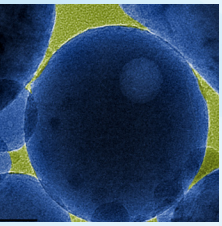
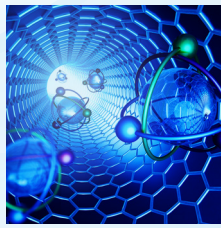
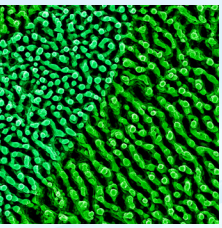
HORIBA
Scientific

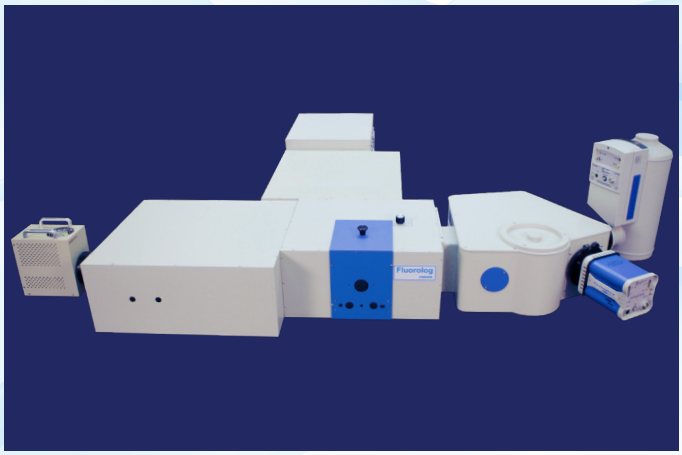


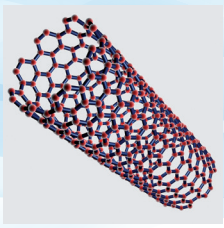
Nanolog

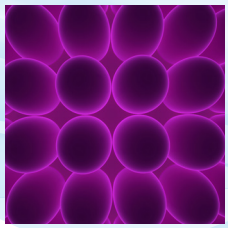
Modular Multi-channel EEM Spectrofluorometer

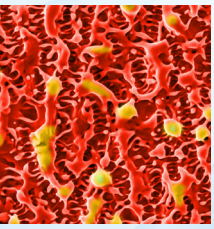












Optimized for nanomaterial EEM characterization with multi-channel CCD and NIR IGA detectors

JOBIN YVON
Technology

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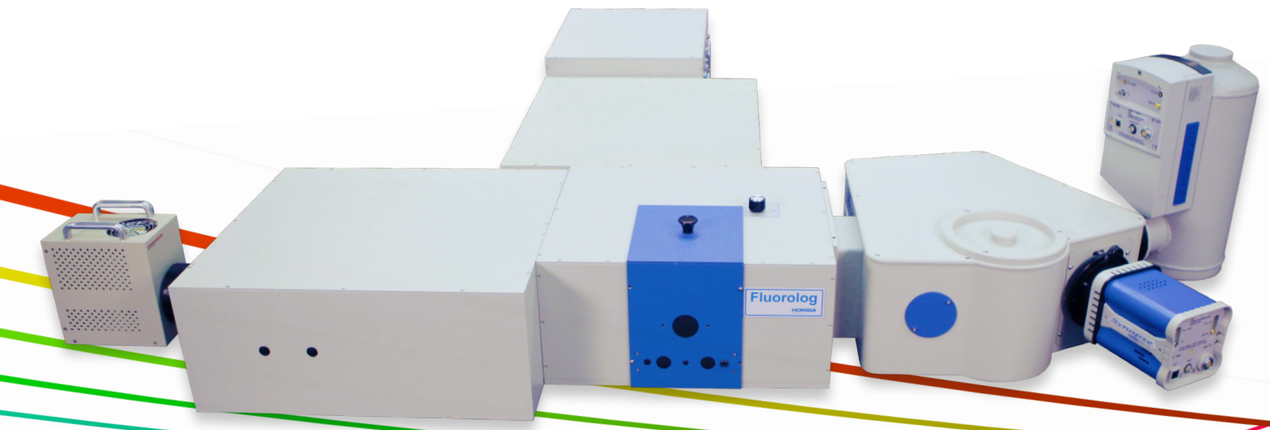
Nanolog®

Modular Multi-channel EEM Spectrofluorometer



Versatility...with Nanolog detectors

- Photomultiplier tubes, both thermoelectrically and liquid N2-cooled for UV through near-IR response out to 1750 nm
- Solid-state photodiodes, for IR response to 2400 nm
- CCD arrays for rapid acquisition and fast fluorescence Excitation Emission Matrix (EEM) fingerprinting
- InGaAs arrays for rapid NIR acquisition and EEM fluorescence

The ideal fluorescence instrument for nanomaterial characterization

Your best answer to analyzing your mixtures of nanomaterials...

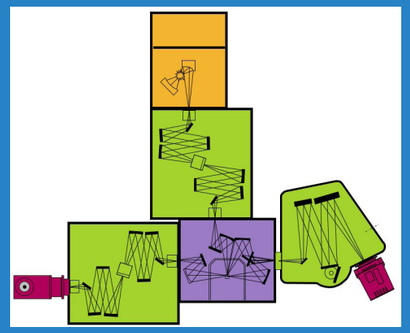
...whether single-walled carbon nanotubes, quantum dots, or nanocrystals. Optimized for detecting nanomaterials near-IR fluorescence, the Nanolog modular spectrofluorometer can help you determine their composition and structure. Based on the proven technology of the world-renowned Fluorolog® from HORIBA, the Nanolog is designed to give you a long life of reliable service and expert assistance.

Modularity

Create your own customized Nanolog from a proven series of components to suit your needs. The Nanolog is a modular instrument, which means that you decide the arrangement of the basic building blocks to create your ideal spectrofluorometer for your experiments. Choose the source, single- or double-grating excitation monochromator, sample compartment with a host of accessories, iHR320 emission spectrometer and optional second monochromator, and detector. No other company offers such a variety of instrument configurations tailored precisely for your experiment and budget.

Recommended configurations

The Nanolog 3-22-iHR, pictured here, is configured with a double-grating excitation and emission monochromator, plus an imaging spectrograph for a second emission channel.



Schematic shows a highly versatile Nanolog equipped with a 450 watt xenon lamp housing, double excitation monochromator for ultimate stray light rejection, T-Format sample compartment with multichannel iHR320 imaging spectrograph equipped with a Symphony NIR InGaAs array detector and a T-Side double emission monochromator with a PMT detector for ultimate sensitivity and stray light rejection.

Automation

The Nanolog is easy to use!

The Nanolog is self-calibrating. Wavelengths and slits, accessories and sample turrets are all automatic, so you don't have to worry about reproducible settings.

Our FluorEssence™ software is a powerful data acquisition package, further enhanced with Nanosizer™. Featuring our patented double-convolution-integral algorithm specially designed for determining chirality and diameter of single walled carbon nanotubes, gives you the most advanced nanomaterials system ever built.

FluorEssence:

- Simplified drop-down menus
- Detector-algebra for customized data acquisition
- Matrix scanning for 3-D data
- Real-time control for instant effects of changing the hardware
- Contour maps and 3-D perspective plots
- Curve-fits
- Deconvolution
- Smoothing
- Excitation and emission correction
- Derivatives and integration
- Standard arithmetic

Nanosizer:

- 3-D spectral surface simulation
- Simultaneous analytical simulation of spectral surfaces
- Rapid preliminary scanning to recognize peaks and their shapes for easy model fitting
- Complete, easy-to-edit model-parameter table for nanotube mixtures
- Nanotube species recognition with editable library
- Nanotube species recognition with user's analytical simulations
- Complete reports and charts in common spreadsheet format
- Optional "enhanced" fitting-engines for statistically robust simulations

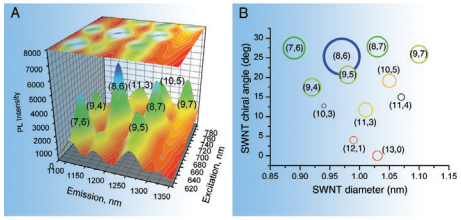
Exclusivity

No other company offers the wide variety of multi-channel detectors, sources, monochromators, and software to build an equivalent, powerful instrument. Who else can supply the applications support and service to get the full potential from your Nanolog? HORIBA Scientific has full applications laboratories in the USA, Europe, and Asia, plus affiliates and representatives the world over. You can rest assured that you have the support you expect only from HORIBA.

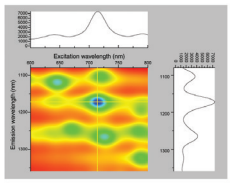
Real nanomaterials performance

Single-walled carbon nanotubes come in a huge variety of structures and diameters. With a sample of these nanotubes, the Nanolog can run an excitation-emission matrix scan. With the finished scan, you transfer these parameters to our exclusive Nanosizer software, which automatically determines the chirality and diameter from the spectral landscape.

Here is an actual scan and complete analysis run on a Nanolog:



Emission-excitation scan of a mixture of single-walled carbon nanotubes. Plot A is the spectral landscape recorded by the Nanolog; Plot B is the structural assignment determined by the Nanosizer software. Diameters and colors of circles in plot B are related to peak-intensities in plot A.



Screen-capture from FluorEssence data-acquisition and analysis software showing selected excitation and emission spectra centered on the intense peak emitted from the (8,6) species of carbon nanotube determined in Plots A and B.

Nanolog Specifications

All-reflective optics Nanolog fluorescence spectrometer for perfect focus at all wavelengths from the UV to NIR

Excitation Sources	Choice of: • 450 W xenon short-arc lamp housing with off axis ellipsoidal collector and optional pulsed xenon lamp enhancement (for time resolved phosphorescence) • 75 W xenon PowerArc™ lamp housing with enveloping ellipsoidal collector. **Note: The Sensitivity Specification listed below is the same with either the 450 W xenon or the 75 W xenon due to the enhanced collection efficiency of the PowerArc!**	
Excitation Monochromators	Choice of: • 180 mm Czerny-Turner monochromator with kinematic gratings and all-reflective optics in either single or double monochromator configuration (the 360 mm focal length double monochromator is recommended for the highest stray-light rejection and sensitivity). • iHR320 triple-grating turret 320 mm spectrometer with one or two entrance ports. **Note: Specifications here are based on 180 mm monochromator with standard 1200 grooves/mm grating blazed at 330 nm. Other gratings are available.**	
	Resolution: 0.2 nm	
	Accuracy	0.5 nm
	Speed	150 nm/s
	Range	0–1300 nm mechanical range; throughput based on grating's blaze
	Bandpass	Set automatically (0–30 nm single-grating, 0–15 nm double-grating)
Sample Compartment	All reflective optics sample compartment with single cuvette sample compartment tray for quick replacement with variety of optional sample holders. Reference photodiode for excitation correction from 240–1000 nm. Optional front-face detection for highly turbid samples in solution. Optional T-Format detection to allow optional second emission-detection channel.	
Emission Imaging Spectrograph	iHR320, for multi-channel acquisition, with triple-grating turret. Can be configured with one or two exit ports each for multi-channel or single channel detectors. Equipped with 150 grooves/mm grating for multi-channel detection of entire emission spectra with a single acquisition.	
	Resolution	0.2 nm
	Accuracy	0.3 nm
	Range	0–1500 nm mechanical range (using a 1200 grooves/mm grating and single channel detector)
Multichannel Detectors	Choice of up to two of the following: • Symphony™ IGA, 512 pixels, 800 to 1,700 nm, LN-cooled • Symphony Extended IGA, 512 pixels, 1,100 to 2,200 nm, LN-cooled • Syncerity™ CCD, 1024 x 256 pixels, TE-cooled (-60oC) • Synapse Plus™ CCD, 1024 x 256 pixels, 200 to 1,100 nm, TE-cooled (-80 °C) • Symphony CCD, 1024 x 256 pixels, LN-cooled	
Optional T-Side Emission Monochromator for Single Channel Detectors	Specifications are the same as excitation monochromator above[1]	
Single Channel Detectors	Choice of: • Room temperature PMT housing with R928 (185 to 850 nm) or R13456 (185 to 950 nm) • TE-cooled PMT housing with R2658 (185 to 1,050 nm) • TE-cooled PMT housing with H10330-45 (950 to 1,400 nm) or H10330-75 (950 to 1,700 nm) • LN-cooled PMT housing with R5509-43 (300 to 1,400 nm) or R5509-73 (300 to 1,700 nm) • LN-cooled IGA (1.7) detector, 800 to 1,550 nm • LN-cooled extended IGA(1.9) detector, 1,000 to 1,750 nm • LN-cooled extended IGA(2.1) detector, 1,000 to 2,000 nm • LN-cooled extended IGA(2.6) detector, 1,000 to 2,400 nm	
Software	Windows™-based FluorEssence™ software supplies all scanning, time-based, and accessory data acquisition plus complete control of all hardware, plus Nanosizer™ for fitting of single-walled carbon nanotube spectra to known library to determine chiralities and diameters.	
Sensitivity	Water Raman Signal-to-Noise Ratio of 15,000:1 (FSD method), 350 nm excitation, 5 nm bandpass, 1 second integration, no filters or averaging, with R928P photomultiplier tube.	

info.sci@horiba.com **horiba.com/nanolog**

HORIBA Scientific

USA: +1 732 494 8660
UK: +44 (0)1604 542 500
China: +86 (0)21 6289 6060
Taiwan: +886 3 5600606
France: +33 (0)1 69 74 72 00
Italy: +39 06 51 59 22 1
India: +91 80 41273637
Brazil: +55 (0)11 2923 5400
Germany: +49 (0) 6251 8475 0
Japan: +81(75)313-8121
Singapore: +65 (0)6 745 8300
Other: +33 (0)1 69 74 72 00