Anton Paar

Cora
Family

Raman Spectrometers

Experienced and forward-thinking: The Cora series of Raman spectrometers

Raman spectroscopy is ideal for chemical fingerprinting and identification of substances even through packaging and bottles as well as in aqueous solutions. It is a non-contact, non-destructive analytical technique requiring little to no sample preparation.

Cora, the new Raman spectrometer series from Anton Paar, is designed for quick quality control, identification, qualitative and semi-quantitative measurements. The products are already widely used in various industries, from pharmaceuticals and chemicals to life science, material analysis, and research.

The Cora series, originally designed in Silicon Valley, incorporates many years of experience in spectroscopy in telecom, laboratory, and process environments. Cora spectrometers excel with high performance and multiple excitation lasers packed in a rugged housing with a very small footprint.

Cora series of Raman spectrometers:
Great performance on a compact footprint.

Cora 5X00 series: Dual and single wavelength

Cora 5100 | 5200 | 5300

- Compact and transportable (battery option)
- Three single wavelength options: 532 nm, 785 nm, or 1064 nm
- Direct measurement control and identification on the instrument touchscreen

Cora 5500 | 5600 | 5700

- Three different wavelength combinations: 532/1064 nm, 785/1064 nm, and 532/785 nm
- Maximum Raman signal with minimal fluorescence
- Automated wavelength change to simplify your measurement routine

Cora 5X00 Fiber

- Fiber-optic probe for measurements outside the instrument
- Full flexibility to characterize samples directly in the field, e.g. through bottles, vials, or containers

Cora 7X00 series: High performance

Cora 7100 | 7200 | 7300

- Ideal for advanced identification, as well as high-precision measurements and characterization
- Three different wavelengths: 532 nm, 785 nm, and 1064 nm
- Sub-ambient or deep-cooled detectors for maximum signal-to-noise ratio

Highlights of the Cora 5X00 series

Compact

Are you always short of bench space in your lab? The Cora 5X00 series helps you save room. The spectrometer only takes up roughly as much space as an open lab notebook.

Robust

You care a lot about your instruments but they should not require a dedicated, vibration-free environment? The Cora spectrometers are extremely robust and have no moving parts except the fan, making them reliable partners in the lab, warehouse, or on the production floor.

Transportable

Do you require identification or confirmation of substances outside your lab? With its battery option, you can take a Cora 5X00 spectrometer everywhere you want. It also sits happily on a cart so you can wheel it through the warehouse.

Efficient

Do you require immediate identification or clear spectra within seconds? High-quality optics from laser to spectrograph and detector produce clear results in minimum time.

Individual

You want maximum Raman signal and minimum interference from fluorescence in your sample spectrum? Pick your wavelength from a choice of 532 nm, 785 nm, or 1064 nm with Cora 5100, 5200, or 5300.

Dual

You measure samples with different scattering and fluorescence behavior? Get the best results by picking the optimal wavelength for each sample on your dual-wavelength instrument. With Cora 5500, 5600, or 5700, changing the wavelength requires only a click on the screen – there is no need to readjust the optics every single time to obtain the best possible spectrum.

Flexible

You want to do “drive-by” inspections of your incoming goods? Or measure through glass or plastic containers? The fiber-optic probe of Cora 5X00 Fiber gives you flexibility to measure in a standard radius of 1.5 m. The Active Trigger fiber-optic probe automatically starts a measurement when the trigger is pulled.

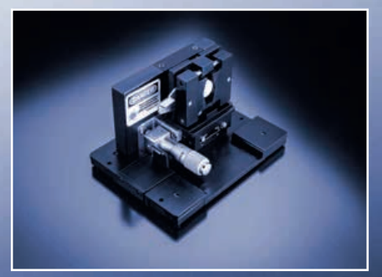
Supportive

You expect easy and straightforward instrument software control? The Cora 5X00 series is operated via touchscreen. The straightforward software is easy to master and fail-safe. With the WiFi option, an external PC can be connected to give you a large and comfortable screen to work on.

Accessories

You measure liquids, powders, solids, semi-solids, or pills? Or all of those? Enjoy a variety of different sample holders you can change within seconds. They jump into place with magnets and position themselves accurately for immediate sample analysis – there is no need to readjust.

- Sample insert with powder and liquid vial holder in flexible shapes and sizes to fit your vials (round, rectangular, square, different diameters)
- Sample insert with pill holder
- Solid sample insert
- Fiber-optic probe (additional vial holders available)
- Active Trigger fiber-optic probe



Highlights of the Cora 7X00 series

Exciting

You need to analyze your samples with high precision and repeatability? The Cora 7X00 spectrometers deliver spectral information without internal algorithms processing spectra or suppressing disturbances. Maximize your signal and minimize fluorescence by choosing the optimal excitation wavelengths for the type of sample you measure – 532 nm, 785 nm, or 1064 nm – and gather the genuine spectrum for your analysis.

Unraveling

You require clearly separated peaks for your research or industrial measurements? Dual transmission gratings provide high resolving power for a resolution of 4 cm^{-1} to 5 cm^{-1} at 532 nm and 785 nm excitation wavelengths and 10 cm^{-1} to 15 cm^{-1} with 1064 nm excitation.

Silent

You are interested in signal, not noise? Cora features just the right ultrasensitive, low-noise detectors for your measurements: a sub-ambient CCD for 532 nm, soft- or deep-cooled CCD for 785 nm, or a deep-cooled InGaAs detector for 1064 nm.

Condensed

You have limited space or want to put the spectrometer on a rack? The Cora 7X00 series incorporates the highest quality optics with soft- or deep-cooled detectors integrated into the most compact setup.

Capable

You need to rely on clear spectra and short acquisition times? The high-throughput volume phase grating works in transmission, ensuring high sensitivity and fast spectral acquisition.

Usable

You prefer the instrument to do its job and like to have all data straight on your PC? The Cora 7X00 series is operated by a straightforward PC software connected via USB.

Strong

You are looking for a durable instrument? This robust spectrometer has no moving parts except the fan. It is mounted in a robust housing protecting the optical system.

Flexible

You need to measure samples outside the instrument? With its fiber-optic probe, the spectrometer can be placed up to 1.5 m away from the sample. Different vial holders for liquids and powders easily attach to the probe to suit different samples.

Applications and industries

Raman spectra from the Cora spectrometers contain a wealth of information for analysis in different industries and fields of use.

The instruments give you the possibility to measure a great variety of samples because Raman spectroscopy is very tolerant to the different properties of a sample.

Sample states:
It is possible to characterize pure samples as well as dissolved substances, mixtures, emulsions, suspensions, powders, etc.

Physical conditions:
You can measure liquids as well as gels, semi-solids, and solids.

Measuring environments:
Cora Raman spectrometers provide the flexibility for contactless measurement (e.g. in a plastic container, through glass, in a vial), on plate, or in vivo (e.g. microorganisms).

	Type of analysis	How	Example industries	Example fields of use	Samples
	Automatic identification and confirmation	Measured Raman spectra are compared automatically with user-built, factory, or third-party spectral libraries.	- Chemicals - Pharmaceuticals - Homeland security and defense - Art and archaeology	- Confirmation for incoming goods inspection - Quick checks on ingredients - Identification of hazardous materials - Authentication and anti-counterfeiting	- Organic and inorganic chemicals - Active pharmaceutical ingredients - Explosives, poisons, chemicals - Gemstones
	Structural characterization	Identification of functional groups, their chemical environment, and stereochemical configuration.	- Life science and biology - Pharmaceuticals - Academic and industrial research	- Study of proteins, DNA - Structural analysis of newly synthesized molecules - Material analysis	- Proteins, microorganisms - Organic molecules - Nanomaterials
	Study of polymorphs	Different crystal modifications and packing, hydration and solvation can show as changes in Raman spectra.	- Pharmaceuticals - Flavors and essential oils - Academic and industrial research	- Drug efficiency testing - Control of sensory properties - Material analysis	- Drugs, excipients - Spray-dried flavors - Carbon nanoparticles, soot, catalysts
	Analysis of oxidation behavior	Oxidation or effects by microorganisms lead to different Raman signals.	- Food - Beverage industry - Minerals and mining	- Shelf-life determination, quality inspection - Control of sensory properties (taste, texture) - Monitoring of the alteration of geological materials	- Edible fats and oils - Alcoholic and nonalcoholic drinks - Rocks and minerals
	Quantification of multi-component mixtures	Raman spectra of samples with known concentrations are measured and used to create a quantification model using external chemometric software.	- Chemicals - Petroleum - Pharmaceuticals	- Quick checks for concentrations - Mixing ratio determination - Content analysis	- Binary and multi-component solutions - Lubricants, bio-fuel - Tablets, pills, gel caps
	Reaction monitoring	Changes in compositions influence the Raman signal.	- Chemicals - Petroleum - Pharmaceuticals	- Process development for chemicals or pharmaceuticals - Chemical reaction development - Process optimization (e.g. gasoline mixing, refinery flow process control, chemical production)	- Samples taken from the bioreactor - Organic and inorganic substances - Gasoline and petroleum samples
	Correlation of physical and chemical properties, phase transitions	Spectra of samples with known chemical/physical properties are used to create a model with external chemometrics software.	- Polymers - Adhesives - Glues	- Correlation of molecular weight and viscosity - Monitoring of curing process - Correlation of glass transition temperature	- Polymers - Resins - Glues

Specifications

	Single-wavelength			Dual-band			Single-wavelength			
	Cora 5100, Cora 5100 Fiber	Cora 5200, Cora 5200 Fiber	Cora 5300, Cora 5300 Fiber	Cora 5500, Cora 5500 Fiber	Cora 5600, Cora 5600 Fiber	Cora 5700, Cora 5700 Fiber	Cora 7100	Cora 7200	Cora 7200 Deep Cooled	Cora 7300 Deep Cooled
OPTICAL										
Excitation wavelength	532 nm	785 nm	1064 nm	532 nm and 785 nm	532 nm and 1064 mm	785 nm and 1064 nm	532 nm	785 nm	785 nm	1064 nm
Spectral range	200 cm^{-1} to 3500 cm^{-1}	100 cm^{-1} to 2300 cm^{-1}		200 cm^{-1} to 3500 cm^{-1} for 532 nm 100 cm^{-1} to 2300 cm^{-1} for 785 nm and 1064 nm			100 cm^{-1} to 3200 cm^{-1}	100 cm^{-1} to 3200 cm^{-1}	100 cm^{-1} to 2000 cm^{-1}	200 cm^{-1} to 1800 cm^{-1}
Resolution (FWHM)	9 cm^{-1} to 12 cm^{-1}	6 cm^{-1} to 9 cm^{-1}	12 cm^{-1} to 17 cm^{-1}	9 cm^{-1} to 12 cm^{-1} for 532 nm 6 cm^{-1} to 9 cm^{-1} for 785 nm 12 cm^{-1} to 17 cm^{-1} for 1064 nm			4 cm^{-1} to 5 cm^{-1}	4 cm^{-1} to 5 cm^{-1}	3 cm^{-1} to 4 cm^{-1}	10 cm^{-1} to 15 cm^{-1}
Laser power	50 mW	0 mW to 450 mW (adjustable)		0 mW to 50 mW for 532 nm 0 mW to 450 mW for 785 nm and 1064 nm			50 mW	0 mW to 450 mW (adjustable)	0 mW to 450 mW (adjustable)	0 mW to 450 mW (adjustable)
Spectrograph	f/2 Transmission Volume Phase Grating									
Integration time	5 ms to 600 s		1 ms to 20 s	5 ms to 600 s for 532 nm and 785 nm 1 ms to 20 s for 1064 nm			5 ms to 600 s	5 ms to 600 s	5 ms to 900 s	1 ms to 30 s
Wavelength calibration	Automatic via software									
Detector array	2048 px CCD	2048 px CCD	256 px InGaAs	2048 px CCD for 532 nm and 785 nm | 256 px InGaAs for 1064 nm			2048 px x 64 px CCD	2048 px x 64 px CCD	2048 px x 64 px CCD	512 px InGaAs
Detector cooling	No cooling for 532 nm, approx. -5 °C for 785 nm and 1064 nm						approx. -5 °C	approx. -5 °C	approx. -55 °C	approx. -55 °C
PHYSICAL										
Dimensions (DxWxH)	305 mm x 380 mm x 168 mm; (12 in x 15 in x 6.6 in)						411 mm x 426 mm x 151 mm (16 in x 17 in x 6 in)			
Weight	~6.4 kg (14 lb)			~7.3 kg (16 lb)			~13 kg (28.6 lb)	~13 kg (28.6 lb)	~15 kg (33 lb)	~15 kg (33 lb)
Operating ranges	0 °C to 40 °C; 0 % RH to 80 % RH									
ELECTRICAL										
A/D converter	16 bit									
Power consumption	<25 W			<30 W			<25 W	<25 W	<75 W	<75 W
Battery (optional)	Lithium ion			Lithium ion			n/a			
Power input	110 / 230 V AC									

	Single-wavelength			Dual-band			Single-wavelength			
	Cora 5100, Cora 5100 Fiber	Cora 5200, Cora 5200 Fiber	Cora 5300, Cora 5300 Fiber	Cora 5500, Cora 5500 Fiber	Cora 5600, Cora 5600 Fiber	Cora 5700, Cora 5700 Fiber	Cora 7100	Cora 7200	Cora 7200 Deep Cooled	Cora 7300 Deep Cooled
COMPUTER										
System control	Onboard touchscreen or external PC						External PC			
GUI	Cora 5000 Software (embedded)						Cora 7000 Software (PC)			
Data ports	USB 2.0 and Ethernet						USB 2.0			
Software development kit (optional)	n/a						DLL and sample code for C/C++			
Internal storage	16 GB						n/a			
Wireless connectivity	WiFi (optional)						n/a			
Security	Tiered password structure (3 levels), event logging, and reporting									
Operating system	Windows-based (32-bit or 64-bit)									
Spectral libraries	Factory library; user-defined; 3rd party options									
SAMPLING OPTIONS										
	Cora 5X00 - Direct sampling options									
Vial holder	Liquid- and powder vials and cuvettes (round with different diameters, square, rectangular)						n/a			
Pill holder	Solid or semi-liquid pills and capsules						n/a			
Solid sample holder	Measuring surface for solids or powders						n/a			
	Cora 5X00 Fiber and Cora 7X00: Fiber-optic Raman probes									
Fiber-optic trigger probe	Coaxial, AR-coated, filtered; trigger to start measurements						n/a			
Fiber-optic probe	Coaxial, AR-coated, filtered									
Probe vial holder set	Insert for vials, tubes, cuvettes for use on fiber-optic probe									

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