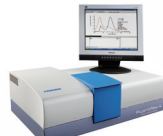


Steady State Compact Benchtop Fluorometer for CDOM

Aqualog

Aqualog simultaneously measures both absorbance spectra and fluorescence. Collecting EEMs is 100 times faster than previous methods. Ideal for measuring CDOM.

[Excitation range] 230 - 620 nm or 200 - 800 nm  
[Emission range] 250 - 620 nm or 250 - 800 nm  
[Detector] TE-cooled back-illuminated CCD



Benchtop Spectrofluorometer

FluoroMax-PLUS

A compact, benchtop instrument offering the ultimate in sensitivity and flexibility.

Dual detectors (UV-Vis and NIR) for wide range measurement  
(600 - 1,000 nm or 950 - 1,650 nm as an NIR option)

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

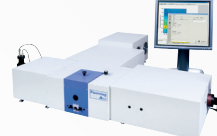


Steady State and Lifetime Modular Spectrofluorometer

QuantaMaster 8000

The PTI QuantaMaster 8000 Series of steady state and lifetime spectrofluorometers offers the world's highest sensitivity specification with safety, cost and energy consumption benefits.

[Signal to noise ratio] 30,000:1 or better  
[Data acquisition rate] 1,000,000 points/sec - 1 point/1000 sec

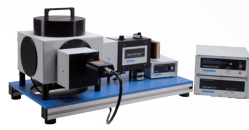


Spectrofluorometer

Fluorolog-3

The Fluorolog-3 is a modular fluorometer enabling analysis of steady state and lifetime measurements.

[Light source] 450 W ozone-free Xe arc lamp  
[Spectral range] 290 - 850 nm (Standard)  
Up to 1,650 nm on request  
[Optional measurement modes] Lifetime options (TCSPC, Phosphorescence)



Fluorescence Lifetime Spectrometer

DeltaPro/DeltaFlex

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

[Minimum lifetime] 25 psec with laser diode source  
[Shortest measurement time] 1 msec  
[Time range] 10 nsec - 11 sec  
[Measurement range] 250 - 650 nm (Standard)  
300 - 1,200 nm / 400 - 1,600 nm (Options)

## Optical Components

### Spectrometers



High Performance Compact Spectrometer

MicroHR

The MicroHR is 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

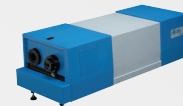


Imaging Spectrometer

iHR320/550

The iHR design provides the most reliable optical platform with the best solution for essential parameters in imaging spectrometers.

[Focal length] 320 mm (iHR320), 550 mm (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] 640 mm/1,000 mm (FHR series)  
1,000 mm/1,250 mm (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] 1.2 nm/mm (FHR640), 0.8 nm/mm (FHR1000)  
0.8 nm/mm (1000M), 0.65 nm/mm (1250M)



Modular Photoluminescence Microspectrometer

MicOS



Perfect tool for photoluminescence, electroluminescence, and photoreflectance measurements at the microscopic level.

[Spectral range] 200 - 1,600 nm  
[Spectral resolution] 0.18 nm (iHR320), 0.1 nm (iHR550)  
with 1,200 gr/mm grating  
[Excitation lasers] 532, 633, 785 nm (Other options on request)  
[Spot size] <10 µm at 100 x objectives



High Sensitivity Imaging Spectrograph

Lumetta

Compact, affordable imaging spectrograph with deep-cooled scientific CCD

[Input (one of)] Free Space, SMA, FC 1/4" ferrule (0.22NA)  
[Focal length] 140 mm  
[Dispersion] 30 nm/mm  
[Spectral range] 400 - 1100 nm



Monograph for Far and Extreme Ultraviolet

H30-UVL

The H30-UVL is specially designed for analyzing from the high EUV to UV range in high vacuum environment and can be used as a monochromator (slit-slit) or spectrograph (slit-CCD).

[Focal length] 274 mm  
[Aperture] f/6.0  
[Spectral range] 50 - 300 nm  
[Resolution] Better than 0.2 nm  
[Vacuum] 10<sup>-6</sup> mbar

### Raman Spectroscopy



Ultimate Raman Microscope

LabRAM HR Evolution

High spectral and spatial resolution analytical Raman microscope ideally suited to both micro and macro measurements, with advanced confocal imaging capabilities in 2D and 3D.



[Spectral range] UV-VIS-NIR (220 - 2,200 nm)  
[Cutoff] >50 cm<sup>-1</sup> (Standard), >5 cm<sup>-1</sup> (Option)  
[Detectors] Up to three detectors  
[Options] Laser trapping, Transmission Raman accessory, ParticleFinder software



Raman Imaging System

LabRAM Soleil

The LabRAM Soleil confocal raman imaging microscope for UV-VIS-NIR imaging comes with ultrafast imaging by patented technology let users map samples up to 100 times faster than before and with also intuitive interface through built-in LabSpec 6 software. It also offers benefits such as self-operation and objective lens auto-recognition.

[Spectral range] UV-VIS-NIR (300 - 1,600 nm)  
[Meas.function] Ultrafast & Confocal imaging  
(Scan area: 500 µm x 500 µm with 10x objective lens)  
[Standard wavenumber cut-off] 30 cm<sup>-1</sup>  
[Dimensions(WxDxH)] 898 x 797 x 806 mm



XploRA PLUS



XploRA INV

Raman Microscope

XploRA Series

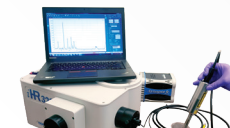
Fully automated and fully confocal Raman microscopes allow fast, non-destructive chemical micro-analysis and Raman chemical imaging.

XploRA PLUS: For research and industrial analytical labs  
XploRA INV: For biological applications



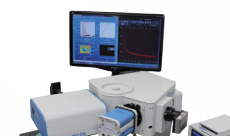
[Excitation] 532, 638, 785 nm, others on request  
[Confocal imaging] 0.5 µm XY

### Custom Spectroscopy Solutions



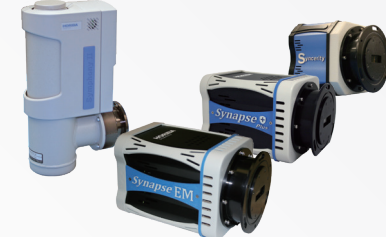
Modular Raman Solutions

- Raman probes
- THz or Low Frequency Raman
- Immersion Raman
- Polarization Raman
- Confocal Raman
- OEM Raman



Flexible Photoluminescence (PL) Systems

- Steady state and time-resolved PL
- Macro and Micro PL
- Low temperature PL
- PL wafer mapper
- Modular Fluorescence Systems



Scientific cameras and detectors offer high sensitivity, low noise and a range from UV-Vis-NIR available in CCD, CMOS, InGaAs.

[Chip] CCD (Scientific Grade 1), InGaAs, ext. InGaAs

### Multi-channel detectors

Thermoelectric Cooled Type Detectors

Syncerity™ Scientific Cameras

[Cooling temp] TE-cooled -60° C  
[Dark current] -60° C <0.0052e-/pixel/s (typical)

Thermoelectric Cooled Type Detector

Synapse™ Scientific Cameras

[Cooling temp] TE-cooled -60° C (Guaranteed) -75° C (Typical)  
[Dark current] -60° C <0.002e-/pixel/s (typical)

Liquid-nitrogen-cooled CCD Detectors

Symphony™ Scientific Detectors

[Cooling] LN<sub>2</sub> cooled  
[Cooling temp] Less than -103° C  
[LN<sub>2</sub> volume] 1 L (24 hrs) or 3 L (72 hrs)

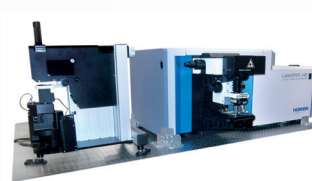
### NanoRaman

## NanoRaman series

LabRAM HR Evolution 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)



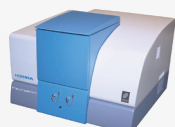
XploRA Nano



LabRAM HR Evolution Nano

[Optical access] Top and side AFM/Raman optical coupling with high NA objectives (0.7NA);  
[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.

### Macro Raman



Affordable Benchtop Raman Spectrometer

MacroRAM

Using superior optical components and design, the MacroRAM™ is an easy-to-use, yet highly sensitive instrument for both routine and complex Raman measurements. Its compact and robust design means it's safe for use in most environments, from undergraduate teaching labs to industrial QC applications.



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

### Cathodoluminescence



SEM-CL Spectral System

CLUE Series

The CLUE Series provides high performance CL analysis, for a wide range of applications for semiconductors, photonics and geology.

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

### Label-Free Biomolecular Interactions



Flexible Label-Free Interaction Analysis Open Research Platform

OpenPlex

OpenPlex combines the throughput of SPR imaging with the versatility of an open configuration.

[Sample volume] Typically 200 µL  
[Sample type] Pure or crude sample  
[Number of interaction] Few hundreds  
[Sample molecular weight] > 240 Da  
[Detection limit] 5 pg/mm<sup>2</sup>



## pH meters



Benchtop pH/Water Quality Analyzer

LAQUA

LAQUA is a high-end laboratory model with intuitive and very easy-to-use touch panel operation.

- pH • mV (ORP) • Ion
- Dissolved oxygen (LAQUAact only)
- Electrical conductivity



Handheld Water Quality Meter

LAQUA

200 series

All models have scratch resistant monochrome digital LCD with white LED backlight. Packaged with electrodes and accessories in a carrying case.

- Electrical resistivity
- Salt concentration
- Total dissolved solids



Compact pH/Water Quality Meter

LAQUAtwin

LAQUAtwin employs a unique flat sensor that realizes the accurate measurement from only a single drop in a few seconds.

- pH • Electrical conductivity • Ion (Na<sup>+</sup>, Ca<sup>2+</sup>, NO<sub>3</sub><sup>-</sup>, K<sup>+</sup>)
- Salt concentration • Total dissolved solids

Updated : June, 2020

Bulletin:HRE-0067B