Thermo Scientific iXR Raman spectrometer

The Raman spectrometer developed for multi-modal analysis

The Thermo Scientific™ iXR™ Raman spectrometer is specifically designed for combination with other analytical techniques, to produce multi-modal analyses. Raman spectroscopy provides the extra dimension of chemical composition and structure of a sample, complementary to the analysis of other techniques.

MARSXR, comprised of an iXR spectrometer interfaced to a Thermo Scientific™ HAAKE™ MARS™ Rheometer

Multi-modal XPS-Raman system, comprised of an iXR spectrometer interfaced to a Thermo Scientific™ Theta Probe X-Ray Photoelectron spectrometer

iXR Raman spectrometer

- Based on DXR Raman components
- Interface to other instruments by free space coupling
  - Lens tubes, mirrors and objectives
- Interchangeable lasers, gratings and filters to optimize laser wavelength for the measurement

Performance specifications

Wavenumber accuracy	+/-2 cm^{-1}

Physical dimensions

Width	29 cm
Depth	44 cm
Height	37 cm
Weight	25 Kg

Spectrograph

Design	Triplet spectrograph	No moving parts
Spectral dispersion	Full range grating	Average 2 cm^{-1} /CCD pixel element
	High resolution grating	Average 1 cm^{-1} /CCD pixel element
Aperture	Four software selectable apertures	25 and 50 um confocal pinhole apertures; 25 and 50 um slit apertures

DXR family shared component specifications

The iXR Raman Spectrometer is based on the same reliable DXR design, allowing users to easily exchange pre-aligned laser, filter and grating components in the spectrometer.

General system features

Lasers	Multiple excitation lasers	Supported wavelengths 455 nm, 532 nm and 785 nm
	Laser safety	Class 3B
	Laser power regulator	Active feedback system to control absolute laser power delivered to the sample Facilitates laser-to-laser and system-to-system reproducibility
Replaceable components	Smart components	Pre-aligned user-exchangeable system components (lasers, filters, gratings) lock into place and are automatically optimized with an internal calibration tool Software checks for laser, grating and filter compatibility Software restores alignment and calibration settings when lasers are exchanged
Computer interface		Through single USB 2.0 connector

Lasers

General	System alignment	Automatically optimized upon exchange
	Fine laser power control	Power controlled and reported at samples in 0.1 mW increments
	Filtering	All lasers include laser fine filters to prevent laser artifacts from showing in measured spectra

Lasers	455 nm	532 nm	785 nm (high brightness)	785 nm (high power)
Laser type	Frequency-stabilized single mode diode laser	Diode-pumped solid state (DPSS)	Frequency-stabilized single mode diode laser	Multiple transverse mode, narrow - spectrum diode
Power laser output	Maximum power at sample 6 mW	Maximum power at sample 10 mW	Maximum power at sample 24 mW	Maximum power at sample 150 mW
Lifetime warranty	12 months	12 months	12 months	12 months
High brightness	Yes	Yes	Yes	No
Center wavelength	455 +/-0.2 nm	532 +/-1 nm	785 +/-0.2 nm	785 +/-0.5 nm
Transverse mode	TEM_{00}	TEM_{00}	TEM_{00}	TEM_{00}
Beam quality (M^2)	<1.5	<1.3	<1.5	N/A

Gratings

Filters

System performance - special range and resolution

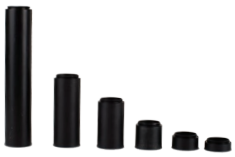
Gratings		Lasers			
		455 nm	532	785 nm (high brightness)	785 nm (high power)
Full range	Resolution[1]	5.0 cm^{-1} FWHM	5.0 cm^{-1} FWHM	5.0 cm^{-1} FWHM	5.0 cm^{-1} FWHM
	Upper cutoff	3500 cm^{-1}	3500 cm^{-1}	3300 cm^{-1}	3300 cm^{-1}
	Lower cutoff[2]	85 cm^{-1}	50 cm^{-1}	50 cm^{-1}	50 cm^{-1}
High resolution	Resolution		2 cm^{-1} FWHM	2 cm^{-1} FWHM	
	Upper cutoff		1800 cm^{-1}	1800 cm^{-1}	
	Lower cutoff		50 cm^{-1}	50 cm^{-1}	
Extended range	Resolution		11 cm^{-1} FWHM		
	Upper cutoff		6000 cm^{-1}		
	Lower cutoff		50 cm^{-1}		

[1]The system spectral resolution is measured using ASTM Method E-2529-06.

The difference between system spectral resolution and spectrograph resolution is primarily determined by the excitation bandwidth.

[2]50% maximum transmitted power.

iXR opto-mechanical interface parts for free space coupling



Lens tubes
6”, 3”, 2”, 1”, 0.5” and 0.3”
left to right

90º flat mirror, coated for maximum reflectivity

Example of a long working distance objective mounted on lens tubes with turning mirror

Available Thermo Scientific software options

Thermo Scientific™ OMNIC™ Software	Full featured molecular spectroscopy acquisition and analysis software
OMNIC Series Software	Supports time-evolved data collection
OMNIC Macros/Pro Software	Interface to advanced Visual Basic programming

Instrument alignment, calibration and optimization

Alignment calibration[3]	Entirely software controlled	Autoalignment technique aligns laser and Raman emission
	Wavelength	Software-controlled calibration using multiple neon emission lines
	Laser frequency	Software-controlled calibration using multiple polystyrene Raman peaks
	Intensity	Software-controlled calibration using standardized white light source
Automatic intensity correction		Consistent instrument response with all excitation lasers
Laser power regulator		Absolute excitation laser power at the sample controlled by OMNIC software laser power at sample reported in mW
Automatic fluorescence correction		Compensates for fluorescence prior to data analysis
User interface	Smart background	Automatically accounts for background noise, improving spectral quality

[3]Standards incorporated into patented alignment tool

Instrument serviceability

Replacement lasers	User-installable
Instrument performance monitoring	Software provides real-time status of system readiness, including error condition checks and diagnostics
Additional laser, filter, grating sets	User installable

Other specifications

Environmental	Minimum temperature: 16ºC
	Maximum temperature: 27ºC
	Humidity range: 20-80%
Electrical	100-240 V AC, 47-63 Hz
Regulatory	CE, UL/CSA/ETL, 21 CFR1040.10
Warranty	12-month warranty standard, extended warranties available

The iXR Raman spectrometer is a class 3B laser product.

Find out more at **thermofisher.com/ixr**

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