HORIBA JOBIN YVON
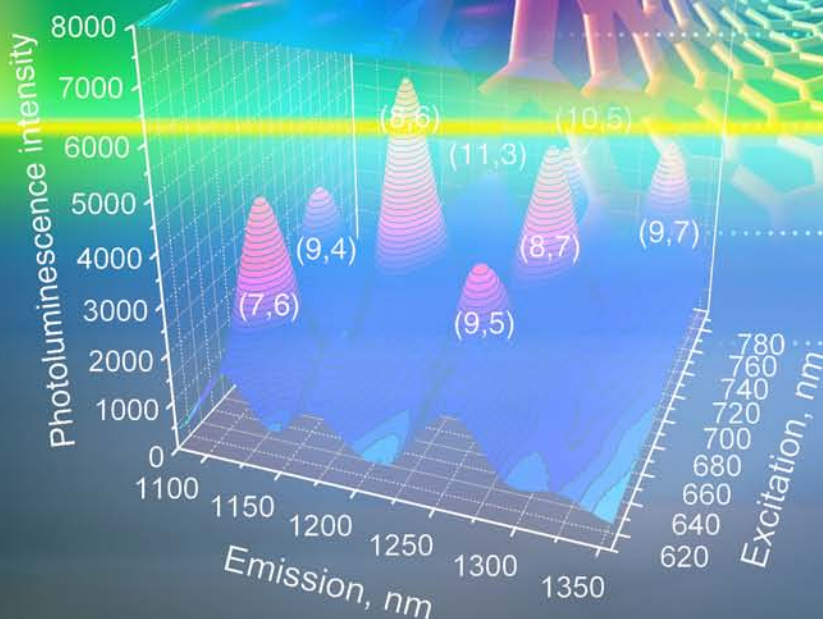
NanoLog™

The World's Most Sensitive Spectrofluorometer for Nanomaterials

HORIBA Jobin Yvon presents the NanoLog™

Your best answer to analyzing your mixtures of nanomaterials, whether single-wall 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 Spex® Fluorescence, 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 spectrofluorometers for your experiments. Choose the source, single- or double-grating excitation monochromator, sample compartment with a host of accessories, TRIAX 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
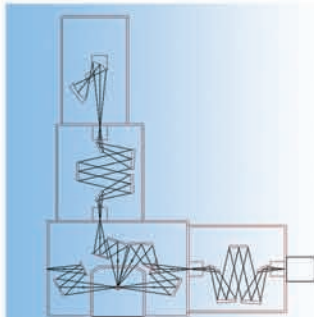
Good

The NanoLog™ 3-11, with single-grating excitation and emission monochromators and IGA-020 near-IR solid-state photodiode (800–1500 nm) for economical studies on nanomaterials
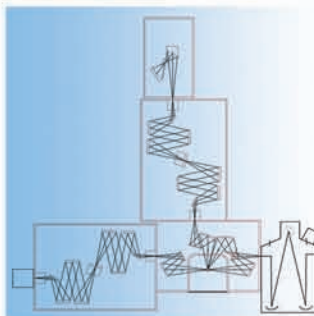
Best

The NanoLog™ 3-22-TRIAX, with double-grating excitation and emission monochromators, plus an imaging spectrograph for a second emission channel. Detectors are the extended InGaAs array for sensitive, rapid detection (1100–2200 nm), and the FI-UV for recording emission from the UV through near-IR (200–1000 nm).

Versatility

...with NanoLog™ detectors

- Photomultiplier tubes, both thermoelectrically and liquid-N_2 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
- InGaAs arrays, both standard and extended ranges

Automation

The NanoLog™ is easy to use!

Hardware 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. Software Our NEW FluorEssence™ software is a powerful data-acquisition package. Add to that our NEW Nanosizer™ with our patented double-convolution-integral algorithm specially designed for determining chirality and diameter of single-walled carbon nanotubes, and you get the most advanced nanomaterials system ever built.

FluorEssence™ includes:
- 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™ includes:
- 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 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 Jobin Yvon 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 Jobin Yvon.

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™:
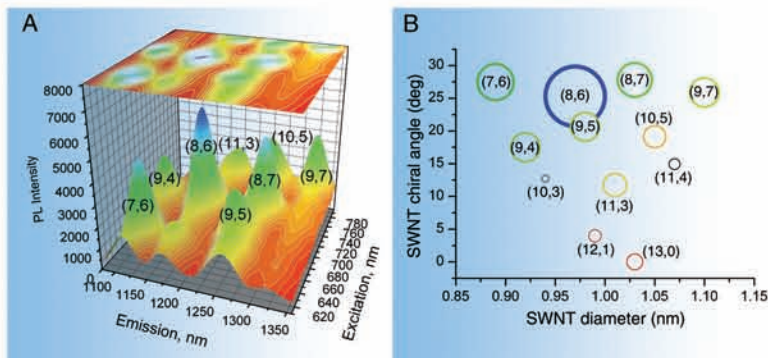
Emission-excitation scan of a mixture of single-walled carbon nanotubes. Plot A is the spectral landscape recorded by the NanoLog™; plot B is the structural assignment determined by the Nanosizer™ software. Diameters and colors of circles in plot B are related to peak-intensities in plot A.
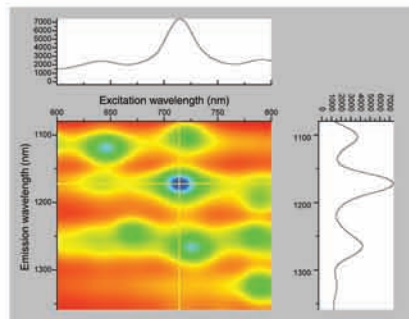
Screen-capture from FluorEssence™ data-acquisition and analysis software showing selected excitation and emission spectra centered on the intense peak emitted from the (8,6) species of carbon nanotube determined in Plots A and B.

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Specifications

Excitation Source

450 W xenon short-arc. Collection and focusing by off-axis mirror for maximum efficiency at all wavelengths.

Excitation Monochromator

Czerny-Turner with kinematic gratings and all-reflective optics. Optional double-grating units available for highest stray-light rejection and sensitivity. (Specifications based on 1200 grooves/mm grating, but 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
Gratings	500 nm blaze for excitation (300–1200 nm range); other gratings available for different ranges.
Bandpass	Set automatically (0–30 nm single-grating, 0–15 nm double-grating) with auto-calibration on start-up.

Sample Compartment

T-box design to allow second emission-detection channel. Gap-bed removable for sampling-accessory replacement. Optional front-face detection.

Emission Imaging Spectrograph

TRIAX, for multi-channel acquisition, with triple-grating turret. Aspheric optical correction practically eliminating astigmatism. (Specifications based on 150 grooves/mm gratings in a double-grating monochromator. Other gratings are available.)

Resolution	4.2 nm
Accuracy	0.3 nm
Range	0–1500 nm mechanical range (using a 1200 grooves/mm grating); throughput based on grating's blaze
Standard gratings	1200 grooves/mm, 500 nm blaze; 600 grooves/mm, 1000 nm blaze; 150 grooves/mm, 1200 nm blaze.

Detectors

Photodiode for excitation correction from 240–1000 nm. Standard emission detector is InGaAs multi-channel array detector for rapid emission spectra. Optional IGA-020 InGaAs photodiode for economical scanning from 800–1550 nm. Other PMTs to 1700 nm. Other detectors for higher-wavelength emissions.

Software

Windows™-based FluorEssence™ supplies all scanning, time-based, and accessory data-acquisition plus complete control of all hardware. Nanosizer™ for fitting of single-walled carbon-nanotube spectra to known library to determine chiralities and diameters.

Sensitivity

Steady-state gives a water-Raman peak *S/N* of 4000:1 at 397 nm, with 5 nm bandpass and background noise 1st standard deviation at 450 nm, on R928P photomultiplier tube. (When comparing *S/N*, be sure that all settings and hardware are the same. For a full explanation on comparison of *S/N*, please see our *Application Note F-20*, "How to Select the Best Spectrofluorometer".)

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(All HORIBA Jobin Yvon companies were formerly known as Jobin Yvon)

Explore the future

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